ICSD 2018

4TH INTERNATIONAL CONFERENCE ON SUSTAINABLE DEVELOPMENT

BOOK OF PROCEEDINGS

April 11 - 15, 2018 Athens

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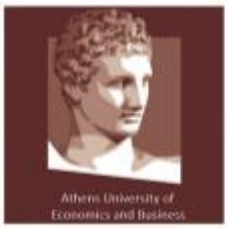

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WELCOME TO ICSD 2018

On behalf of the organizing committee, we are pleased to announce that the 4th International Conference on Sustainable Development (ICSD-2018) is held from April 11 to 15, 2016 in Athens -GREECE. ICSD 2018 provides an ideal academic platform for researchers to present the latest research findings and describe emerging technologies, and directions in Sustainable Development issues. The conference seeks to contribute to presenting novel research results in all aspects of Sustainable Development. The conference aims to bring together leading academic scientists, researchers and research scholars to exchange and share their experiences and research results about all aspects of Sustainable Development. It also provides the premier interdisciplinary forum for scientists, engineers, and practitioners to present their latest research results, ideas, developments, and applications in all areas of Engineering and Natural Sciences. The conference will bring together leading academic scientists, researchers and scholars in the domain of interest from around the world. ICSD 2018 is the oncoming event of the successful conference series focusing on Sustainable Development. The scientific program focuses on current advances in the research, production and use of Engineering and Natural Sciences with particular focus on their role in maintaining academic level in Engineering and Applied Sciences and elevating the science level. The conference's goals are to provide a scientific forum for all international prestige scholars around the world and enable the interactive exchange of state-of-the-art knowledge. The conference will focus on evidence-based benefits proven in clinical trials and scientific experiments.

Best regards,

Prof. Dr.Özer ÇINAR

CONTENT PAGE

Evaluation of Sustainability of Irrigation Areas in GAP Project with Existing Applications	1
Application of fly ash from fluidized bed combustion as addition for underwater concrete	7
Anti-Dumping Taxes and Their Effects in the European Union	12
Mainstreaming of Transgenders: Towards Well-Being for All	22
Social Networking Sites Usage among Undergraduate Students in relation to their Mental Health	26
How institutions create value for the rural marginalized person: A comparative analysis	31
Sustainability Strategies in the Health Sector	41
Social Sustainability in Food Supply Chains	46
Influence of a Turkish NGO on Sustainable Farming Supply Networks	59
Determination of Satisfaction due to Land Consolidation Projects of Yenipazar District in Aydin	69

Environmental Stresses Applied to Microalgae and Their Effect on Biomass, Lipid and FAME Composition	**76**
Global Sustainable Tourism Council Standards: As a Tool of Sustainable Cruise Tourism	**79**
Conventional Cotton Fiber Plant Breeding or Transgenic Cotton Fiber: The Situation in Turkey	**87**
Determination of Credit Rating Tendencies of Turkish SME's; A Survey on West-Mediterrenean Region Companies of Turkey	**93**
Development of A Financial Statement Based Credit Rating Methodology; A Research on Turkish SME's In Scope of East Mediterrenean Region	**100**
The Effects of Hydrogen Peroxide and Sodium Hypochlorite Oxidizing Treatments on the Color Properties of Naturally Colored Green Cotton	**108**
Sustainable Exploitation Of Corn Cob Wastes Through Acidogenic Fermentation	**119**
Analysis Of Perspectives And Awareness Of Accounting Students' Corporate Governance Concept	**125**
Demand, Relevance and Possibilities to Implement Renewable Energy Sources at the Industrial Sector of Paraná State Located in Southern Brazil	**133**

Control Of Freedom: Its Challenges To Wellness 140

Pesticides: A threat to survivability of earthworms 149

Inconsistencies And Deficiencies In The Waste Management Practices In Athens. An Intersectional Approach. 157

Tourism and Marine Protected Areas 162

Risk Quotient Based Analysis on the River Health: Case Study of Kelang River, Malaysia 169

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Evaluation of Sustainability of Irrigation Areas in GAP Project with Existing Applications

Mustafa Hakki Aydogdu[1], Veysel Gumus[2], Kasim Yenigun[2], Nihat Kucuk[3]

Abstract

The Southeastern Anatolia Project is the most comprehensive regional development project of Turkey that is applied in semi-arid region. The Project area covers almost 11% of Turkey, in terms of area and population. The main objective in regional development is to promote the welfare of both the region and the country through the sustainable use of water and land resources in the project area. Within the scope of the project, 22 dams, 19 HEPPs and 1.84 million hectares of irrigation areas are foreseen. GAP is expected to increase welfare of the Region. This will be achieved through the efficient and sustainable use of water and land resources. The GAP irrigations began in Harran plain. The 88.5% of the gravity irrigation is being done, and problems of water insufficiency in the lower parts of the plain, salinity problems in the middle and in the lower parts of the region are seen. As a results of these, water level increases in some areas and losses occur due to salinity and water insufficiency. On the other hand, because of the unplanned urbanization in Harran plain, both the amount of fertile agricultural land decreased and environmental pollution based on the living centers begin to be seen. There are structural problems arising from irrigation management and methods in Harran Plain, which creates a threat to sustainability. Pressurized and water saving irrigation systems should be introduced, irrigation training should be given to farmers, structural problems of irrigation associations should be solved and unintentional urbanization should not be permitted.

Keywords: Agriculture, GAP Project, Harran Plain, Irrigation, Sustainability, Turkey

1. INTRODUCTION

The living standards, economic activities, levels of welfare and development of people and societies both influence and are influenced by natural resources. Today, in many regions of the world, there is a problem of sustainability in natural resources, especially in water and soil resources, which puts great pressure on natural resources both in terms of quantity and quality [1, 2]. Rapid population growth, urbanization and industrialization are among the first reasons. Every country has its own human and natural resources, in agricultural production, primarily in the effort to ensure the nation's food security and then increase its welfare. Nowadays, what will be the quality, quantity and future levels of proficiency is one of the most debated questions and answers are sought about the natural resources in the world for sustainability. In other words, the main problem is the sustainable usage of resources. How much is enough, when these resources are evaluated together with present and future needs? [1]. Or, food security will not be provided in many parts of the world in the future and will the level of prosperity decline after the shortages of natural resources in terms of quantity and quality? Or will wars, scarcities and catastrophes be experienced more because of the inadequacy of natural resources in future? How will these problems be overcome? This global situation is becoming more and more worrying [3-6].

Regardless of the level of development, agriculture is a vital sector for every country. In addition to ensuring food safety, agriculture also has a great emphasis on employment and industry. One of the most important inputs of agriculture is water. The largest amount of water in the world is used in agriculture [7, 8]. The ratio in the world is around 70%, [9], while in Turkey is around 73% [10]. On the other hand, agricultural irrigation has gained a great deal of importance due to climate change and drought, which are beginning to occur globally more frequently. Agricultural irrigation has an important effect on increasing productivity in agricultural areas, accelerating growth based on economic and sustainable development and spreading social welfare [11]. Today, irrigation and

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management are increasingly important in agriculture, and 91.6% of the irrigation water in the world is surface irrigation and irrigation water efficiency is 45% [12]. Approximately 85% of the irrigated area which is constructed by the State is surface irrigation in Turkey [6].

Development projects are being implemented in order to ensure the development of certain regions that have development potential in terms of human and natural resources but which have not developed sufficiently, in terms of social, cultural and economical way. The potentials, resources, advantages, disadvantages, development projects, needs of each country and region are different from other countries and regions. Sustainable development can be achieved by balancing human and nature, without consuming natural resources, in a manner that will allow the development and the needs of future generations by programming today and future's development. Sustainable development is a concept that has social, ecological, economic, spatial and cultural dimensions [13].

2. THE SOUTHEASTERN ANATOLIA PROJECT, GAP

The area of the Southeastern Anatolia Project (its Turkish acronym, GAP) is known throughout history as a fertile crescent. The region covers the Euphrates-Tigris rivers basin and 9 provinces located in the Upper Mesopotamian Plain. The area and population size of the provinces within the GAP is around 11% of Turkey. The main objectives of the GAP are to increase the income level and quality of life of local people by evaluating the human and natural resources that the region possesses. Accordingly, to eliminate the development disparities between the region with the other regions of Turkey and to increase productivity and employment opportunities in rural areas. In this way, it contributes to the goals of economic development and social stability at the national level. GAP has been dealt with as a multi-sectoral and integrated program based on the development of the region's water and land resources. Within the scope of GAP, 22 dams, 19 hydroelectric power plants and 1.84 million hectares of irrigated agriculture were planned to be constructed. GAP is expected to increase the per capita income by 209% and increase the gross domestic product (GDP) by 409% in the Region [13]. The budget foreseen by the GAP is 32 billion dollars. The GAP Region has 7.5 million ha of land. Agriculture is the leading sector with 3.13 million ha of cultivated land, Agriculture is the leading sector with a 3.13 million ha of land in the GAP Region, GAP is the largest investment for regional development in the history of Turkey and fourth largest irrigation project in the world [14, 15]. The location of GAP project is given in Figure 1.

Figure 1. Turkey and GAP Region (Resource: GAP Administration, Anonymous).

With the GAP Master Plan, it has become a regional development project that includes investments in agriculture, industry, transport, education, health, rural and urban infrastructure. The project is based on the philosophy of sustainable human development aimed at creating an environment in which they can develop themselves for future generations. Providing justice at development, participation, environmental protection, employment, spatial planning, infrastructure development, public-private sector and public participation in investment applications are the main strategies of GAP. In this sense, GAP is being implemented as an integrated regional development project aimed at increasing the competitiveness of the region, strengthening economic and social integration, based on multi-sector, sustainable human development. The purpose of GAP is not only economic growth, is basically improving the quality of human life. All activities are assessed in terms of sustainability, including those contributing to economic growth, such as infrastructure development, agricultural and industrial development, environmental protection, natural resource development, social services. Within the scope of the Sustainable Development Program in the GAP Region; Promotion of agricultural sustainability and development of rural productivity and sustainable use of natural resources are among the main objectives.

Sustainable development includes efficient multifunctional agriculture, using environment-friendly and saving technologies and attention to quality and a socially acceptable rural development, simultaneously and managed in harmony with the production and protection [16]. In the GAP project, at the beginning of 2016, the irrigated area

reached 474,528 hectares; 45% of the irrigation target of the plan and 74% of the energy investments were achieved [13]. The GAP Region agricultural irrigation areas are given in Figure 2.

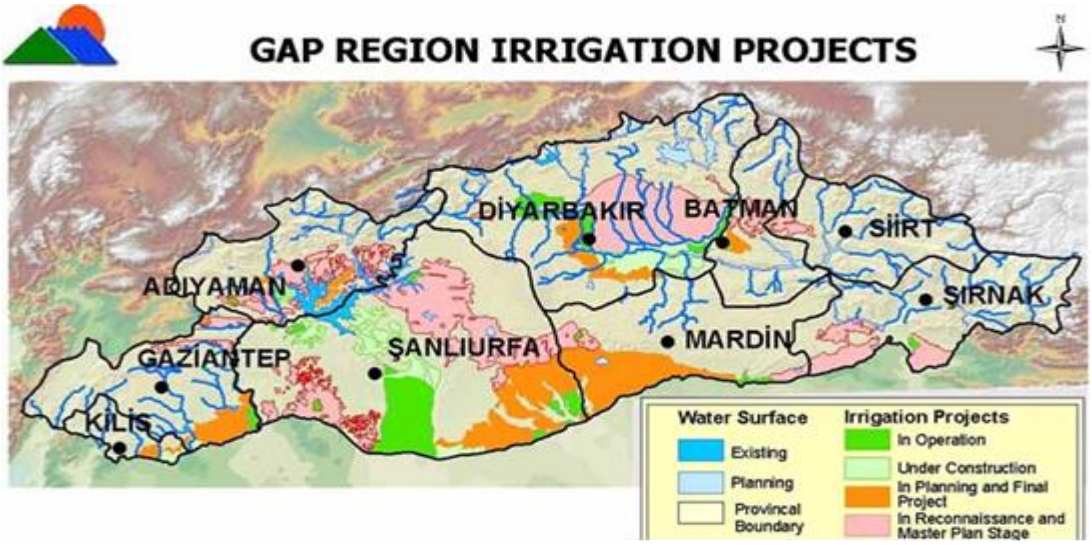

Figure 2. GAP Region irrigation areas (Resource: GAP Administration)

3. HARRAN PLAIN

Harran is the first area where irrigation is started within the scope of GAP and is about 10% of total irrigation areas and is located within the boundaries of Sanliurfa province. It is located at southeast part of Turkey at 375 meters of altitude that is the lowest altitude locations in the GAP. The average precipitation is between 300-365 mms and annual evaporation is 1,848 mms [17]. Although the topography of Harran is generally made up of flat and nearly flat land, it is possible to find places with slight hill features in places. It's simply a semi-arid area and to obtain a significant yield without irrigation is impossible.

3.1. Harran Plain Irrigations

Harran Plain is the research field that has 150,000 ha of irrigation areas. Irrigation has begun first time in Harran plain within the scope of GAP at 1994 with 30.000 hectares of the land. There are 22 water users' associations (WUAs) in the plain. Today, in the context of GAP-Harran irrigation, irrigated agriculture is being carried out in an area of approximately 168 thousand hectares together with the upper Harran irrigation. There are almost 22.000 farmers at irrigation areas according to farmers' registration system. The main crop type is cotton and followed by wheat and corn respectively in the plain. These three crops cover almost the 95% of the crop pattern of the plain. Especially cotton and corn products have high water consumptions and also Turkey is importer of this product group. Harran farmers' produce agricultural support products and the largest agricultural support is made of cotton that has share of almost with 70% in crop pattern, where mostly open surface irrigation is done in the Harran plain. With the current applications, it cannot be said that the expected benefits from the GAP-Harran Plain irrigation have been sufficiently provided. The satellite land image of Sanliurfa and Harran plain is given Figure 3.

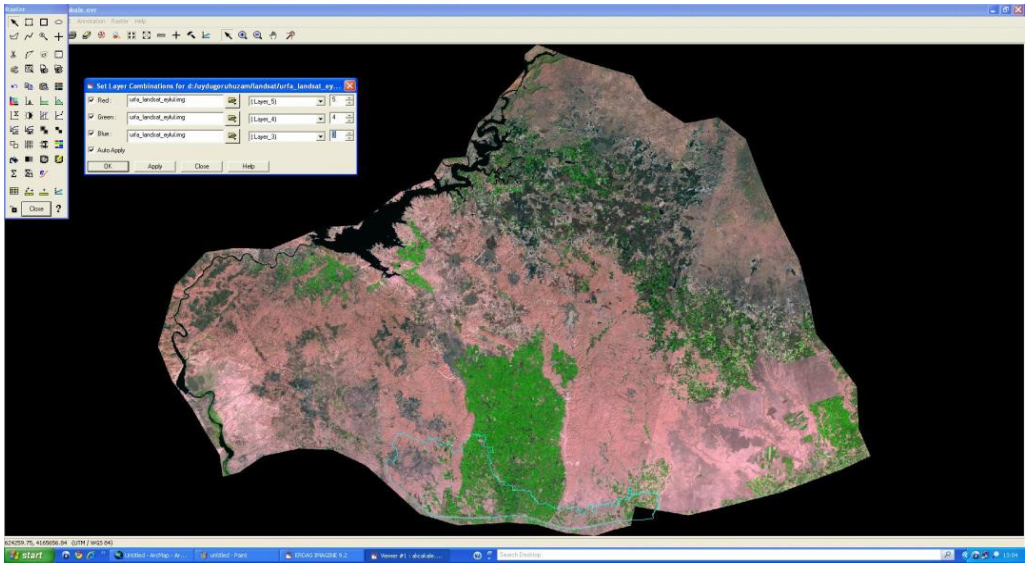

Figure 3. Landsat satellite image of Sanliurfa-Harran Plain

3.2. Problems in the Harran Plain Irrigations in terms of Sustainability

At the beginning of the problems of Harran Plain irrigation comes type of irrigation. In the field, surface irrigation is common and the rate of gravity irrigation is around 88%. Due to this irrigation type being made based on open channel irrigation, water transmission losses occur. On the other hand, the efficiency of irrigation in the field is also very low. The slope, which is generally between 0% and 2%, ranges between 2% and 6% in the northern, western and eastern parts of the plain and shows a pitting characteristic to the south. Due to gravity irrigation, underground water level rises, as a result of this, salt formation and desertification risk arises due to the high temperature which has the highest yearly average temperature of Turkey. In consequence, yield losses are experienced. Another important problem is the return waters and drainage problems caused by surface irrigation. This situation affects both quality and quantity of irrigation water negatively. On the other side, because of the excess surface irrigation, there are some areas in the lower parts of the plain that are not irrigated sufficiently due to irrigation water insufficiency. In these areas, returned and drainage waters are also used for irrigation that is leading to product losses and it may cause deterioration of the soil texture.

There are drainage problems due to improper irrigation methods that is mainly furrow irrigation in Harran plain [18] due to excessive water usage. The Imambakir WUA is located in the lowest altitude of the Harran plain where groundwater level is high, intensive salinity is observed around Bozyazi and Tuzluca areas due to excessive irrigation and results to significant yield losses [19] and about 13154 tones salt was added to soil annually in this area [20]. On the other hand, it was estimated that the water table increased by 69,7 cm in Imambakir WUA are due to unsustainable irrigation management [20] and salt effected area is around 10% in the plain [21]. Salinity is one of the major problem of the world that affects 20% of total irrigated areas [22], 23% of total cultivated land has been degraded by salinity [23] and affecting an area of 800 million ha that is equal to 6% of the total land area globally [24]. Salinity affects plant growth and causing yield losses, and also adversely affects soil structure, fertility and soil life [25, 26]. Salinity decreases cotton yield 29.6% in Harran Plain [27] and has led to a 1,840,625 kg cotton yield losses in a year, the resulting income loss was $935,711 in 2009 in the Akcakale, within GAP-Harran Plain [28]. Another research concluded that in Reha WUA areas; the total crop water requirement of command area was estimated as 79.4 million m^3, whereas total water given to the WUA's area was 177.2 million m^3. The excess use of water was determined as 97.8 million m^3 that was 55.2% more which revealed an unsustainable water management. It is possible to irrigate an additional 13102 hectares of land with same crop pattern in the same area, with this excess amount of water. Accordingly, annual gross loss of production value was calculated as 32.23 million dollars [29].

Population growth is also experienced with the start of irrigation in Harran plain. Due to rapid population growth, an uncontrolled urbanization has begun to take place in Harran plain. This has been due to both high fertility and migration due to increased labor needs due to irrigations. In 1990, the population of Harran was 29,592, while it reached 85,319 in 2017 [30], with 89% of the population living in the rural areas and 11% of the population living in the district center [31]. While the seasonal out migration rate was around 70% before the start of irrigation in Harran, reverse migration began to occur due to seasonal workers coming from elsewhere in the beginning of the irrigation, especially during the cotton harvest period. As a natural consequence of this, both fertile agricultural land become residential areas, and pollution of water and soil resources has begun to occur due to the wastes that are formed and

the domestic use. The settlement area before the irrigation in the Imambakir WUA was 52 hectares, it increased 4.28 times with the beginning of the irrigation and reached 223 hectares in 2016 [20]. The pollution has been identified in the return waters in the regions where settlements are located due to domestic and animal wastewater. These pollutants need to be prevented so that these waters can be safely used again in agriculture.

Irrigation operation and management in Harran plain is carried out by irrigation associations that is managed by the farmers. Irrigation associations have problems in the selection system, water pricing, collections, operation, maintenance, repair and management. In terms of operation, transmission losses in transporting the water taken from the source to the field, evaporation and infiltrations are quite high due to open channel and classical irrigation systems in Harran plain. Farmers are not as knowledgeable about irrigation and management issues. There is predominantly surface (wild) irrigations are done and furrow lengths are long. Therefore, muddy and slime consist of in the land where slope is less as opposed to this one, water flows into the stream in high slope areas. As the nightly watering is not done much, the waters are flowing into the evacuations channel. For these reasons, the benefits expected from irrigation associations are not as good as expected. This is not sustainable with existing applications. In other words, there will be problem of sustainability in terms of water and soil resources near future.

3.3. Suggestions for achieving sustainability

First of all, farmer training should be given priority for efficient and effective usage of the resources for sustainability. Farmers' training should be on the field and show how its applied. Elections in irrigation associations are made according to the delegate system. Although the delegates are chosen from every settlement, they are far from the pluralistic democratic representation ability due to the patriarchal structure. On the other hand, this election system is open to abuse and negotiations based on various interests can be made. It would be better to have a selection of local governments that each water user would join. In this way, both the rate of representation and the irrigation association management will be able to make more accurate and transparent decisions because different water users are involved. Water prices in irrigation area are taken according to irrigated unit area and crop pattern. This situation leads to uncontrolled and excessive use of water. If volume-based pricing is done, farmers will use the water more controlled and economical way. In this case, sustainability will be more easily achieved from both water and land resources. Water fees are the basic revenues that provide the quality and continuity of irrigation associations' services. Collection rates in irrigation associations are low and this affects sustainability and the quality of service of irrigation systems negatively. In the case of direct deductions from agricultural supports to farmers made by government, the collection problem will cease to exist. If the inspections of the irrigation associations being carried out by the public are carried out on an efficiency basis, the resources will be used more rationally. Accordingly, optimality in terms of operation, maintenance, repair and management will be achieved. Water losses due to open channel and surface irrigation are excessive. Transition to closed and pressurized irrigation systems should be widespread. Field leveling should be completed in all irrigation areas. Night irrigations should be widespread among the farmers. In this, different water price tariffs should be applied during day and night irrigations. Lower water charges should be paid from night irrigations. In this way, the amount of evaporation of water caused by high temperature during the day will be reduced and both water and soil resources will be protected. Uncontrolled settlements and construction in efficient agricultural areas should not be allowed. Planned settlement areas should be established for increased housing demand and residential areas outside of agricultural land.

4. CONCLUSION

The natural resources are not unlimited resources for development. The reduction and deterioration has begun in terms of the quality and quantity in natural resources mostly based on human beings' activities. They need protection and conservation for sustainable development. Sustainability of resources can be achieved with awareness, training and education. There are already water shortages in some parts of the plain mainly because of misusage and mismanagements. If a suitable combination of crop pattern and irrigation methods can be supported through training programs for farmers, water efficiency, productivity and effectiveness can be increased significantly in the field [32] and results to usage of sustainable resources for development better than existing applications. It is essential to use efficient irrigation technologies such as pressurized systems for water and soil savings in the Harran plain. There are some structural problems at WUAs and additional legal and administrative arrangements are needed. Unplanned urbanization should not be allowed in Harran Plain and due to the growing population, planned settlements should be established outside of agricultural areas for the sake of sustainable development.

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Application of fly ash from fluidized bed combustion as addition for underwater concrete

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Abstract

The paper presents the method of using fly ash from the combustion of solid fuels in fluidized bed as valuable constituents of cement concretes. The research was conducted in two directions. The first one was to obtain such consistency of a concrete mix, modified with fluidized ash, to ensure the required consistence for underwater concreting, while the second direction included the study of basic physico-mechanical features of hardened underwater concretes with the addition of fluidized ashes and theirs development in time. Underwater concretes with fluidized bed ash content, used as a cement substitute in the quantities of 10, 20, 30, 40 and 50% of cement weight, were subject to testing. The measurements of consistence, determinations of viscosity and flow ability through the reinforcement as well as the air content were carried out for the concrete mixes. The tests of the hardened underwater concretes included determination of compressive strength and tensile strength as well as water absorbability and depth of water penetration under pressure; the concretes were tested after 28 days of curing. The tests confirmed the possibility of using fluidized ashes as a substitute for cement in concretes placed under water. A mix with a content of 30% of fluidized ashes was selected for the further tests as a cement substitute. The development of strength over time after 7, 14, 28, 56 and 90 days was tested and an attempt was made to determine the efficiency coefficient k for the tested fluidized ashes.

Keywords: Circulating Fluidized Bed Combustion Ash, Mechanical Properties, Underwater Concrete

1. INTRODUCTION

Fly ashes, as the by-products of coal combustion, are important and valuable raw materials for the building materials industry, particularly for the producers of cement and concrete. This is reflected in the valid standards, which give precise requirements for the fly ash used as an addition to cement (EN 197-1:2012 [1]) or concrete (EN 450-1:2012 [2]). The physico-chemical properties of the fly ashes, and thus the possibilities of their use in the cement concretes, depend on many factors, like: type of the combusted material, type of the installation, including conditions of burning and rate of cooling, and technology of gases desulfurization. Besides the typical fly ashes, which are the by-products of combustion of the black or brown coal in the so-called conventional combustion beds, new types of ashes are also created in the form of the mixture of the products of simultaneous combustion of the coal and desulfurization of the gases (the ashes connected with the products of dry methods of desulfurization and the ashes from the fluidized bed combustion). The fly ashes from the fluidized beds are the mixture of the products of ash removal from the exhausts and the residues of the sorbent. Thus, they often contain high amount of SO_3 and CaO and show high loss on ignition [3]. The fluidized ashes do not meet the rigorous requirements of European Standards for the mineral additions to cement and concrete. For this reason they are often considered unuseful for traditional technologies of cement production. According to the requirements of the standard EN 450-1 [2], the fly ashes from fluidized bed combustion may be used in the cement production in the amount up to 5%, as the secondary mineral addition, and as an addition for concrete they are presently used on the basis of Technical Approvals.

As a consequence of the strict requirements referring to the emission of CO_2, SO_3 and NO_x, introduced by the European Union, the growing number of combustion systems with fluidized beds is installed in the Polish energy plants as a part of their modernisation. Therefore, the amount of the conventional siliceous fly ashes, produced by the Polish energy industry, is decreasing. The interest in use of the fly ash from the fluidized beds to the production of building materials, including cement composites, has rapidly grew [4-7].

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The results of testing of the underwater concretes (UWC), made with the use of the ashes from the fluidized beds, are presented in the paper. The fly ashes were used in UWC as a partial substitute of cement in the range 20-50% with a 10% step.

2. PROGRAM AND RANGE OF TESTING

All UWC mixes have been made of the Portland cement CEM I 42.5 R, river sand 0/2 mm and natural gravel with the maximum grain size 16 mm. The fluidized ashes from Zeran (Poland) electric plant have been used as the mineral addition in the amount 10 to 50% of the cement mass (referring to the reference concrete C0). The chemical composition of the ash is presented in the Table 1. The constant value of w/b = 0.4 has been used. The admixture for the underwater concretes has been also introduced in the amount 4 kg/m^3 of concrete (7.5 g/kg of cement). The composition of the concrete mixes is presented in the table 2.

The tests of the concrete mixes, carried out according to the valid standards and recommendations, included determinations of the following properties:

- consistence (slump) after mixing and after 60 minutes from completion of mixing;
- mixing time by the V-funnel;
- ability to flow through the reinforcement by the J-ring;

For the hardened UWC, the 28-day compressive strength has been determined in the air-dry conditions, as well as the mass absorbability and the depth of water penetration under pressure. The results of testing of the concrete mixes and hardened UWC are presented in the Table 3. On the basis of the obtained results, the concrete C30 has been selected for the further testing, as it has met the requirements regarding to the consistence and demonstrated good strength parameters; the concrete C0 without the ash has served as a reference concrete.

Table 1.Chemical composition of fly ash from fluidized combustion beds [wt. %]

LOI	S_iO_2	Al_2O_3	Fe_2O_3	CaO	MgO	Na_2O	K_2O	SO_3	TiO_2	P_2O_5
10.31	39.06	21.01	5.55	10.74	1.87	0.54	1.98	6.83	0.80	0.64

Table 2.Mix proportioning of underwater concrete [kg/m^3]

Concrete	Cement	Fluidized ashes		Water	Sand	Gravel	Super-plasticizer	AWA admixture
		kg/m^3	% of cement mass					
C0	530	0	0	212	593	1028	4.0	4
C10	477	53	10	212	593	1028	5,2	4
C20	424	106	20	212	593	1028	7.5	4
C30	371	159	30	212	593	1028	10.0	4
C40	318	212	40	212	593	1028	12.5	4
C50	265	265	50	212	593	1028	15.0	4

Testing of the concrete C30 covered the following properties:

- compressive strength development over time after 7, 14, 28, 56 and 90 days of curing in the water;
- compressive strength development over time after 7, 14, 28, 56 and 90 days of curing in the air;
- splitting tensile strength development over time after 7, 14, 28, 56 and 90 days of curing in water.

The compressive strength of UWC was determined on the specimens made and cured in two different environments: water and air. The specimens made and cured under water were prepared in the following way [8]. The steel mould with dimensions 30 x 50 x 15 cm was placed at the bottom of the container. The container was filled with water in

such a way that the level of the water was at least 20 cm above the upper edge of the mould. The concrete mix was then placed directly over the water level. The manufactured concrete plate was demoulded after two days and stored in water until testing. Immediately before the strength testing, the concrete plate was cut in the cubes with the side 10 cm. There were 6 cubes prepared to testing in every time. The obtained values of compressive strength were re-calculated for cubes with the side 15 cm. The tests of splitting tensile strength of underwater concretes stored under water were performed similarly.

Table 3 Results of UWC testing

Mix	Consistence				V-funnel	J-ring		Compressive strength
	slump [mm]		flow [mm]					after 28 days
	t=0 min	t=60 min	t=0 min	t=60 min	Time [s]	Flow [mm]	B_J [mm]	$f_{c,uw}$ [MPa]
C0	230	145	450	370	5.3	315	32.7	50.2
C10	230	150	450	300	4.7	325	30.4	47.6
C20	235	160	445	270	3.9	347	29.0	42.4
C30	270	170	600	365	7.3	600	15.2	45.8
C40	260	200	525	310	16.1	515	18.7	43.2
C50	289	230	545	350	19.4	455	28.7	33.9

The specimens cured in the air were prepared in the cubic moulds with the side 15 cm, without compacting. After two days of storing in the room with the relative humidity 95% and temperature 20±2 ºC the specimens were demoulded and stored in the same room until testing.

3. TEST RESULTS AND THEIR ANALYSIS

Analysis of the development of compressive strength (Fig. 1) and splitting tensile strength (Fig. 2) of the tested concretes showed that regardless of the age of the concretes, the concretes with addition of the fluidized ashes (C30) had in every case the lower compressive and tensile strength than the reference concrete (C0).

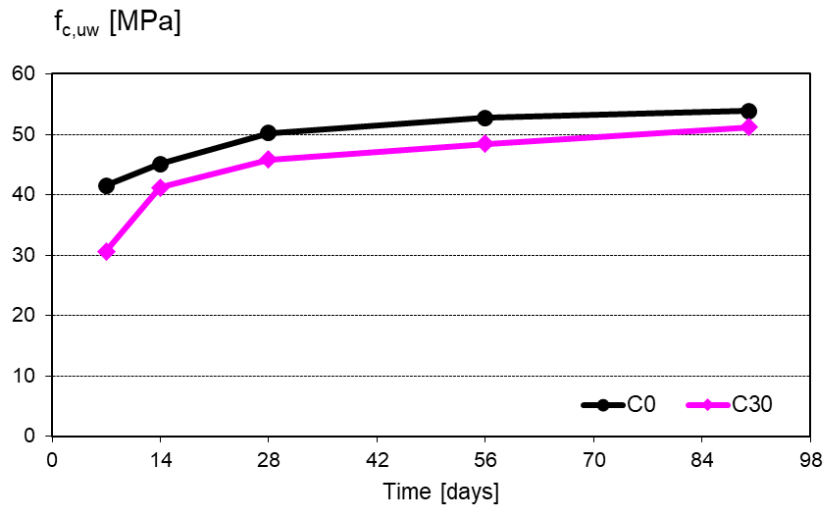

Figure 1.Development of the compressive strength of the tested concretes made in the underwater conditions

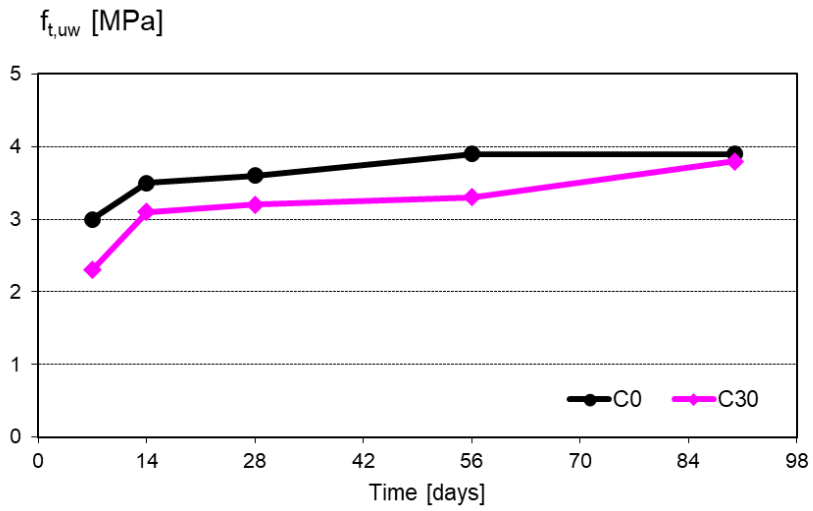

Figure 1. Development of the splitting tensile strength of the tested concretes made in the underwater conditions

The ratio of compressive strength of the concrete specimens prepared and cured under water, $f_{c,uw}$, to compressive strength of the concrete specimens prepared and cured in the air, $f_{c,air}$, may be an indicator for the evaluation of correctness of designing the UWC mixes regarding to compressive strength. According to the requirements given in [9], this indicator should be not less than 0.8.

Figure 3 presents the indicator $f_{c,uw}/f_{c,air}$ as a function of curing time for the tested concretes. The reference concrete (C0) has achieved the value of the indicator $f_{c,uw}/f_{c,}$air equal to 0.8 after just 7 days, while the concrete containing 30% of the fluidized ash (C30) after 14 days.

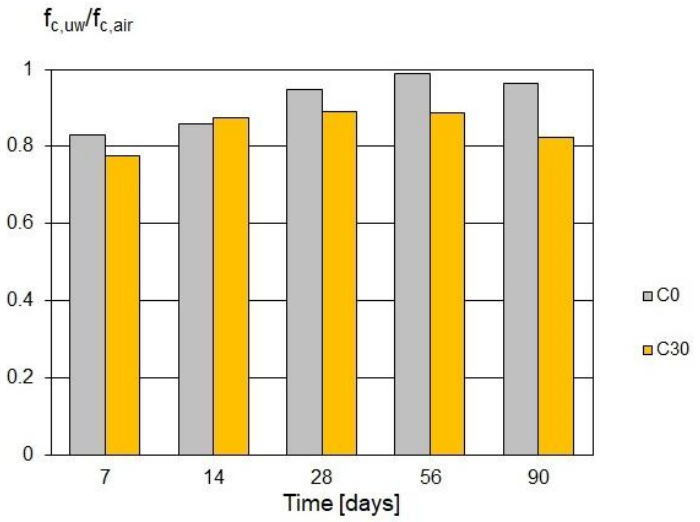

Figure 3. The indicator $f_{c,uw}/f_{c,air}$ as a function of curing time for the tested concretes

For determining the value of the efficiency coefficient *k*, the concept by Atis [10] was employed. The value of coefficient *k* was calculated for various times of concrete curing *t* on the basis of the following formula:

$$k(t) = \frac{c}{p}\left(\frac{f_c(t)_p}{f_c(t)_c} - 1\right) + 1 \qquad (1)$$

where: $f_c(t)_c$ is compressive strength of the concrete made only of cement, in MPa, $f_c(t)_p$ is compressive strength of the concrete made of the cement and fly ashes, in MPa, *c* and *p* are the contents of cement and ash in the concrete, in kg/m^3. The calculated values of the coefficient *k* are presented in the Figure 4.

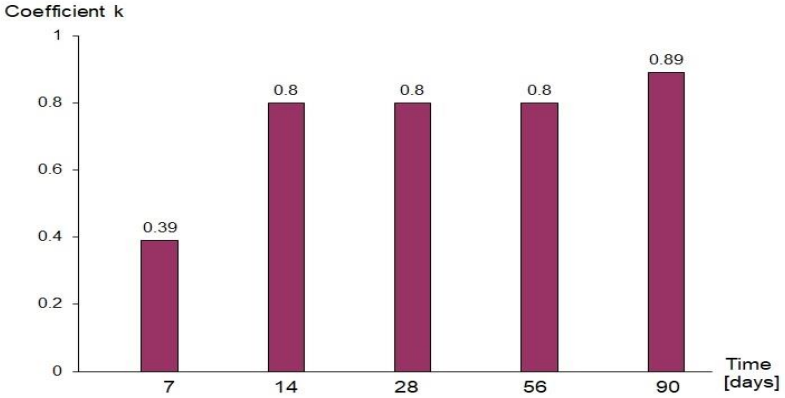

Figure 4. Coefficient k for C30 concrete

It can be noted that the value of coefficient *k* depends on the c/p ratio and the time of curing. According to Atis [10], the stabilization of the value of coefficient *k* is observed only after about 100 days of concretes curing, when the compressive strength is stabilising. In the case of the tested concretes, the stabilization of the coefficient *k* was visible after just 14 days. The coefficient *k* for the concrete C30 is twice higher than for the concretes containing siliceous fly ashes.

4. CONCLUSIONS

The carried out investigation shows the possibility of using the fly ashes from the fluidized combustion beds for the underwater concrete, however, development of the detailed recommendation for their use requires still a lot of studies with the wide range. The serious disadvantage of the underwater concretes with fluidized ashes is a rapid fall of workability of UWC mixes with time. As it was shown in the research [11], even at the maximum content of superplasticizer the difficulties with achieving the necessary mix workability occur after one hour. The research should be continued, taking into consideration the change of w/b ratio and longer time of concrete curing, for instance 360 days, as well as higher content of the fluidized fly ash in the binder.

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Anti-Dumping Taxes and Their Effects in the European Union

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Abstract

As is known, free trade policy is applied in foreign trade. This situation brings with it negativity besides many positive effects. The best example of this is dumping. That is, an exporting firm is exporting its goods to a price below normal value. Due to the damping product, unfair competition arises absolutely. Hence anti-dumping tax against damping is inevitable. At this point, the main purpose of anti-dumping tax is to protect domestic producers. Along with globalization, various associations (integrations) have been established in the world. One of them is the European Union (EU). The EU is a democratic European country with a single-minded and thoughtful goal to improve the lives of its citizens. Anti-dumping tax for this structure is an important foreign trade policy tool. The protectionist structure in the EU is increasing the use of anti-dumping tax. It is not uncommon for the EU to use it because anti-dumping tax is considered to be a protective legislation. The use of anti-dumping measures by the European Union has increased rapidly in the 1980s, but since then a number of these measures have followed a steady process. While there were 139 anti-dumping measures in force in 1990, this number increased to around 150 in 1993 and 1994, and dropped to 141 and 142 in 1997 and 1998, respectively. The product categories most affected by anti-dumping measures are iron and steel products, electronic products and chemicals. Anti-dumping duties applied in the EU will be examined during in the study. Thus, it is aimed to determine the effect of targeted anti-dumping on the EU. It is therefore possible to assess the effects of anti-dumping taxation in the EU in terms of international trade. This frame will be evaluated over the data and a number of suggestions will be made.

Keywords: Anti-dumping taxes, Trade, EU.

1. INTRODUCTION

Achieving competitiveness on international commercial is an important issue for both developing and developed countries. This competitiveness can be achieved through legal means such as incentives, as well as by methods that may be the subject of debate on legality such as dumping product exports.

The damping product provides a certain trade volume and breadth to the exporting country, while it causes negative reflections among the producers in the importing country. This situation has obliged countries to use ways to protect against dumping products. One of these routes, and perhaps the most important, is anti-dumping measures. Anti-dumping measures or other words anti-dumping duties against to dumping not only at ordinary times is a factor which increases the international competitiveness for countries. A preliminary view that anti-dumping tax practices can be used effectively in times of crisis is formed due to the reasons stated in the study.

When assessed specifically for the EU, the prevention of the loss of competitiveness of international commercial trade, which is important for a country, and the measures for financial crises are important for the integration for such a significant integration.

In this context, the study assessed anti-dumping investigations and anti-dumping taxes, applied to the countries of the world by the EU in terms of the country and the types of goods applied, and emphasized the importance of this protectionist policy.

2. THE CONCEPT OF DUMPING

One of the important obstacles to international trade is unfair competition. It can be said that many factors can cause unfair competition. The tariffs and incentive policies of countries, political instabilities and legal regulations can be listed among the reasons of unfair competition. Another factor that may cause unfair competition is dumping.

There are various definitions in the literature about dumping concept. [9] described dumping in two different ways and made this definition in the two-legged legal grounds. The first definition is to sell abroad a product that is lower than the domestic market value of the product in question on the export market. In the second definition, [9] emphasized average cost and explained the dumping as selling abroad at a price below the average cost of a product.

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[8] has pointed out that dumping is a concept of artificiality and that there is a kind of unfair competition in importation of artificially reduced prices of goods and the introduction of these goods into foreign markets in large quantities.

Also [13] describes dumping in his work as price discrimination between national markets. [4] states that the presence of dumping may be mentioned if intentions such as the removal of foreign competitors, damage or forcing cartel agreement are mentioned.

Dumping in the framework of the World Trade Organization (WTO) is "exporting a product at a lower price than the price offered for sale in a country of export for a similar product". (GATT, art. VI/1).

From these definitions it is possible to identify the dumping in terms of exporting to another country at a price below the normal value of a particular product, or selling at the price quoted by the importer in connection with the importing country, unrelated to legitimate causes such as natural advantages, technological superiority and labor force.

Sales of dumped goods, which provide significant advantages for the exporting country, negatively affect the market in which the import is made. At this point, it is necessary to refer to the types and conditions for a better understanding of the concept of dumping.

2.1. Types of Dumping

Dumping can be done in three ways, which is considered unfair competition in international trade. These are [6].

- *Sporadic dumping;* changes in taste and preferences, variations in production technologies, technological innovations leading some goods to become obsolete in developed countries, firms following an unplanned production policy, and eventually accumulation in inventories after demand narrowing in the economy. To get rid of these stocks, firms temporarily sell their products to foreign markets at a low price. This is called sporadic dumping.
- *Persistent dumping;* especially because of the limited domestic market, producers are constantly selling to international markets at a price slightly above cost to reach the optimum capacity, to benefit from scale economies and maximize profits.
- *Destructive Dumping;* is the type of unfair competition that companies or governments impose on a domestic country with a lower price than the domestic market price of their products in order to remove their competitors from the domestic market.

2.2. Conditions of Dumping

Dumping is basically a price differentiation when viewed. This price differentiation is at the international level. Therefore, in order to be able to go to price differentiation, certain conditions or conditions must occur in the economy. These conditions are [11].

- The internal and external markets must be separated from each other. Otherwise, goods can be bought from cheap market and sold again to the market where it is expensive. This is called re-export.
- Demand flexibilities in different markets must be different for exported goods. Thus, if the demand elasticity is high, the goods can be sold cheaply, and if the demand is low, it can be costly.
- The exporter company that will do the dumping should have a strong market.

3. CONCEPT OF DUMPING IN THE EUROPEAN UNION

The dumping referred to as price difference or separation between national markets is the export of a good at a price below the production costs. At the article 1 of the Anti-Dumping Agreement (ADA) which is substractive for administer General Agreement on Customs Tarrifs and Trade (GATT), dumping is defined as selling at an export price below the normal value of a good. A dumping of a good in the o Article 1/2 of the ADA is dumped to the condition that the goods exported into the union are lower than the prices of similar goods in the exported market. Therefore, dumping from the point of view of the EU is an application that will create problems. This situation arises especially in international commercial relations between third countries and the EU.

Third-country entrepreneurs are required to present their final end-products to the EU market, which is far below the cost of production, to determine that competition in national markets is insufficient. It is obvious that these exports to EU countries will be disadvantageous for the suppliers in the union. It is absolutely essential for the EU to develop policies or take measures against such dumping practices. One of these measures is undoubtedly anti-dumping tax.

The anti-dumping instrument, a fact of international trade, is of great importance for monitoring the economic and political objectives of the defense of dumping. In summary, according to the ADA, the legal conditions for the adoption of anti-dumping measures are;

- Imports of certain dumped goods,

- If the domestic industry is severely damaged and the damage is related to the damped product,
- Unity benefits.

4. ANTI-DUMPING TAX

It is legitimate to take anti-dumping measures against the dumped product if the legal conditions specified in the previous section are fulfilled. According to the article VI. of GATT, if a country is dumping against other countries, the injured country has the right to apply anti-dumping or anti-dumping duties.

Anti-dumping tax practice has recently been used not only in developed countries but also in developing countries. Anti-dumping duties are taxed at the extent of exceeding the export price of normal value to avoid unfair competition in imports [4]. The anti-dumping tax is an extraordinary, exceptional and temporary obligation arising from foreign trade transactions, even though it is included in foreign trade taxes [10].

Anti-dumping tax is preferred due to the fact that the damping system allows for a wide selection of countries in terms of exposed countries. So this tax may go to any exporting country or business. The authorities of the importing country may decide to apply the anti-dumping duty in cases where all the conditions for the application of the vaccine have been fulfilled. Antidumping taxes should be collected on a non-discriminatory basis in imports when it is determined that a product is damped from all sources and that the damage is caused.

Anti-dumping duties are the dumping goods that are imported into the countries below the marginal cost of the subject. Under normal circumstances, those who are to be taxed here are exports or institutions. However, it is not possible to tax them. Organizations affiliated with foreign trade organizations are responsible for collecting or otherwise carrying out anti-dumping duties [1].

5. ANTI-DUMPING REGULATION OF EU AND ITS BASICS LEGISLATIONS

The customs tariff in the European Economic Community (EEC) is of great importance in terms of foreign trade policy. The customs tariff of the group entered into force in 1968. Therefore, the basis of EEC anti-dumping legislation is also based on 1968. Due to the customs tariff, the first anti-dumping regulation of the EEC was accepted on 1 July 1969 [10]. However, this legislation has been changed many times. The EU tended to protect its producers with Regulation No. 2423/88 until 1994, with the adoption of the Anti-Dumping Agreement of the World Trade Organization (WTO) requiring the renewal of the existing statute. Thus, regulation no. 3284/94 has been accepted. The technical faults found in these statutes and the failure to provide the required benefit have been deemed unnecessary.

In this context, the main text of the EU anti-dumping legislation is "Council Regulation No. 384/96 of 22 December 1995 on the Protection Against Dumping Import from Non-European Union Member States".

The EU has developed its own legislation in line with the dumping provisions contained in the GATT Agreement [3]. According to this legislation, if a firm or producer involved in imports from any country makes a claim that there is a dumping, and if it proves it with the evidence, a dumping investigation will be launched by the EU commission [7].

According to WTO rules, there is a dumping sale for anti-dumping application and there must be a material damage or injury threat of the importer country's domestic industry. In EU legislation, in addition to these, there is a need for the EU to be able to apply anti-dumping.

In this respect, EU anti-dumping legislation has three basic characteristics. These;

- Community interest,
- Zeroing,
- Lesser duty rule.

5.1. Community Interest

The concept of common interest, followed by "community extraction" and "community interest", which are used in a similar way, basically have different meanings and aims at certain market liberty or rights or exceptions [14]. From this point of view, the union actually aims to protect the interests of its partners, in particular the community in general. One indication of this is the need for community influence to be adversely affected in order for anti-dumping measures to be implemented according to the EU anti-dumping legislation [14].

Acording to community interest, anti-dumping measures can only be applied by the EU Commission if the situation is contrary to the general interest of the union economy.

5.2. Zeroing

Another feature of EU anti-dumping legislation is zeroing. In this application, the value of the product imported by the member countries of the Union and the value of the same product in the EU are compared. When the zeroing is judged from the legal perspective, it is the practice of changing the "dumping margin"[2] [2]. This application will remove the negative dumping margin. This is the case when the export price is exceeded by the normal value calculated for the actual amount of the dumping margin. With the zeroing application, the weighted average of a normal value of a product is compared with the prices of individual export operations. Exports made at a price above the normal value are not considered during the calculation of the dumping margin.

5.3. Lesser Duty Rule

If the amount of tax to be applied against the damper compensates for the damage of the domestic production branch, it is said to be "lesser duty rule" under the determined dumping margin [7]. This rule is also applied in EU legislation.

In lesser duty rule, the amount of anti-dumping tax is determined under the dumping margin and loss margin. The loss margin is the difference between the selling price of dumping goods in the EU and the selling price of similar goods in the EU industry, again in the EU. For example, if the price of imported goods (dumped) by the EU is 50 euros and the selling price of the similar goods produced in the EU is 60 Euros, the margin of loss is 60-50 = 10 euros. This margin is important in terms of the maximum amount of anti-dumping tax that will be applied.

6. ANTI-DUMPING INVESTIGATIONS BY THE EU AND EVALUATION OF THE CURRENT SITUATION

Authorized entities in anti-dumping investigations are obliged to ascertain the existence and magnitude of the damage or damage hazard arising from dumping products. Following this detection, they may take anti-damping measures to prevent damping or provide compensation if deemed necessary.

There are two dimensions of the anti-dumping investigation which is to be opened or to be opened by the EU. These are technical and political dimensions. While determining the dumping margins and determining the damage within the technical dimension, the political dimension is entirely related to the "communitt interest". At this point, the process of opening anti-dumping investigations to the EU is required.

6.1. Anti-Dumping Investigations in EU and Investigation Process

Anti-dumping investigations in the EU are opened in particular by observing the principles of openness and impartiality. In general, the process followed for each anti-dumping investigation is the same. However, it is seen that different applications have been made for candidate countries that are not EU member. (Brussels, 2005:12).

The competent body of the EU in relation to anti-dumping regulations is the Directorate General for European Union Trade. This unit is obliged to carry out dumping investigations. Investigations begin with a complaint. Documentary evidence must be sufficient at the request [5]. The adequacy of documentary evidence is particularly important at the point of correctness. The reliability and adequacy of the information stated in the complaint is assessed by the commission taking into account all aspects. As an example of these issues;

- The product subject to manslaughter,
- Related countries,
- The structure of the EU industry,
- Current general information,

can be shown.

6.1.1. Giving the complaint petition

The petitioner's petition for an anti-dumping investigation must also make up 25% of the share of the petroleum product in question, the total amount of that product in total EU production. Complaints can be made directly to the commission.

Complaints can be made to one or more companies outside the EU (exporting to the EU). In particular, the following information should be included in the complaint;

- The complainant should provide information on other companies and persons related to the dumping product, the complainant and the countries other than the country of origin.
- The dumping related evidence showing the claim must be shown.

[2] *Dumping margin; is the amount of normal value exceeding the export price (Resolution 99/13482 on the Prevention of Unfair Competition in Imports article 2 / f).*

- There should be evidence of damage to the economics branch mentioned to be in the loss.

In order to implement anti-dumping measures for a country's imports, imports from that country must be at a higher rate than 3% of the consumption of the union and the market share should not be less than 1%.

6.1.2. Commencement of Investigation

The General Directorate of European Union Trade may initiate the investigation process if it considers that the particulars and evidence specified in the complaint application are sufficient. If the investigation provides the necessary conditions, the complaint must be initiated within 45 days of the application [5]. Announcement of the beginning of the investigation is published in the EU Official Gazette. This announcement is an official announcement and the parties are required to communicate the information and documents to the commission. A formal announcement has been made.

The Commission is responsible for submitting the complaint text to relevant[3]. If there are more than one exporter's inquiries, the complaint will only be sent to the country representative or the relevant trade union. Following the commencement of the proceedings, Member States and the Commission jointly initiate both the dumping and the damage assessment.

The Commission shall designate a period of examination not to be less than six months in advance of the commencement of the proceedings for the purpose of obtaining findings. Initiated investigations are completed within 1 year.

6.2. Anti-Dumping Investigations launched by the EU and "Competition Pact"

Anti-dumping practices by 31 countries from 2006 to 2017 are seen by the EU. Table 1 lists the number of anti-dumping investigations conducted by years and countries.

Table 1: Anti-Dumping Investigations by the EU Between 2006-2017

Countries	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**
Argentina	-	-	-	-	-	-	2	-	-	-	-	-
Armenia	-	-	1	-	-	-	-	-	-	-	-	-
Belarus	-	1	1	-	-	1	-	-	-	-	1	-
Bosnia &Herzegovina	-	1	-	-	1	-	-	-	-	-	-	1
Brazil	-	-	1	-	-	-	-	-	-	1	1	1
P.R. China	12	6	6	7	10	8	7	6	6	6	6	5
Egypt	1	-	-	-	-	-	-	-	-	-	-	1
India	2	-	-	2	3	3	2	1	2	2	1	-

[3]*Representative of the exporting country, complainant and trade associations.*

Indonesia	-	-	-	-	1	-	3	1	-	-	-	-
Iran	-	-	-	2	-	-	-	-	-	-	1	-
Georgia	-	-	-	-	-	-	-	-	-	1	-	-
Japan	1	-	-	-	-	-	-	-	1	-	-	-
Kazakhstan	2	-	-	-	-	1	-	-	-	-	-	-
Korea (Rep. Of)	1	-	1	1	-	-	-	-	1	-	2	-
F.Y.R.O.M	1	-	-		-	-	1	-	-	-	-	-
Malaysia	2	-	-	2	1	-	-	-	-	-	-	-
Mexico	-	-	-	-	-	-	-	-	-	1	-	-
Moldova (Rep. Of)	-	-	1	-	-	-	-	-	-	-	-	-
Oman	-	-	-	-	-	2	-	-	-	-	-	-
Pakistan	-	-	-	2	-	-	-	-	-	-	-	-
Russia	2	1	-	-	-	1	-	-	2	1	1	1
Saudi Arabia	-	-	-	-	-	2	-	-	-	-	-	-
Serbia	-	-	-	-	-	-	-	-	-	-	1	-
South Africa	1	-	-	-	-	-	-	-	-	-	-	-
Taiwan	3	-	1	1	-	-	1	-	1	1	-	-
Thailand	2	-	1	2	1	-	1	-	-	-	-	-
Turkey	1	-	2	-	-	1	1	-	2	1	-	1

Ukraine	3	-	1	-	-	-	1	-	-	-	1	1
U.A.E.	-	-	-	2	-	-	-	-	-	-	-	-
U.S.A	2	-	4	-	1	2	-	-	1	-	-	-
Vietnam	-	-	-	-	-	-	-	1	-	-	-	-
Total	**36**	**9**	**20**	**21**	**18**	**21**	**19**	**9**	**16**	**14**	**15**	**11**

Source: Created by the author, using [15], [16], [17], [18], [14-9].

When Table 1 is examined, it is seen that a total of 209 anti-dumping investigations have been opened between 2006 and 2017. The country with the most anti-dumping investigation was China with 85 investigations. India follows China with 18 inquiries. These indicators are an indication that the EU is a pioneer in the international harmful commercial competition. Another issue that needs to be examined in this framework is anti-dumping investigations on which product groups are being conducted. The data related to this situation are given in Table 2.

Table 2: Anti-Dumping Investigations by the EU in the Production Sector Between 2006-2017

Product Groups	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**
Chemical and Similar Products	13	2	2	9	7	11	-	1	2	6	1	5
Textile and Similar Products	2	-	-	3	-	-	-	3	-	-	-	-
Paper and Wood	-	-	-	-	2	-	-	-	-	-	1	-
Electronic	5	-	-	1	2	-	2	-	-	-	-	-
Other Mechanical Products	2	-	-	-	1	1	1	-	-	-	-	1
Iron and Steel	-	6	6	4	3	6	11	1	9	6	13	-
Other Metals	9	-	-	1	-	1	-	-	3	-	-	2
Other products	5	1	1	3	3	2	5	4	2	2	-	3
Total	**36**	**9**	**20**	**21**	**18**	**21**	**19**	**9**	**16**	**14**	**15**	**11**

Source: Created by the author, using [15], [16], [17], [18], [14-9].

When Table 2 is examined, the most anti-dumping investigation has been opened on iron and steel with 65 investigations in 12 years period. In the second place, the investigation is mostly on chemical and similar products and the total number is 59. It is clear that the negative effects of these two product groups on the Union economy are greater than those of other products. When an overall assessment is to be made it is possible, in particular, to establish a connection with crisis periods.

While this link is established, it is necessary to draw attention to the "competitive paunch" from the EU's "crisis measures"[4]. As is known, putting only stability mechanisms in crisis periods does not completely remove the effects of the crisis. Different structures are needed for this. One of them is undoubtedly a "competitive pact".

The financial crises, which are felt more and more rapidly with the globalization phenomenon, are affecting many countries. Every country is absolutely affected by crises. Only the ratings from the crisis are different. The protection from crisis is a major factor in the high competitiveness of these countries. However, low labor cost and flexible production in countries such as China and India, which have gained momentum in the world economy, prolong the process of getting rid of the crises, especially by reducing the competitiveness of the EU countries. Moreover, the fact that the countries in the union have different competitive power, the power of the union to endure the crisis extends the crisis process.

In this direction, German Chancellor Angela Merkel and French President Nicolas Sarkozy set up a Pact aiming to permanently increase the competitiveness of the Member States in order to ensure a stronger economic integration in Europe by taking a joint initiative to create a better economic governance framework in the Euro Area have reached agreement on the issue [12]. As a result of this initiative, it was decided that the participating states of the Pact would give binding commitments on economic policies. It is stated that in order to measure the competitive power of national economies in the Pact, which is proposed by Germany and France in February 2011 at the Council of Europe, the following three indicators will be tried to be established [12]:

- Indicators for price competitiveness
- Indicators to ensure a comprehensive view of the stability of public finance
- To set a minimum investment limit of a certain percentage of GDP for research and development, education and infrastructure investments.

Therefore, the union aims to prevent the negative effects of competition competition and international commercial competition. In particular, it is clear that the goal of price competitiveness is aimed at achieving a certain level of balance, even superiority, supported by anti-dumping tax.

6.3. Anti-Dumping Tax Examples Implemented by the EU

Anti-dumping measures are often seen by the EU, especially in some countries. An example of some anti-dumping tax that is applied in the competition pumping direction in the light of the above tables (Table 1 and Table 2).

These examples are anti-dumping measures applied to People's Republic of China. On January 27, 2017, the EU commission decided to apply anti-dumping duty on two steel products originating in China and Taiwan. It has been decided to apply anti-dumping duties to products imported from China at rates ranging from 30.7% to 64.9%. Anti-dumping duties between 5.1% and 12.1% were also eligible for products imported from Taiwan. Especially the high tax rates applied to China are remarkable. This is an indication that this country has a harmful international competition policy.

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[4] *Measures taken by the EU in times of crisis [12];*
• Balance of payments fund,
• Credit pool,
• European financial stability mechanism,
• European financial stability fund,
• European stability mechanism,
• Competition pact,
can be ordered.

Another example is related to an anti-dumping tax applied on China. The European Commission has announced that some hot rolled flat steel (HRF) products will implement final anti-subsidy measures for imports from China. The Commission launched an anti-dumping investigation on the HRF in May 2016 following a complaint from Eurofer at the European Steel Association. The Commission found that the investigation confirms the existence of mutual subsidies and that China's subsidized imports make the EU steel industry vulnerable. According to the Commission report, the Chinese government supports the steel industry with significant steel aids, including preferential lending, tax refunds and other financial injections. These supports were uncovered as a result of anti-dumping investigations by the Commission, which also allowed Chinese companies to sell the HRF artificially at low prices in the EU market, and the profitability of EU producers sharply dropped by the end of 2015. As a result of the investigation, the commission has set anti-dumping rates on the subject product in China ranging from 18.1 to 35.9 percent.

A striking decision to implement anti-dumping duties on the EU is also reflected in the anti-dumping rates applied to polyethylene terephthalate films (PTF) imported from India, which the European Commission received in January 2009. Accordingly, the new rates against Indian companies are set at 5.4% and 19.1%.

Another anti-dumping duty dated June 29, 2017, approved by the Commission for India, was placed on stainless steel bars. The anti-dumping tax rate is between 3.4% and 4%. It is possible to increase the number of these samples.

CONCLUSION

It can be said that in these general evaluations made in the EU, the members maintain the members of the priority policy. From the era of the union, it is clear that there are many activities in favor of member countries. Anti-dumping measures taken against countries that export dumping goods for the purpose of not compromising the international commercial trade association member countries are a good example of these activities.

It should be noted that the anti-dumping measures imposed by the EU have an advantage over member countries in times of crisis. Because, as it is known, the phenomenon of globalization has accelerated the spread of crises and reduced the competition power of the countries. Along with the competition puck which it adopted in 2011, the union has strengthened the unity of competition power. The importance given to indicators for price competitiveness within the pact actually makes the necessity of taking precautions for dumping products legitimate.

The countries where the EU opened the most anti-dumping investigation between 2006 and 2017 and the anti-dumping tax was applied were China and India. In addition, the opening of four anti-dumping investigations in the United States, which is shown as a source of the 2008 crisis, can be considered as a result of the protectionist policy.

Therefore, countries may resort to tax harmful commercial competition and, in times of crisis. However, these measures do not have to be in the form of a new tax or increasing the rates of existing taxes. Because these practices also have a legal dimension, this is delaying the country's intervention process of piracy or international harmful commercial intervention. At this point the effectiveness of anti-dumping taxation emerges. Anti-dumping tax is an important protection policy especially for EU-like integrations and developing countries. The legal, economic and social dimensions of this practice, which can be regarded as a kind of commercial embargo, are also important in increasing the efficiency of determining carefully.

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BIOGRAPHY

He was born in Mersin / Tarsus in 1983. He graduated from Gaziosmanpasa University Faculty of Economics and Administrative Sciences, Department of Business Administration, in 2007. He started his graduate education in Gaziosmanpasa University Social Sciences Institute, Department of Finance.. Working with Prof. Dr Yusuf Ziya TASKAN "Turkey" Made in Quantitative View of Academic Studies at the Finance Area "defending his thesis he completed his master's degree. In 2011, he started his PhD education at Pamukkale University, Institute of Social Sciences, Department of Public Finance. He defended his thesis (Assessment of Value Added Tax in Terms of Legal Security Principles) with Prof.Dr Ibrahim ORGAN. He was deemed worthy of the title of "Doctor". Dr. Dogan BOZDOGAN, who is still working as a lecturer in the Department of Finance at Tokat Gaziosmanpasa University Faculty of Economics and Administrative Sciences, has many studies on tax law, international tax systems and taxation.

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Mainstreaming of Transgenders: Towards Well-Being for All

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Abstract

Trans people experience the harsh realities regarding their gender identities every day of their lives. Yet, like all other human beings, trans people have fundamental rights – to life, liberty, equality, health, privacy, speech, and expression (United Nations, 2015), but they constantly face denial of these fundamental rights because of the rejection of the trans person's right to their gender identity. In these circumstances, there can be no attainment of the goal of universal equitable development as set out in the 2030 Agenda for Sustainable Development (Divan et al., 2016), and no effort to raise awareness regarding the rights of trans people can succeed if their identity and human rights are denied. Sustainable development is a joint venture towards our common future and developmental goals are the pathways to achieve that venture. The 17 targets of 2030 agenda for sustainable development include preserving nature, wholesome human life, equality in education, health care, sanitation facilities, economic growth, climate awareness, peace and justice including ensuring healthy lives and promotion of well-being for all at all ages which are covered under these sustainable development goals. There is no international data available on the size of transgender population. But as per Gardiner's article on Quora, globally there are 1.4% of counted transgenders who spread evenly across the planet. The majority of transgenders irrespective of place and age are mentally unhealthy. The research paper is an attempt to study mental health of transgenders in relation to social acceptability and their coping strategies through qualitative approach- in depth interviews of 30 transgenders in Punjab (India). The results reveal that due to the problems in their social acceptability, they are facing discrimination in various walks of life – a danger to harmonious social life. Because of this, there are different symptoms which reflect negatively on their normal behavior such as frustration, aggression, anxiety and depression. There is problem in their coping behavior which is predominantly avoidant. Consequently, they have become victims of social isolation, withdrawal and helplessness. Some of them, playing a lead role, talk about their education and rehabilitation as human rights. Thus, it may be seen from the above facts that undoubtedly transgenders are facing problems in attaining optimal level of their mental health which is necessary for good, peaceful and honorable living. So, it is suggested that the educational and rehabilitation programs for transgenders should also include awareness and sensitization of general public.

Keywords*: transgenders, mental health, coping, public sensitization*

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1. INTRODUCTION

"Sustainable Development is the development that meets the needs of the present (people) without compromising the ability of future generation to meet their own needs."Brundtland Report

The 2030 Agenda for Sustainable Development which is built on Millennium Development Goals – the eight goals; set by the United Nations back in 2000 to eradicate poverty, hunger, illiteracy and disease by the end of 2015. The Millennium Development Goals were concrete, specific and measurable which helped to establish priority areas but also left out equally important areas. According to United Nation's assessment of Millennium Development Goals, "The assessment of progress towards Millennium Development Goals has repeatedly shown that the poorest and those disadvantaged because of gender, age, disability or ethnicity are often bypassed."

The Sustainable Development Goals includes 17 major goals for the people and planet with 169 targets to be achieved. The targets of 2030 agenda for sustainable development include preserving nature, wholesome human life, equality in education, health care, sanitation facilities, economic growth, climate awareness, peace and justice including ensuring healthy lives and promotion of well-being for all at all ages; gender equality are covered under these sustainable development goals. The 193 member countries and all stakeholders acting in collaborative partnership are implementing this plan. The member states are resolved to free the human race from the tyranny of poverty and want and to heal and secure the planet with determination to take the bold and transformative steps which are urgently needed to shift the world on to a sustainable and resilient path. To embark on this collective journey, everyone is pledged that no one will be left behind (United Nations, 2015).

Trans people whose population is not known exactly as there is no international data available on the size of transgender population. But as per Gardiner's article on Quora, globally there are 1.4% of counted transgenders who spread evenly across the planet. They experience the harsh realities regarding their gender identities every day of their lives. Yet, like all other human beings, trans people have fundamental rights – to life, liberty, equality, health, privacy, speech, and expression (United Nations, 2015), but they constantly face denial of these fundamental rights because of the rejection of the trans person's right to their gender identity. In these circumstances, there can be no attainment of the goal of universal equitable development as set out in the 2030 Agenda for Sustainable Development (Divan et al., 2016), and no effort to raise awareness regarding the rights of trans people can succeed if their identity and human rights are denied. The majority of transgenders irrespective of place and age are mentally unhealthy.

2. OBJECTIVES:

I. To study mental health of transgenders in relation to social acceptability.
II. To suggest coping strategies for transgenders.

3. METHOD:

Qualitative Approach was used to meet the objectives of the present study. The case studies were conducted with the help of interview and observation schedules. The open ended questions were used and the observation schedules were planned for the deep study.

4. SAMPLE:

Stratified Random Sampling was used to get the sample of 200 transgenders from six districts of Punjab, India.

5. FINDINGS:

1. The discrimination starts right from the family and keeps occurring at every step of their lives from their education to employment to marriage and adoption of kids.
2. The discrimination occurs at every phase cause them an **extreme worry** regarding their lives and the future of children and teens like them.
3. The **nervousness** dominates them when they try to open up in front of others regarding their gender identity.
4. The high level of discrimination by their family and peers push them towards **loneliness** where they deny to share anything with people around them.
5. The piling up of emotions cause **frustration**, **irritation**, **aggression** which take them towards the condition of **emotional instability.**
6. The continuous emotional instability make them **hopeless** about their whole life.
7. The passiveness about the situations don't let them rise up. Consequently, they become aggressive which results in **lowering down their social well being.**
8. They have shown proneness to self inflicted injuries.
9. They feel uncomfortable to communicate with doctors regarding their health issues.
10. They have shown a state of hopelessness, misery and belief about all such negative accommodations as a result of the destiny.

6. CONCLUSION:

1. Rejection by their family snub their self confidence to stand out in society.
2. Lack of confidence takes them to distorting path of emotional, mental and physical health.
3. There are different types of discrimination they face in society, for e.g. denied inclusiveness in educational institution; denied access on public property; violent behavior of people; violent behavior of police; denied justice; extremely low employment facilities; zero housing provisions; cold behavior of ambulance service; unwilling attitude of doctors towards transgenders; lack of knowledge in public and doctors about their sexual complications; lack of awareness in general public regarding their identity and recognition.
4. The level of discrimination varies from very high to medium.
5. Discriminating behavior includes violent behavior, teasing, sexual harassment, emotional torture, ignorance.
6. Seeking alms and prostitution are two main ways for them to earn their livelihood.
7. Their denied quality life is due to discriminating behavior of society as well as due to their own perceptions of not considering themselves equal to the fellow humans.

8. **Recommendations:** These are divided in two parts

Self-awareness

1. Continuous discrimination makes them believe odd in society so they avoid inclusion.
2. For their inclusiveness, their own willingness is equally contributing factor towards their emotional well being and sustainable well being of society.
3. Awareness is necessary among them regarding medical conditions which are contributing in their physical health which directly affects their mental health.
4. Complications regarding their health are required to be discussed clearly.
5. Awareness of self has ability to lead them to consider themselves normal in society.
6. Encourage them to prioritize them above anyone else.
7. Continuous counseling and assistance by trained counselors and doctors.

Sensitizing General Public

1. The attitude as well as recognition of society towards something decides the fate of that particular thing.
2. Sensitization of general public should be a very important part of national policies pertaining to inclusiveness.
3. Awareness regarding medical, physical and emotional conditions of transgenders should be a part of the curriculum right from the very beginning of the school education.
4. Their inclusiveness should be practiced instead of making policies regarding the same.
5. Such community programs and activities should be organized where general public at large must be drawn in as integral part of the same.

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Social Networking Sites Usage among Undergraduate Students in relation to their Mental Health

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Abstract

Sustainable development goals represent sustainable development agenda, an agenda "of the people, by the people and for the people". These goals are framed to prevent environmental degradation, to check over exploitation and wastage of human resources for ensuring a safe human life. These 17 sustainable development goals are so framed to transform the world to be a peaceful and beautiful place to live in and to ensure a conducive environment for individual's wholesome development of personality. Mental health is of utmost importance for wholesome development of personality is evidenced by the fact that mental health is included in sustainable development agendas at UN general assembly in 2015. As per report by WHO almost 7.5 % of Indians suffer from mental disorders (Times of India, 2017). Various factors that lead to distorted mental health are low socio economic status, alienation, loneliness, poverty, abuse (emotional, physical, sexual) and excessive use of social networking sites is a new addition in this list of factors. This research paper is an attempt to study relationship between social networking sites usage and mental health as well as to examine mental health as a predictor of social networking sites usage. Quantitative method of research was used to meet the objectives of present paper by using a sample of 793 undergraduate students of Indian origin. Results of correlation and regression analysis revealed that social networking sites usage was negatively related with mental health as well as mental health was found to be significant predictor of social networking sites usage. Implications were discussed.

Key words: mental health, social networking sites usage, undergraduate students.

1. INTRODUCTION

Keeping in view the principle of "***Leaving no one behind***", in September 2015, the General Assembly adopted the Agenda for Sustainable Development- the development that meets the needs of the present without compromising the ability of future generations to meet their own needs (The Brundtland Commission,1987). Sustainable development goals represent sustainable development agenda, an agenda "of the people, by the people and for the people". *Global Goals* aim to guide global, regional and national efforts with a vision of preventing environmental degradation to protect the planet for future generation; to foster peaceful and inclusive societies to ensure that each and every individual around the world will live happier, healthier, more prosperous and hopeful lives in a healthy environment in harmony with nature. A global collaborative effort with the participation of all countries, stakeholders as well as all people can make a vision of open and social inclusive world free of poverty, hunger, want, disease, fear, violence *a reality* where use of all natural resources- from air to land, from rivers, lakes to oceans are sustainable; where equitable and universal access to quality education at all levels and well being-physical, mental and social are assured; gender equality as well as respect for human rights ,human dignity, race, cultural diversity and bio-diversity prevails. Multiple number of universal sustainable development goals were adopted at 70th session of UN General Assembly conference in 2015 and specifically goal three of sustainable development goals focuses on ensuring healthy lives and promoting physical, social and mental well-being for all at all ages. Under the goal three, target 3.4 is "to reduce by one-third premature mortality from non-communicable diseases through prevention and treatment and promote mental health and well-being."

The inclusion of mental health in Global Goals marked its high degree of importance in achieving better world for present and future citizens. Mental health is a dynamic state of *internal equilibrium which enables individuals to use their abilities in harmony with universal values of society. Ability to cope with normal stresses of life; to recognize one's own emotions and to modulate it effectively; to pay attention, recognize and organize information; to solve problems and make decision; to communicate and interact with others and possession of basic cognitive and social skills are components of mental health* (Galderisi et al.,2015).

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Literature evidenced that mental health shows higher inter dependency with other sustainable development goals i.e. sustainable economic growth (Cruz et al.,2011); peaceful and inclusive societies (Goodwin & Rana,2013 and Thornicroft & Patel,2014) ; inclusive education, food security and improved nutrition (Surkan et al.,2011) and sustainable agriculture, healthy life and promoting well-being (Guszkowska et al.,2014 & Thornicroft & Patel,2014). Prince et al. (2007) further added that mental health is essential for sustainable human development. This illustrates the essential role of mental health in creating the world we want and better future for each and all.

But the sorrow reality of present scenario is that globally 300 million people are affected from depression and 250 million people suffer from anxiety disorders (Bach, 2017). Specifically 7.5 % of Indians suffer from major or minor mental disorders as per WHO statistics published in 2017 (Times of India, 2017). Moreover in article "Six mental disorders you should know about for the sake of your mental health" published in India Today (May,2017), Dr. Parikh highlights that 20 % of India's population will suffer from some form of mental illness by 2020 as per WHO prediction. This increasing rate of distorted mental health has to be checked on prior basis as Thornicroft & Patel in 2014 stated that poor mental health can act as a barrier in achieving the goal of sustainable development.

A look into reasons behind poor mental health represent endless list of causes that can deteriorate one's mental health such as broken home, low socio economic status, abuse(emotional, physical and sexual),stress, loneliness, isolation, alienation, unemployment, long term illness etc. and many more with excessive use of social networking sites as a new addition in this list of factors. Researches done in the recent past evidenced the linkage between mental health and use of social networking sites (Centre for Addiction and Mental Health, 2015; Sampasa-Kanyinga & Hamilton, 2015; Sampasa-Kanyinga & Lewis, 2015 & Linnea, 2016).

Innumerable studies were embedded in the body of literature that addresses relationship between social networking sites usage and mental health which leads to bidirectional/controversial results favoring both positive and negative relationship between the two. Saleem et al., 2012; Manjunatha, 2013 & Thanuskodi, 2015 through their research work revealed that students were more active users of social networking sites. Keeping in mind the afore mentioned facts, this research paper is an attempt (i) to study relationship between social networking sites usage and mental health as well as to (ii) examine mental health as a predictor of social networking sites usage among undergraduate students of Indian origin.

2. HYPOTHESES

1. There is no significant relationship between social networking sites usage and mental health among undergraduate social networking sites users.
2. Mental health is significant predictor of social networking sites usage among undergraduate social networking sites users.

3. MATERIALS AND METHODS

3.1Methods

Quantitative approach was used to meet the objectives of the research paper. Descriptive method of research with ex post facto design was employed to examine relationship between social networking sites usage and mental health as well as to check predictive ability of mental health towards social networking sites usage.

3.2Participants

Stratified random sampling technique was used to extract a sample of 793 first year undergraduate social networking sites users pursuing Bachelor of Arts and Bachelor of Commerce in three universities i.e. Punjabi University, Patiala, Guru Nanak Dev University, Amritsar and Panjab University, Chandigarh. Initially there were 920 participants, however applying exclusion criteria the final sample get reduced to 793 respondents. Exclusion of responses was due to respondent stating that they were not using any of the social networking sites. Thus the final sample included 518 male (65.32%) and 275 female (34.68%) undergraduate students between the ages of 18 years and 22 years at the time of data collection. There are 76.29 % of undergraduate students from arts stream and 23.71% from commerce stream with 73.14% respondents were from nuclear family where as 26.86% resides in joint family.

3.3 Materials used

3.3.1.Social Networking Sites Addiction Scale (SNAS) by Shahnawaz et al. (2013) is 32 item scale used to access social networking sites usage among adolescents. The response format is a 5-point Likert ranging from strongly disagree to strongly agree. Total scores were calculated across items with higher score indicating social networking sites addiction (50^{th} percentile-average social networking sites usage and above 75^{th} percentile- social networking sites addiction). Cronbach's alpha internal reliability coefficient provides information that the scale had reliability and SNAS has found to have discriminant validity as well.

3.3.2 Mental health battery developed by Singh & Sengupta (2009) consists of 130 items aimed to measure mental health status of persons in the age range of 13 to 22 years. This battery consists of two sections A & B where section A is used to determine socio-economic status and section B consists of six dimensions i.e. emotional stability, over-all adjustment, autonomy, security-insecurity, self-concept and intelligence. Each question in Section A & B is followed by options and respondent had to choose one right option. Total scores were calculated across each dimension with higher score indicating excellent mental health (P_{90} and above=excellent,P_{70} to P_{69}=good, P_{50} to P_{69}=average,P_{30} to P_{49} = poor & P_{29}=poor mental health).Mental health battery were found to be reliable and valid.

4. RESULTS

In order to verify the hypotheses of the study correlation analysis and regression analysis were used.

4.1.CORRELATION ANALYSIS was used to study relationship between social networking sites usage and mental health among undergraduate social networking sites users. The results of correlation analysis were represented in table 1.

Table 1 Coefficient of Correlation between social networking sites usage and mental health among undergraduate social networking sites users

Variables	N	Mean	r(coefficient of correlation)	Inference
Social networking sites usage	793	80.60	-0.226**	Significant at 0.01level of significance
Mental health	793	77.35		

The perusal of table 1 reveals that social networking sites usage had negative and significant correlation with mental health (r= -0.226, significant at 0.01 level) among undergraduate social networking sites users. This means that with increase in use of social networking sites usage mental health of undergraduate social networking users get deteriorates.

4.2.REGRESSION ANALYSIS

Results of step-wise regression analysis technique revealed that mental health emerged as a significant predictor of social networking sites usage of undergraduate social networking sites users as represented in table 2.

Table 2 Social Networking Sites usage as a function of mental health among undergraduate social networking sites users

Variable	R	R^2	R^2 change	F-value	Variance
Mental Health	0.239	0.057	0.056	47.72**	5.7%

*** p<0.05, **p<0.01**

As shown in table 2, mental health contributed significantly to regression model (F=47.72,p<0.01) and accounted for 5.7% of variance in predicting social networking sites usage among undergraduate social networking sites users.

5.DISCUSSION

Hypothesis 1 There is no significant relationship between social networking sites usage and mental health among undergraduate social networking sites users.

The first hypothesis was rejected, indicating that with increase in use of social networking sites usage, mental health of undergraduate social networking sites users get deteriorates. The result of present research paper is in consonance with studies conducted by O'keefe et al. (2011) and Vivekanandan et al. (2016). Plausible explanation for deterioration of mental health with use of social networking sites can be seen in upward social comparison hypothesis (proposed by Festinger, 1954), social isolation hypothesis and social withdrawal hypothesis (Kraut,1998). Individual get engaged themselves in upward social comparison on social networking sites and who uses social networking sites heavily have less face-to-face interactions effecting one's social support system eventually leading to ill mental health (Kraut,2002).

Hypothesis 2 Mental health is significant predictor of social networking sites usage among undergraduate social networking sites users.

The second hypothesis was confirmed, indicating that mental health plays a significant role in predicting SNS usage of undergraduate social networking sites users. A study by Yao et al. (2013) suggested that mental health status such as depression, anxiety, somatization are predictors of internet addiction which is in line with present study findings. On

contrary note, past researches disclosed that mental status of user (Zhu et al.,2011) and mental health dimension such as anxiety (Hao et al.,2013) can be predicted by examining his/her web page behaviors. Earlier researches very well stated that individual with mental health problems may be using SNS to seek interaction and social and emotional support (Sampasa-Kanyinga & Lewis, 2015).

6. CONCLUSIONS

In conclusion, the current study demonstrated that there is statistically significant and negative relationship between SNS usage and mental health. Findings also highlights that mental health is a significant predictor of SNS usage. The implications of the findings is that *students* should be self-aware about their usage, keep track of the time spent on social networking sites and must learn time management skill and make out some time for outdoor activities too along with health use of social networking sites. *Parents* must abreast themselves with the signs of excessive SNS usage, fix some time limit and reasonable rules for SNS usage ,ask their wards to spend gadget free time at home and encourage their wards in indoor and outdoor activities to ensure balance between real life and virtual life activities. *Counselors* and *government* should arrange awareness campaigns to educate parents, teachers and society at large about not so-good aspects of SNS usage as how it can harm one's mental health could lead to future prevention. Government should provide adequate funds to researches and related regulatory bodies should be conversant with researches conducted for reframing of internet related policies according to needed change**.** *Policy makers* in the field of education should incorporate the teaching of responsible use of social networking sites in curriculum keeping in mind the health consequences of SNS usage.

Limitation of the present study is that mental health predicts only 5.7 % of variance in social networking sites usage. Future study should undertake other psychological variables such as peer pressure, rumination, social connectedness to test their predictive ability in determining social networking sites usage among adolescents. Studies of similar nature should be conducted on larger population with diverse settings to obtain more generalized findings. It is important to mention that current study focused on relationship between SNS usage and mental health at single time point with only Indian population as sample. So studies longitudinal in nature should be conducted to determine casual relationship between SNS usage and mental health.

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How institutions create value for the rural marginalized person: A comparative analysis

Aritra Chakrabarty[1], Chetan Singh Solanki[2]

Abstract

Studies on rural development have primarily focused on poverty alleviation (D Gangopadhyay, A.K. Mukhopadhyay & Pushpa Singh 2008). Later on, renewed interest in human development and welfare in developing countries led to broadening the idea of rural development to include social development as a prerequisite (Papakonstantinidis L.A. 2017). According to Mishra and Sharma (1979), rural development includes developing quality of life of the rural masses into self-sustaining and self-reliant modern communities. In developing nations, there has been special emphasis on the role of voluntary organizations in development. This is a due to inefficient bureaucracy and government bottlenecks to execute developmental programs (M Shamsul Haque 1997). This article looks at four kinds of formal institutional structures in India that have evolved for improving the rural livelihood, namely- private company model which is involved in a primary produce, a cooperative model established by act of legislature, a non-governmental organization (NGO) led project-based intervention model, and a producer company (PC) model which has been a recent development in the Indian economic scenario. The paper adopts a quantitative analysis of these models. Data on share of labour in total cost of production for these four models is obtained from secondary sources as well as primary sources. It is observed that an institutional arrangement has a strong bearing on rural development which has not been explored hitherto in literature. Out of the four models studied, the NGO-intervention based model creates the highest value to the rural marginalized person and at the same time, makes the target community a stakeholder of the model. However, one major shortcoming of this model is that is temporary in nature and solutions need to be explored to make it self-sustaining.

Keywords: *rural development, institutions, production, labour, cooperative model, producer company, non-governmental organization*

1. INTRODUCTION

DURGA is a private limited company which is owned by the women members of the Cluster Level Federation (CLF) of Dungarpur, Rajasthan. This CLF is a part of the institutional system formed under the government mandate. Every state has its respective State Rural Livelihood Mission (SRLM) body responsible for livelihood creation, employment generation and generating finance for the poorest of the poor. To achieve these overarching goals, the SRLM forms Self-Help-Groups (SHGs) at the ground level which are governed by CLF. An SHG, on an average consists of 12-15 women members. A group of about 10-12 SHGs form a CLF.

The institutional analysis of Dungarpur is based on the above premise and the objective of this analysis stems from the following idea:

Gandhi's talisman

"I will give you a talisman. Whenever you are in doubt, or when the self becomes too much with you, apply the following test. Recall the face of the poorest and the weakest woman [man] whom you may have seen, and ask

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yourself, if the step you contemplate is going to be of any use to her [him]. Will she [he] gain anything by it? Will it restore her [him] to a control over her [him] own life and destiny?

The objective of this study is to understand the gains to the poor, adivasi woman given the institutional arrangement of DURGA. In order to establish that, this paper will consider the three forms of company structure- established as a cooperative society, as a private limited company and as a producer company. By definition of the above three types of company structures, DURGA falls under the category of a private company limited by shares. Nonetheless, its administrative arrangement is based on the administrative arrangement of the CLF of Dungarpur. Therefore, this study will critique the ownership and administrative model of DURGA, based on the study of the three different types of company structure-

- Production cooperatives- which primarily deal with agricultural and industrial production such as farming cooperatives, industrial cooperatives.
- Producer Company- only certain categories of persons can participate in the ownership of such companies. The members necessarily have to be primary producers, i.e. persons engaged in an activity which is connected to primary produce. A primary produce is that which is arising from agriculture including animal husbandry, horticulture, floriculture, pisciculture, viticulture, forestry, forest products, re-vegetation, bee raising and farming plantation products: produce of persons engaged in handloom, handicraft and other cottage industries: by - products of such products; and products arising out of ancillary industries.
- Private company limited by shares- the liability of the owners is limited to the extent of nominal value of shares held by each of the owners. For a private company, the minimum paid up capital combining the total amount paid by the owners should be of 1 lakh or more, as prescribed by the Companies Act. It can have a maximum of 50 members and no less than 2 members as shareholders.

2. LITERATURE REVIEW

Cooperatives are governed by the Multi State Cooperative Societies Act, 2002. A cooperative is created to satisfy the twin objective of meeting the individual economic needs of the members and at the same time, ensuring profitability and sustenance of the enterprise (FAO report, 2012). In essence it is a democratic set up which aims to fulfill the social, cultural and economic aspirations of each of the members of the cooperative while maintaining a healthy profit for the enterprise. However, in reality these are more bureaucratic in nature than people led (Hegde, Narayan, 2013). A cooperative organization has the advantages of easy access to financial and administrative support for developing infrastructure and services that will boost production (Hegde, Narayan, 2013). The disadvantage is the lack of equal participation of all farmer members. Since the formation of a cooperative is more of an enforced directive without clear cut objectives, it leads to inefficiency in operation and dominance of small number of members. The main objective of forming a cooperative producer company is to pool the resources of the individual members which can inculcate joint management among the members for the resources and work towards a common objective of maximizing produce. However, cooperatives, especially agricultural cooperatives have met with limited success in India due to the following reasons:

- lack of educated and enlightened leadership in rural areas,
- lack of social consciousness among lead members,
- over-emphasis on membership rather than on quality,
- failure to create confidence and enthusiasm among farmer members,
- lack of transparency in operation of the cooperative

As a result, cooperatives, by and large failed to move the lowest stakeholder up the value chain and create a sense of business ownership due to mainly bureaucratic issues, power struggles among members and lack of emphasis on core activities (Venkattakkumar, R & Sontakki, B.S , 2012).

Producer companies are a hybrid between private companies and cooperative societies. In order to combine the efficiency of a private company with the welfare spirit of cooperatives. The aim is to integrate small holders into modern supply networks to minimize transaction and coordination costs while benefiting from economies of scale (Lanting, 2015). This new concept came into existence as an outcome of the recommendations of the Y Alagh committee. The Companies Act of 1956 was amended (Section 581) in 2002 which paved the way for incorporation of producer companies (Alagh, 2007). Since then, about 150 producer companies have been established covering wide range of commodities (Venkattakkumar, R & Sontakki, B.S , 2012).

In general, most of the producer companies at present are promoted and supported by NGOs, developmental agencies or sponsoring organizations. It has been recognized that a producer company requires a supportive eco-system which comprises of promotional agency, financial institutions for working and fixed capital, training and capacity building institutions for both leadership and management (Ajit Kanitkar, 2016). Most of these promotional agencies are currently are providing technical services and inputs to the producers for collective marketing. The major issue concerning the producer companies is that the concept has not yet received incentives from the central or state governments (Ray, 2007). These companies need huge amount of working capital for its entire range of activities including marketing as well as extending credit, loans and advances. The equity capital of the producers is inadequate. Banks refuse to lend to these companies due to lack of central or state guarantees (Venkattakkumar, R & Sontakki, B.S , 2012). In the absence of formal institutions in rural, a budding rural entrepreneur ha little option but to depend on some form of informal financial arrangement.

3. ANALYSIS

The analysis of this study adopts a comparative review method of the four types of company structure- cooperative society, Producer Company, private limited company, NGO led company. For these four forms, we'll look at-

- Rangsutra –producer company
- DURGA- a private limited company
- NGO model of Dungarpur
- Gujarat Cooperative Milk Marketing Federation (GCMMF) – dairy cooperative

Private Limited Company model-Labourers are at the lowest order in the organizational hierarchy and their share in production is reflective of the same. The cost figures used in analysis have been obtained from a private company (whose name is withheld due to reasons of anonymity) which is in the business of solar panel and module manufacturing and sale. The data, is thus, to be treated as primary source of data for this study.

The data relates to the cost of production of the solar panel and solar lamp by the vendor, when produced for sale in the open market. The total cost of production is INR 418, out of which, manufacturing cost is INR 60. It implies that approximately 14% of the production cost is the actual cost of production in the factory and the remaining is the cost of raw materials. For the sake of simplicity of analysis, this study will represent manufacturing cost as purely labour cost of production. (further explanation needed here).

Given the retail price of the solar panel and solar lamp, taken together as INR 600 (as stated in the SoUL lamp+panel kit), the profit percentage as a share of production cost is 43.5%. It can fairly established from the data that an economic actor in an institutional arrangement of private limited company has very low value addition to his/her livelihood in monetary terms. Given the selling price of the solar panel and lamp kit, the labour share in production cost indicates the extent of control over resources a labour has in a private company model.

In the case of DURGA, the workers in the factory are paid an average wage of INR 253 per day for the role of operator at the factor and INR 190 per day for the role of technician. the total cost to of production of a panel is INR 80 out of which, INR 65 is the cost of raw material and INR 15 is the manufacturing cost. Continuing with our assumption of manufacturing cost representing as labour cost of production, the share of labour then stands at

18.75%. As compared to this, in the MSP model, the assemblers and distributors, combined were appropriating a share of 27.8% in the total expense of the NGO. This share was little higher in the Dungarpur model of the previous phase, where the assemblers and distributors combined had 30% share in the total expense of the Cluster Level Federation (CLF) in Dungarpur.

Non-Governmental Organization model- In building a business based on the concept of rural development, the biggest hurdle faced is access to finance. In a study conducted by International Network on Gender and Sustainable Energy (ENERGIA) of energy projects across countries such as Nepal, Senegal, Kenya, Nigeria, it has been highlighted that across all four types of institutional arrangements namely, NGO-led, Cooperative-led, Producer Company or Private Company, creating a capital base for starting a rural business enterprise and ensuring equitable distribution of revenue to the persons involved in the enterprise are the biggest hurdles (ENERGIA, June 2017). However, interestingly, a lot of the barriers relating to access to finance are non-financial in nature. These includes among others, the legal and regulatory environment, education and awareness among women, and lack of interest within financial institutions to give finance to female clients. The report refers to a success story in Indonesia, where the local NGO (Kopernik Solutions), works with women to develop supply chains to connect clean energy technology to last mile consumers. The NGO trains local women in technology use and maintenance, sales and marketing, bookkeeping, agency and empowerment. In order to make the women entrepreneurs economically stable, the NGO formed network with credit unions where the entrepreneurs were members.

For any NGO to create and sustain entrepreneurship among local communities, especially women, the crucial aspect is agency building among the individuals. Agency in sociology is defined as the 'ability to influence one's life' (Mortimer and Shanahan, 2003). In the field of economics, Sen (1985b: 203) has defined agency as 'what a person is free to do and achieve in pursuit of goals or values he or she regards as important'. In the case study of Indonesia given in the ENERGIA report, Kopernik provided opportunities to local women to become leaders of their communities by changing the status quo of energy access. The training of women is a part of agency building process where NGO intervention leads to individuals pursue goals, in this case, become entrepreneurs.

In the MSP phase of the project, a similar NGO model was adopted wherein, the local community, in particular, the women were trained on assembly and distribution of the solar lamp, repair and maintenance of the lamp post distribution, and were paid for every lamp assembled, distributed and repaired during the project duration by the NGO. Out of the total INR 500 expenditure per lamp, the NGO had INR 90 share in it, or 18%. Within that proportionate share, every local woman trained had approximately 28% share in the total expense of the NGO.

Table 1: Financial analysis of the NGO model in the MSP phase

Expenditure (INR)	Expenditure Items of the NGO	% distribution of NGO expenditure
90	Total expense	100
55	Operational expense	61.12
10	Assembly	11.12
15	Distribution	16.67
10	Repair and Maintenance	11.12

Source: Financial data of the MSP project

The important aspect of the NGO-led intervention model is the outcome where women become leaders of change for their communities (ENERGIA, September 2017). In the same context, the MSP model, which was NGO based intervention, appropriated a sizeable economic share to the local women, who in turn became the stakeholders of the project, developing a sense of ownership along the way. This is made possible because NGO-led intervention model is based on agency building. It involves empowering the individual to take decisions, economic in nature, which will produce monetary benefit to the individual, and when it is collective in nature, results in development of the group. Ultimately, a group acting together can reach a higher level of economic development, as compared to individual efforts alone (Pranab Panday, 2016).

Producer Company model- For the analysis of a Producer Company, the paper looks at literature on non-farm producer companies. The available literature on producer companies is a limited universe and within that, data on non-farm Producer Company is further limited in scope and methodology. The evolution of PC model in India has been a boon for the farming sector, as suggested in literature. However, the presence and use of the PC model in the non-farm sector has not been observed extensively, and even if some scant number of such cases exist, their rigorous study from literature is missing. Nonetheless, for the interest of this research, we will rely on an available case study of a non-farm producer company named Rangsutra.

The point of approach for this PC is from the value-chain perspective, based on the argument of how PCs are creating pro-poor value chain interventions (Pastakia. A, 2012). Given the thematic concept and practical approach of the research, reliance on this literature implies a mild departure from the nature of the paper. In spite of the limitation, the literature on Rangsutra can be referred to, for understanding the PC pattern of a non-farm scenario, specifically with regards to how the stakeholders (craftsmen) in this case, own and manage the Rangsutra organization.

Rangsutra PC was promoted with membership of the artisan groups and a paid-up capital of 0.1 million, the minimum amount required to form a producer company (AIACA, 2008). It was formed to generate sustainable livelihood by bringing together all parts of the supply chain. This was done by bringing together small producer groups of artisans, weavers and managers (AIACA, 2008). There are 10 shareholders representing five artisan groups and five individuals. The objective of this PC is to access government grants for the purpose of developing artisan clusters. The business model of the PC in terms of revenue generation, relies on providing consultancy charges to other NGOs. Its core business is to market and sell handloom and textile products, through strategic tie up with Fab India, a leading marketing company in the domestic market with fair-trade values. To raise additional capital, Rangsutra formed a private limited company in 2007 with a paid up capital of 5 million (Pastakia. A, 2012).

Table 2: Ownership model of Rangsutra PC and Rangsutra Pvt. Ltd. Company

PC –Rangsutra Crafts Duniya	**Pvt. Company -Rangsutra Crafts India**
Initial investment of 10% at INR 10,000 each	25% ownership of each stakeholder
Five NGOs comprise 50% of the initial capital	One stakeholder- Is the artisan group of NGOs combined
Five sector specialists	Second stakeholder-Sumita Ghose (founder)
	Third stakeholder –Aavishkar (venture capital fund)
	Fourth stakeholder- Artisan Microfinance Pvt. Ltd (joint venture)

Source: AIACA, 2008 p:5

The key understandings from this case study are-

1.It is more practical to set up separate institutions to carry out commercial, developmental and welfare functions in a value chain intervention.
2.The separation of institutions/organizations on the basis of functionality of the organization is a major learning for creating livelihood for the rural marginalized person.
3.Business enterprising activities, in the hands of the stakeholders results in low revenue for the company. It is beneficial to appoint sector specific individuals with shared interests in the PC to run the enterprise.

The role of institutions in adding value to rural livelihood depends on how the institution is being defined, specifically with regards to roles and responsibilities. Such well-defined divisions help the stakeholders (labourers) in understanding their contribution and participation in the economic activity of the organization. Having well defined monetary stake, which states the labour share in production cost and share in profit in exact monetary terms has an outcome of the enterprise.

Cooperative model- there are three types of cooperatives:

- Production cooperatives- agricultural and industrial production
- Marketing cooperatives- agro-market and consumer cooperatives
- Service cooperatives- co-operative banks, co-operative credit societies, co-operative housing societies.

Among these, this paper relies on the case study of dairy cooperative as one of the forms of production cooperatives (Sood. Jyotika, 2014). A cooperative has a three-tier structure- village level cooperative society formed by farmers which elects its members and chairpersons. These societies then join to form district-level unions. The chairpersons of these unions form the board of directors of the state level federation.

The Gujarat Cooperative Milk Marketing Federation (GCMMF) has 3.6 million members spread across 18 member unions and has an annual output of 6.44 billion litres of milk (2017). At the end of each year, the federation shares its profits with the dairy farmer, who is a stakeholder in the federation, as per his/her contribution of milk. The three-tier cooperative structure is the foundation of Anand cooperative at Kaira, Gujarat. It is practiced in three main activities-management of the cooperative, collection of milk and distribution of profits among the farmers. Post 1991, however, saw the entry of private players and with that, the efficiency of cooperatives became questionable. The main problem affecting the cooperatives is politics. GCMMF and its brand flourished under the patronage of one political regime. The government treats cooperatives as their private institutions and restructures management based on the vested interests of the government. Hence, the democratic-set up is tarnished and the members do not have an equal say even though they're shareholders of the cooperative. Cooperatives have been strong institutions but currently they are plagued by many pressures and problems associated with the obduracy of existing orthodoxies (Bhandari. Vivek, 2010).

The Anand pattern of cooperative structure has one unique point which is not present in the case of other dairy cooperatives- managerial decision making, and marketing activities are in the manner of private company model. In other words, the producers are the owners of the cooperative and the revenue/profits are shared among each farmer according to the value contributed to production, access to market, access to finance, decision making are under the control of professional management.

To understand the exact share of labour in production of milk, the study relies on secondary data. The analysis of the same is presented in the table below.

Table4: Financial analysis of the Cooperative model of GCMMF

Average procurement per day	19.3 million liters
Number of farmer members	3.6 million
Average procurement per farmer per day*	5.36 liters
Milk procurement price (cow milk)	28 INR
Average earning per farmer per day*	150 INR
GCMMF revenue for 2015-16 (INR)	229720 million
Revenue per day* (INR)	765.7 million
Revenue per farmer per day*	212.7 INR
Labour share in production*	70%

where * implies calculated values

Sources: Data on annual revenue and farmer members is published on AMUL website;
Data on average procurement per day and procurement price from media report

The case study of GCMMF in cooperative model is one of the few positive exceptions in the current dairy cooperative sector. The selection of this institution for analysis can be considered as flawed, in that regard. However, the paper, is attempting to bring out the factors which have caused this exception, or in other words, what would have been the case otherwise. It has already been established in this study that the main cause of inefficiency of the cooperative model is the lack of ownership of the stakeholders and absence in decision making. The GCMMF study reveals two other aspects- the separation of managerial activity from bureaucracy, and access to market is depends on the network of vendors, which are outside the model. An analysis of 14 state milk federations has shown that only five federations have elected chairpersons, as established by process (Sood, Jyotika, 2014).

Considering the four case studies for the four different models, the paper has identified seven parameters from the analysis which can be selected for comparison of the models. The table below indicates which parameter is present among the four institutions. The presence of the parameter receives a score of +1 and the absence of the same is scored -1, and a score of +0.5 for limited presence. For labour share in production, the models have been ranked according to the financial analysis above.

The parameters are-

- **Agency building-** how an institutional model trains an individual to undertake activities for development of self, and in collective form, motivates the group for entrepreneurial endeavor.
- **Technology training-** whether an institutional model imparts technology-based skill training to the individuals required to earn skill-based livelihood.
- **Access to finance-** can the institutional model create links with institutions of finance, and source finance for itself to sustain the economic activity over time
- **Access to market-** is the institutional model capable enough to market its production, or has forged links with such entities which will link the organization to the market.
- **Ownership of resources-** is the institutional model based on equitable ownership of resources among the shareholders of the organization, according to each stakeholder's monetary input.
- **Decision making-** is the institutional model based on decision making by the stakeholders of the organization which creates sense of responsibility towards the sustainability of the organization among the members.

• **Labour share in production-** what is the share of labour in production of the output in the model. It indicates the value of labour in the model.

Table 3: Comparative analysis of 4 models based on select parameters

Parameters	**NGO-led model**	**Producer Company**	**Private Company**	**Cooperative model**
Agency building	Present	Absent	Absent	Present
Technology training	Present	Present	Present	Present
Access to finance	Limited scope	Limited scope	Present	Present
Access to market	Limited reach	Limited reach	Present	Present
Ownership of resources	Present	Present	Absent	Absent
Decision making	Present	Limited scope	Absent	Absent
Labour share in production	Medium	No data available	Low	Highest

Based on the above table, the final cumulative score for each institutional model (for six parameters, leaving out labour share in production), is as given below.

Table 5: Cumulative scores for each institutional model

NGO model: 3.5	Producer company: 3	Private company: 0	Cooperative model: 2

The models have been ranked for the seventh parameter, i.e. labour share in production (no data is available for producer company). On this account, cooperative model is ranked 1st, followed by NGO-led model, and finally private company.

4. DISCUSSION

The analysis of the selected case studies for the four institutional models have revealed interesting insights about the role of institutions in rural development. In comparison to what literature has to say, the analysis of this paper shows that NGO-led model and producer company model are at par when it comes to adding value to rural livelihood. The study of literature suggests that producer company structure has brought about major improvements,

combining the elements of both cooperatives and private company. However, the impact and outcome it has on rural development is limited as compared to NGO structure for one crucial reason-agency building.

The strength and capabilities of the rural communities to undertake a path of life towards development is one of the principal processes and part of the institutional arrangement of NGO intervention model. In a producer company model, the sustainability of the organization is dependent solely on the latent capabilities of the members into organizing themselves into an economic unit. Even though a PC is better equipped at technology training of labour, but there lies an inherent flaw- the institution considers the stakeholders at a lower end of the organizational hierarchy. The study of the PC in this paper, shows that in order for a PC to sustain, it needs to form a separate entity to ensure its business success. In this case, a private company was formed which looks after the marketing and managerial activities. In the case of an NGO intervention, the stakeholders are made capable to undertake such activities.

In the case of private company, it is clearly visible that labour has no decision making power, neither any ownership on resources. Moreover, the share of labour in production in monetary terms is the least among others. The case of private enterprise as an institution for rural development is ruled out.

Cooperative model has been in existence since the time of Indian independence and were developed to solve the issue of underdevelopment of the rural economy. They were established on a democratic set-up (Sood, Jyotika, 2014) which would provide equal opportunity and equal say in matters concerning collective development. However, the three-tier structure, in spite of federal nature, has failed in recent times, as bureaucracy became increasingly involved in the management of the cooperative. The cooperatives have become a stage show of the incumbent governments, from time to time (Hegde, Narayan, 2013). Secondly, the contractual nature of relations of the farmer/producer with the cooperative (Sreenivasaiah, K and Chellakumar, Arul, 2016), implies there is no sense of ownership among the stakeholders towards the organization.

In the scenario of an NGO model, because by nature, it's a pro-poor value chain intervention, wherein the NGO creates and allocates power across the value to the targeted community (Cooper. Liz, 2013). In the study of NGO model of MSP phase, the transfer of skills, employment creation and responsibility of the project to the local community empowered them to engage in the economic activity, enabled them to take business decisions, at least during the project duration.

Limitations of the study

This paper is limited in its scope and outcome because of the limitations imposed firstly by unavailability of data, secondly lack of exhaustive literature on cooperatives, private company and Producer Company models. With regards to the analysis presented in this paper, it is very rudimentary and when compared to qualitative analysis methodology established in literature, it has its own failings. The paper will not be able to explain to draw causal relations between the parameters shown in the table. A chi-square test of the parameters will reveal how each parameter influences (strengthens/weakens) the effect of another parameter on the efficiency of institutions in rural development. A robust analysis of each institutional model can be achieved if enough secondary data evidence is present.

Labour share in production is an important, and the only quantitative parameter present in this study. A scientific approach towards its analysis is needed, which requires higher granular of financial data, particularly on labour cost of production and revenue generated per labour input. These data points, over a time span, will provide the paper the longitudinal analysis to strengthen its argument.

Another angle which can be added to this study is the value chain approach of analysis, i.e. how much monetary value each stakeholder in the value chain is appropriating from the economic activity. This will increase the reach

of the study to include the domain of value chain analysis in study of institutions, which has not been undertaken so far.

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Sustainability Strategies in the Health Sector

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Abstract

Sustainability research mostly focused on manufacturing sector and neglected healthcare aspects. However, sustainability is an issue that concerns all sections of society, also sustainability is a common goal of both businesses and civil society. Therefore sustainability studies in the health sector are important for a healthy society. This study is a literature review on sustainability of health sector. The study involves review of papers analyzing sustainability on healthcare as compared to sustainability strategies of manufacturing sector. We try to filter studies in such a way that puts forward conflicts, trade-offs, synergies, strategies and enhancements regarding healthcare goal besides economic and environmental goals. Because sustainability for health sector is divided into two; the first is social responsibility towards society that is external stakeholders, and the second is social responsibility towards employees and patients that are internal stakeholders. Finally, in this study we attempt to investigate in detail sustainability strategy within an organization involved in the health sector in Turkey.

Keywords: *sustainability, strategies, health sector*

1. INTRODUCTION

The most well-known definition of sustainability has arisen in 1987 when the Brundtland Commission defined "Sustainable Development" in the document "Our Common Future". According to the document, sustainability is meeting the needs of the present without compromising the ability of future generations to meet their own needs [1].

Sustainability is emerging as a competitive advantage for many organizations. Sustainability research mostly focused on manufacturing sector and neglected healthcare aspects. The challenge for most organizations is how to organize the wide-ranging efforts that support environmental and social sustainability, and effectively integrate them into ongoing operations.

Social sustainability is at the forefront of health care because environmental dimension is ineffective because there is no production. Therefore, social sustainability in healthcare is the most dimension/pillar because it creates a difference.

Sustainability balances the economic, environmental and social impacts of an organization's operations. Environmental impacts typically refer to an organization's relation to the natural earth systems, including consumption of non-renewable resources. The social component of sustainability can be more difficult to define. Social sustainability addresses a business organization's relationship to the community and society where it operates. It includes activities around human rights, labor practices, fair operating practices, consumer support, health and safety, and community involvement and development. While manufacturing firms were among the first to adopt sustainability initiatives, service industries such as healthcare have begun to more aggressively embrace sustainability. Healthcare, as one of the largest service industries, represents a significant opportunity for dramatically affecting economy-wide sustainability performance. Healthcare facilities consume enormous amounts of energy. The average hospital uses more total energy than any other commercial building type, and is second only to retail food establishments in energy use per square foot. On the other hand, healthcare facilities use a multitude of cleaning chemicals, which result in potentially hazardous wastewater effluents. The hazardous chemicals used for anesthetics are often vented, creating potentially hazardous air emissions. Hospitals also have significant social impact in their communities. First, hospital employees directly impact their communities. They are the largest employers in many communities. Next, accessibility to healthcare is important for community health. Healthcare provides services that support community wellness, disease prevention and emergency preparedness. Consequently, proximity to and density of healthcare services is a significant indicator of community attractiveness and quality of life. Finally, hospitals offer a range of services that have significant spillover effects on the surrounding communities, including attracting businesses, skilled workers and new residents. The scope and size of

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healthcare's social and environmental impact represent tremendous opportunities for the industry. Nevertheless, effectively implementing sustainability in healthcare organizations presents a unique challenge. Healthcare is one of the most complex and rapidly changing industries. Healthcare is continually transformed by new techniques, technologies; pharmaceuticals and delivery systems. Healthcare system managers are under pressure to simultaneously improve cost efficiencies, patient safety and quality. Sustainability in healthcare must address a wide variety of activities while maintaining quality of care. [2].

Based on the sustainability, we can divide the social sustainability into two categories for the healthcare or hospitals. The first social sustainability is towards patients (or society) that is external stakeholders, and the second social sustainability is towards employees/personnel that are internal stakeholders. The purpose of this paper is to analyze current problems by evaluating the social sustainability of existing facilities at a private hospital in Istanbul and suggest possible advices for further research in this area. Main problems that initiated this research were:

- unsustainability of hospital (healthcare) facilities,
- lack of strategies and knowledge base in healthcare and
- no research regarding social sustainability.

Moreover current studies are mainly oriented on evaluation of either economic or environmental aspects of sustainability, so this research will be focused on assessment of social sustainability of healthcare facilities or hospitals.

On the other hand, "Human beings are at the center of concerns for sustainable development. They are entitled to a healthy and productive life in harmony with nature". The goals of sustainable development cannot be achieved when there is a high prevalence of debilitating illnesses, and population health cannot be maintained without ecologically sustainable development. Despite undoubted health advances in many areas, poor health continues to be a constraint on development efforts. In some cases the process of development itself is creating conditions where, as a result of economic, political and social upheaval, environmental degradation, and uneven development or increasing inequities, human health suffers. Many of the key determinants of health and disease lie outside the direct control of the health sector. Addressing the underlying determinants of health is to ensuring sustainable development and sustained health improvements in the long term. Much progress has been made in forging closer links between health and other sectors, particularly through local and national health and development plans and through increased use of planning tools such as health impact assessment procedures, integrated monitoring and surveillance systems and improved health information systems and indicators. [3].

However, healthcare systems (or hospital systems) vary significantly from one country to another and can have regional variation within a single state (e.g. within the UK there are differences between England, Wales, Scotland and Northern Ireland). While the nature and configuration of these healthcare systems has been documented in many different sources (e.g. Lee and Goodman 2002) further analysis of their appropriateness in modern times is limited. Healthcare systems around the world face a range of challenges, one of which is the existence of what is now termed economic and financial austerity. In many countries the operation of the healthcare system is an important political issue and any change to healthcare provision to meet emerging challenges is often fiercely resisted and consequently can prove difficult to implement. [4].

In Istanbul there are a lot of public and private hospitals so healthcare system is at high level of sustainability related to social security and human dignity, while treatments and health care are accessible for everyone. Also, hospitals have great role in enabling physical, mental and social well-being. Therefore, in this research we focus on current state of the private hospital. Although there are many hospitals in Istanbul, hospitals are currently unsustainable in social terms due to crowded population.

In today's economic climate, many governments are targeting healthcare expenditure for cost-cutting as part of broader austerity programs. A discussion on long-term sustainability therefore is timely to ensure that short-term priorities do not damage long-term value. Health system leaders need to think for the future, expanding the group of responsible stakeholders and breaking from the status quo to deliver high quality, full-access, affordable, sustainable health services. Looking to the future helps to improve the decision-making of today. A longer-term perspective provides an intellectual space devoid of current constraints, vested interests or immediate concerns, and enables us to focus on what really matters. Participants used a set of complementary methods, including visions, strategies, critical uncertainties and scenarios. This requires health system leaders to forge a new approach and create a new mind-set as they collaborate for change with a diverse set of stakeholders and partners. [5].

On the other hand; if a hospital has out-dated health care infrastructure, inappropriate design, with its non-adaptable and non-maintainable buildings, poor performances and overall insufficient conditions could result dissatisfaction of not only the employees, but also the patients and their families. As a result from this, sustainability approach becomes important. Also the physical facilities in which healthcare are performed play an important role in the healing process. If designed properly, hospital's internal environment can foster healing, efficient performance, effective actions, safe behavior and positive outcomes.

On previous research It is proven that hospital design can influence clinical results and personnel effectiveness in healthcare. Therefore the hospital design should have a sustainable structure. A sustainable structure can be easily maintained and can be functional from the environmental, social and economic point of view, in order to comply with the diverse interests and needs of all the stakeholders. But, we cannot refer to hospitals just as buildings; we have to take into consideration their critical and sensitive nature – so hospitals are the place of healing. Modern new studies offer new an approach in defining health care sustainability that is not bound to environmental issues only. The new modern approach considers social sustainability and especially makes a focus point on patients' and personnel's satisfaction. In that sense the sustainability aspect of hospitals facilities in this research is concentrated mainly on user satisfaction. So the design of hospitals should consider the needs and preferences of the patients and personnel. As a result, sustainable hospital buildings strive to achieve health, comfort and safety of users and neighbors. [6].

In order to evaluate the social sustainability of hospital infrastructure, we focused mainly on previous statements, as well as on user perspective and experience. Therefore, main categories used for assessment of healthcare facilities are infrastructure and practices of the hospital. The first category – infrastructure was described by several the criteria such as: accessibility, public relations, hygiene, noise, temperature, natural lightning, air quality, guidance, privacy policy, rooms and equipment, areas flexibility, open green areas, social environments / areas and car parking etc. Practices category are defined by security, evacuation plan, strategies and strategy planning, patient rights, employee rights, regular patient / disease control and private health insurance.

2. METHODOLGY

In Istanbul (Bahcelievler) a big private hospital was selected as a case study. A group of key stakeholders consisted of patients, non-medical and medical staff from the hospital were selected to collaborate. Both qualitative (interviews and observation) and quantitative (surveys and questionnaires) methods were used. This study is providing a framework model for evaluation of social sustainability of healthcare facilities or hospitals. The framework model of the research was divided into these steps: literature research, choosing case study, choosing stakeholders, defining criteria, conducting the survey / interviews and analyzing results.

Based simply on user observation, we can argue that the private hospital has significant problems in the domain of design, indoor and outdoor spaces, and most importantly user satisfaction. Choosing stakeholders for this research was rather easy, and we focused on the most relevant and most frequent users, stakeholders were selected. Directors and senior managers were not asked to participate. A group of key stakeholders consisted of patients and visitors, as well as medical and nonmedical staff from the private hospital. A total number of 145 people were completed survey.

Before conducting any surveys / interviews, participant observation technique was used for collecting data on naturally occurring behaviors of patients and staff in their usual status the hospital. In-depth interviews and surveys were optimal for collecting data on individuals' personal perspectives, and experiences, particularly when sensitive topic like this one is being explored. As result of this; they revealed important information about main problems and potentials of the hospital indoor and outdoor areas, physical and functional characteristics (means that infrastructure) and practices of the hospital. Besides from the literature research and good practice examples, observation and pilot practice were main methods for creating specific set of criteria for evaluating social sustainability. This criteria method is used by different public institutions or businesses and academic researchers to carry out sustainability monitoring and evaluating programs. On the other hand the criteria point out practical, measurable standards that could be used for similar research in different hospitals. Therefore they may differ, as well as the criteria, according to the healthcare facility or hospital toward which the sustainability evaluation system is addressed.

The survey was conducted during the period of three weeks. Number of 100 patients with visitors, and 45 members of hospital staff participated, which represent a sample of more than 10 % of all users from the private hospital. After this period the results were collected and processed.

3. RESULTS

The results of the research are seen in defining key problems which are necessary to overcome in order for the healthcare facilities or hospitals to be socially sustainable. These are some of the questions that achieved the interviewing process: What is your overall satisfaction with the hospital? Which are the main problems and potential of the hospital?

The questionnaire was consisted of 23 questions based on criteria evaluated, and stakeholders were asked to evaluate their satisfaction with grades from 1 to 5 (five likert scale) for every question.

Interviewed patients are mainly satisfied with infrastructure of the hospital, especially accessibility of the hospital, the city transport systems and public relations. Hygiene, treatment rooms and patient rooms of the hospital were listed as advantages

especially in comparison to other healthcare facilities. On the other hand, interviewed patients are satisfied with practices of the hospital, such as patient rights, regular patient / disease control, and especially private health insurance. However, because of complex floor plan, poor guidance system and lack of personnel lead to disorientation of both patients and visitors. The main problem is "lack of car parking". Another important issue is "no open green space in the hospital status".

During the interviews with hospital personnel the main potential they were focused on is that this type of large-scale tower block hospital can offer every type of treatment in one building. On the other hand, lack of daylight and long hallways, offices mostly without natural light, lack of oxygen and temperature differences between indoor and outdoor spaces are affected work efficiency of the personnel. Interviews also demonstrated that there is no specific strategy or plan in case of fire area or emergency accident (for example earthquake), so the overall practices of the hospital are rather questionable.

However, participants who are hospital personnel satisfied with certain infrastructure elements, such as accessibility, public relations, hygiene, operating rooms and treatment rooms etc. On the other hand, interviewed personnel are satisfied with practices of the hospital, such as employee rights and private health insurance. Both patients and personnel have demonstrated that they are least satisfied with air quality, open green areas and social environments; therefore there is no fresh air inside the hospital due to air-conditioning system.

Table 1. The results of patients' satisfaction with regarded criteria

Category	Criteria	Average Grade
INFRASTRUCTURE	Hygiene	4.23
	Noise	3.85
	Temperature	2.12
	Air quality	1.85
	Natural lightning	2.05
	Inspection / treatment rooms	4.12
	Operating rooms	4.15
	Patient rooms	4.20
	Guidance	2.05
	Privacy policy	3.95
	Accessibility	4.02
	Public relations	4.30
	Social environments / areas	2.15
	Area flexibility	3.50
	Open green areas	1.35
	Car parking	1.15
PRACTICES	Security	3.75
	Evacuation plan	2.45

	Strategies and strategy planning	3.80
	Patient rights	4.20
	Employee rights	4.00
	Regular patient / disease control	4.30
	Private health insurance	4.50

4. DISCUSSION

Our research process presented could serve as a new framework for evaluating quality of hospital facilities. In our study using both qualitative and quantitative methods collected locally specific knowledge about the hospital, but also providing general conclusions. Presented methodology explains both social sustainability level and specific critical areas related to the hospital, presenting good knowledge base for developing possible strategic solutions to improve overall hospital sustainability. Our research process has some limitations. The methodological problem regarding this research was of multiple natures. Firstly, it is quite certain that there were challenges while posing the research questions. Secondly, how to determine relevant criteria, that are at the same time specific for the selected hospital and participants, and could be universally used in similar researches in different regions. Thirdly, how to interprete the obtained results and rank them. Finally, the question remains, which stakeholders were selected and are their assessments of an objective or subjective nature? However, the importance of social sustainability is not the same for different groups of people.

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Social Sustainability in Food Supply Chains

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Abstract

Sustainable supply chain research mostly focused on economic and environmental dimensions and neglected social aspects. However, to achieve true sustainability social issues such as human rights, employee rights, worker safety and health, organizations that increase employee motivation, ethic, fair business conduct and activities to society should also be incorporated. On the other hand, social sustainability is a common goal of both businesses and civil society. This study is a literature review on social sustainability of food supply chains. The study involves review of papers analysing sustainability on social dimension as compared to environmental and economic dimensions. We try to filter studies in such a way that puts forward conflicts, trade-offs, synergies and enhancements regarding social goal accomplishment besides economic and environmental goals. Moreover, we attempt to investigate whether there is regional difference between social sustainability applications. We also try to differentiate social sustainability in terms of internal/ external impact management.

Keywords: social, sustainability, food, supply chain, review

1. INTRODUCTION

The concept of "sustainability" comes from the Latin "sustenare" word, which means "to hold up" or "to support". The word that progresses over time and means "to keep something going", then has also taken the following meanings: "providing extended support for the extended period and requirements", "causing a particular state, power or intensity to continue", "to keep up without any interruption" [1]. The most well-known definition of sustainability has emerged in 1987 when the Brundtland Commission defined "Sustainable Development" in the document "Our Common Future". Accordingly, sustainability is meeting the needs of the present without compromising the ability of future generations to meet their own needs [2].

Understanding the dimensions of sustainability is essential for full implementation. In general, sustainability requires a balance between economic and social systems and ecological conditions. A truly sustainable organization needs to take into account the economic, environmental and social dimensions of sustainability together. However, when we look at the literature on sustainability, it is clear that many researchers and practitioners focused on the economic and environmental dimension of sustainability, and paid less attention to the social dimension [3]. It is therefore generally accepted that social sustainability needs to be further developed to achieve a balance with environmental and economic sustainability [4].

Supply chains are complex systems where social dimension of sustainability must be examined. Because, in supply chain, stakeholders including suppliers, manufacturers, customers, and society need to be informed of not only "where" the products are made, but also "how" and "in what conditions" they are produced.

In this study, a literature review was undertaken to investigate social sustainability in food supply chains. A review was conducted aiming to collect and analyze the relevant papers in the fields of social sustainability and food supply chains, as well as to provide a future agenda for researches.

The paper proceeds as follows. Firstly, the information about sustainable supply chains, social sustainability in supply chains and food supply chains are given briefly. Secondly, the methodology used for the review is introduced. Thirdly, we present a descriptive analysis of the sample of papers reviewed. The last section cover discussion and conclusion herewith suggestions for future research.

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2. CONCEPTUAL BACKROUND

2.1. Sustainable Supply Chains

A typical supply chain (SC) is the interconnected network of supply, transformation and demand in which materials, services and information are processed [5]. Participants in the supply chain can be identified as producers, distributors, retailers, customers and service providers.

The integration of the concepts of supply chain and environment has actually emerged in the last thirty years. In the early 1990s, the concept of "*environmentally sensitive supply chain management*" was adopted by advancing industrial ecology and industrial ecosystem research. Subsequently, the concept of "*sustainability*" entered the enterprise environmental management dictionary. Along with the advancement of management principles and theories in connection with sustainable supply chains, additional investigation and critical analysis are required for a better understanding of this area [6].

From the triple-bottom line perspective, sustainable supply chain (SSC) is the co-operation of companies throughout the supply chain with the management of materials, information and capital flows, while taking into account the three dimensions of sustainability: economic, environmental and social objectives of customers and stakeholders [7].Transforming existing supply chains into sustainable supply chains to meet sustainability needs exerts significant pressure on organizations. The main actors who trigger this pressure externally are government, customers, stakeholders and non-governmental organizations [7]. In addition, organizations have to make their supply chains sustainable due to globalization, challenging markets, demand uncertainty and tough competition.

2.2. Social Sustainability in Supply Chains

The social dimension of sustainability and human development were first mentioned in the Agenda 21 plan adopted at the United Nations Conference on Environment and Development in Rio de Janeiro in 1992 [8]. According to the Agenda 21, human is the key element for sustainable development and the improvement of human resources for the health and safety of children, youth and women; the improvement of quality of human settlements and the living and working environments of all people; the protection of human health conditions etc. are among the objectives for social sustainability [9].

The integration of social sustainability and supply chains begins with the management of social issues such as equity, health and safety, labor rights, philanthropy, and product responsibility, that affect the safety and welfare of the people in the supply chain. Mani et al. [10,11] have indicated that social issues affect every level of the supply chain and have addressed social sustainability in terms of suppliers, producers and customers. However, determining the global and universal social sustainability dimensions in supply chains is challenging. Because different concepts are remarked between developing countries and developed countries.

2.3. Food Supply Chains and Sustainability

Food is one of pillars for ensuring the continuity of communities. It is fundamental to health, happiness and political stability. Therefore, it is significant to ensure the supply of food in all the circles of the chain, from farm to folk. Typically, a food chain includes agriculture, food manufacturing, food and drink wholesaling and retailing, and the food catering and service [12].

Food quality is another important issue in the food supply chains. The traditional view of food quality was based on appearance, technical quality and biological quality. Thus, it was good quality food that looked good, tasted good or had no harmful effect. In recent years, this definition has extended to take into account various factors related to cultural, environmental and ethical values [13]. In this context, sustainability and quality food seem to intersect within the same intention.

The food supply chain has significant implications for sustainability including pollution, labor standards, ethics in supplier relations and waste issues. The intensity of greenhouse gases (GHG) during the production of food is another dimension of sustainability considered in the food supply chains. The UK Sustainable Development Commission has combined many different stakeholder views to produce an internationally applicable description of "sustainable food supply chains":

- Produce safe, healthy products in response to market demands and ensure that all consumers have access to nutritious food and to accurate information about food products.
- Support the viability and diversity of rural and urban economies and communities.
- Enable viable livelihoods to be made from sustainable land management, both through the market and through payments for public benefits.
- Respect and operate within the biological limits of natural resources (especially soil, water and biodiversity).

- Achieve consistently high standards of environmental performance by reducing energy consumption, minimizing resource inputs and using renewable energy wherever possible.
- Ensure a safe and hygienic working environment and high social welfare and training for all employees involved in the food chain.
- Achieve consistently high standards of animal health and welfare.
- Sustain the resource available for growing food and supplying other public benefits over time, except where alternative land uses are essential to meet other needs of society [14].

3. METHODOLGY

3.1. Description of Research Methodology

The present paper aims to conduct a literature review on social sustainability at food supply chains and provide the current status of the research field by classifying and analyzing the relevant papers. Google Scholar database was considered for the study because of its wide coverage of peer-reviewed academic literature: scientific, engineering, social sciences journals; books and conference proceedings. Our keywords were 'sustainability', 'social sustainable' and 'food supply chain'. We searched these keywords in both abstract and title. Also we looked for these keywords and their combination in the title; abstract; and full text. There are two purposes of this paper. First, it offers a literature review on social sustainability for food supply chain management. Second, it offers a conceptual framework to summarize the literature review in this area with four parts. Our framework will be presented in four parts, which are called:

- Research method employed
- Social indicators (for social sustainability) intended to four category
- Drivers/ enablers/ critical success factors (CSFs) for social sustainability implementation in food supply chains
- Barriers for social sustainability implementation in food supply chains

3.2. Descriptive Analysis

We carried out an in-depth analysis of the 49 articles about social sustainability and we classified them based on the categories that are identified above. Our paper categorizes all the available literature along various categories: growing number of publications across time period, research methodology, enablers and barriers for SSCM. Findings of these categories enable us to unearth research gaps and develop further research opportunities. The reason why the studies on social sustainability have been more after 2015 year is the suggestions of The National Research Council with the 2030 Agenda for Sustainable Development. The National Research Council submitted a general framework for assessing the entire food system. The framework moves beyond environmental sustainability, and considers social issues such as health [2]. On the other hand, it is possible to note that sustainability in food supply chain management becomes a topic of consideration after the 2008 Global Economic Crisis. So that social dimension of sustainability becomes relevant from 2015.

The research on social sustainability is dominated by the qualitative research methods such as case study, interview and conceptual studies, which all together contribute to 65.3% of the study in comparison to the quantitative research (34.7%). Social sustainability research can be advanced by means of mixed methodologies, which otherwise has mostly relied on a limited set of quantitative methods.

Figure 2. Distribution of the reviewed papers according to publication year

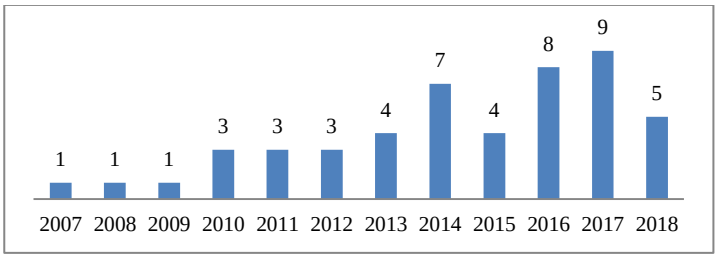

Table 1. Distribution of Research Methods

Research Method	No of Papers	%
Case Study	10	20
Case Study + Survey	3	6
Case Study + Interview	2	4
Conceptual	8	16
Interview	6	12
Literature Review	7	14
Mathematical Modeling	3	6
Mathematical Modeling + Case Study	2	4
Survey	7	14
Survey +Interview	1	2
TOTAL	**49**	**100**

Table 2. Sustainable social indicators

Category	Indicator	Authors
INTERNAL SOCIAL INDICATOR	Employment and production volumes	[15], [16], [17], [18], [19], [20], [21], [22], [23], [24]
	Employment gender ratio	[15], [16], [17], [18], [19], [22], [25]
	Employees' education, knowledge and skills	[26], [27], [28], [29]
	Wages	[15], [17], [18], [16], [19], [22], [30]
	Employee motivation	[27], [31]
	Work/Life balance of employees (Unsocial hours)	[32]
	Well-being of the employee (employees' health and safety) and his/her family	[23], [24]
	Annual employee/personnel turnover	[33], [34]
	Trained employees rate	[25], [35], [33], [28], [22]
	Number of improvement suggestion submitted by employees	[35], [22]
	Employee commitment (Responsibility for social and environmental concerns shared across the organization)	[31], [28]
	Long-term confidence among employee	[28]
	Absenteeism of employee	[25]

	Training per employee	[36], [37], [34], [29]
	Age of the farm owner	[24]
	Time since installation	[24]
	Urban distribution of firm's stores	[38]
	Work conditions (including overseas labor conditions) and work safety procedures	[20], [32], [36], [39], [22], [37]
	Product/service failure rate	[30]
	Accidents/incidents rate	[16], [25]
	Diversity	[37]
	Ethical trading schemes (Ethical vs. total products)	[16], [21]
	Reverse logistics/supply	[40]
	Firm's perception of its market share and its supply chain performance	[22]
	Investments in social projects	[37]
	Management levels with specific environment responsibility	[35], [22]
	New higher skilled positions in all the levels of the organization	[23]
	Traceability system (labeling)	[26], [27], [41], [36], [40]
	E-business system and communication	[36], [37], [29]
	Transparency system/management	[42], [36], [43]
EXTERNAL SOCIAL INDICATOR	Average customer/consumer satisfaction	[44], [22]
	Consumer complaints	[34]
	Consumer education and communication	[45]
	Consumer health and safety	[42], [36], [22]
	Firm's reputation in the social context (average reputation factor)	[27], [44], [22], [23]
	Bans and fines	[34], [46]
	Overall Sustainability Index	[15], [41], [47]
	Customer/consumer valuation (both retailers or supplier and consumers) by asking them about the WTP (Willingness to pay) of the new alternative)	[48]
SOCIAL INDICATORS TOWARD STAKEHOLDERS	Stakeholder engagement (initiatives) and community projects	[30], [34]
	Economic linkages with communities and contribution to community (Donations (e.g. school building))	[16]

	Multi-stakeholder commodity roundtables (meetings)	[46], [23]
	Level of trust among partnerships	[28]
	Supplier's competences (supplier's capability to comply with requested sustainability standards)	[49]
MACRO SOCIAL INDICATORS	Local food & local business/jobs & local communities & local employment	[26], [26], [39], [24]
	Access to food, health care and education	[26], [50], [29]
	The level of education	[24]
	The rate of unemployment	[29]
	Number of people who saved from poverty	[31]
	Living standards and quality of life	[31], [21], [51]
	Social welfare	[35], [37], [52]
	Human Health & Safety & Welfare	[16], [26], [49], [36], [33], [51], [34], [53], [52]
	Food safety, food quality, food health, and food hygiene	[27], [26], [42], [49], [36], [20], [20], [43], [54], [50], [55], [51], [39], [37], [40], [53]
	Food losses and waste	[43], [50], [54]
	Pensions system	[29]

Table 3. Enablers for social sustainability implementation in food supply chains

Category	**Enablers / Drivers / CSFs (critical success factors) for Social Sustainability Implementation**	**Authors**
INTERNAL DRIVERS	Social commitment, agreement and trust of supply chain partners'	[27], [49], [19], [56], [57], [53]
	Companies' interest in social scientists' feedback	[57]
	Firm's social values, ethics & policies (such as social impact assessment policy)	[43], [31], [58]
	Firm's corporate policy (that reconciles economic objectives with social and environmental aspects)	[31], [28]
	Employees' attribute, motivation and skills	[49], [25], [19], [59]
	Employees' demands (internal pressure) for social issues	[17], [58]
	Managerial attitude (such as equal power distribution along the supply chain) and collaborative management structures of supply chain partners	[20], [59]
	Personnel/employee commitment	[49], [19]

	Problems (environmental, social, ethical and health problems) that harm firm's corporate social responsibility (CSR) image	[60], [19], [61], [51], [34], [40]
	Reputation / branding	[38], [25], [31], [22], [51], [23]
	Firm's organizational effectiveness (such as social footprint) among food supply chain	[60], [38]
	Technical and operational capacity of firm	[38]
	Top management support (vision of top management)	[49], [32], [31], [25], [19], [59], [52]
EXTERNAL DRIVERS	'Ethical trade' movement and "Corporate science" that response to new societal and environmental challenges	[38], [57]
	Boycotts, strikes and potential adverse publicity	[32]
	Globalization, global competition and sustainable competitive advantage	[38], [43], [61], [44], [28], [56], [22], [57], [40]
	Certification (Certification of suppliers on social and/or environmental actions and outcome via third-party certification schemes such as NGO-led certification)	[49], [31], [21], [46]
	Collaboration (long-term stakeholder partnership between multiple organizations (including governments, non-governmental organizations, suppliers, retailers and the general public)) and multi-stakeholder initiatives (MSIs)	[49], [36], [20], [19], [62], [30], [37], [58], [57], [46]
	Communities (such as rural communities, local communities) for food industry	[26], [31], [19], [56], [22], [37]
	Demands and expectations of all stakeholders (consumer, governmental and communities' demands and expectations (such as food safety, food freshness, animal welfare and environmental impact))	[31], [43], [61], [44], [22], [28], [62], [29], [53]
	Consumer/customer attitude (consumer preference towards more healthy food and ethical issues, consumers' awareness and lifestyle, consumer's purchasing and consumption habits, consumer value, cultural and social influences of consumers on supply chain relationships)	[36], [35], [19], [55], [21], [22], [62], [52]
	Consumers organizations, major businesses, Non-government organizations (NGOs) and food authorities, dominant players or leaders of their supply chains	[17], [26], [42], [55], [57]
	Corporate social responsibility (CSR) targets, activities and practices	[16], [60], [38], [32], [49], [36], [21], [63], [30], [28], [51], [39], [57], [23], [64], [58], [24], [52]
	Potentially punitive costs for work hours in the workplace or lawsuits	[32], [51]

	Culture (shared values and common practices, religious beliefs, social norms), politics and social environment	[19], [54], [22], [52]
	Dependences such as supplier, client and market dependence	[25]
	Socially fair and ethical trade initiatives	[15], [16], [45], [43], [61], [21], [37]
	Governments, governmental agencies, trade unions, communities and their roles	[17], [38], [26], [42], [32], [36], [53]
	Growing demand for organic food, convenient and ethnic food	[41], [61]
	Human rights and child labour	[60], [26], [41], [22], [30], [37]
	International commission, ISO, WTO, UN Global Compact, GRI and their missions	[42], [36], [57], [64]
	Loss of business, market share, reputational and supply risks	[32], [43], [46]
	Pressure of various groups (Government, civil society, consumer-driven pressure, public attention, market, regulatory forces, stakeholders, NGOs, etc.)	[38], [49], [25], [61], [43], [19], [30], [59], [58], [46], [52], [40]
	Regulations, legal environment, governmental policies and policy makers	[38], [27], [26], [25], [35], [43], [51], [46], [52], [40], [53], [17], [27], [26], [42], [28]
	Social equity and poverty reduction	[15], [26], [41], [51], [28], [24]
	Social events for instance educational field trips (“learning journeys”)	[57]
	Technological and social innovations in Food Supply Chain Management	[54], [56], [62]
	Social media and social networks	[45], [38], [56], [57]
	Widely recognized social, environmental standards and codes (e.g., ISO 26000, ISO 9000, ISO 14000, SA 8000, ISO 26000, ISO 22000, HACCP, Codex, GMP, EurepGap (now GlobalGap), OHSAS 18000, hygienic standards and prevalent industry standards etc.)	[15], [60], [45], [27], [42], [31], [31], [41], [43], [22], [46], [57], [40]
	Strict policies which are against any form of discrimination, harassment and bullying	[41]
	Supplier relationship management (Sub-suppliers’ relationships, roles and activities) and supplier engagement programs	[49], [63]
	Sustainability empowerment and sustainable development (sustainable economic growth, economic stability)	[35], [54], [21], [56], [58], [34], [24], [52]
	Sustainable production and consumption behavior / concept	[26], [54]
	The development of the local food networks and local economy	[45], [39]

	The increasing attention of civil society to environmental issues and to the research of healthy and high quality products (such as healthy diet, food composition and dietary assessment systems)	[50], [56], [62]
	Prevention of any possible hazards/hazardous conditions to human health (society development and human welfare)	[27], [26], [41], [36], [50], [22]
	Traditions and experiences in the local food chain	[45], [52]

Table 4. Barriers for social sustainability implementation in food supply chains

Barriers/ Impediments for Social Sustainability Implementation	**Authors**
Lack of statistical data on social and environmental issues across the food supply chain, therefore difficulties of empirical analysis	[15], [36]
There is a very limited amount of information available on the performance of food growers and producers	[15]
The food supply chains have no specific vision, but instead is taking fragmentary actions and very small steps	[38]
Lack of benchmarks or assessments of the relative importance of each sustainability criterion and indicator	[38], [60], [22], [30], [29]
Ageing farmers	[26]
Lack of interest or understanding and knowledge by decision makers	[26], [22]
Poor livability of farming communities	[26]
Lack of consumers' trust in relation to actors in the supply chains	[26], [55]
Lack of awareness and regulation	[42]; [25], [55]
Lack of information and transparency in food supply chain	[42], [49], [25], [36], [19], [55], [22], [62], [57]
Lack of suppliers' competences and skills	[49], [19]
Lack of strategic commitment and trust between supply chain partners	[49], [31], [19], [22]
Lack of personnel/employee commitment	[49]
Communication difficulties and different mentalities. Difficulties in interactions deriving from cultural and language differences amongst supply chain members	[49], [19]
Differences within regional and globally	[25], [19], [46]
The difficulty to measure social sustainability, difficulty to standardize due to different approaches of countries (universal effective performance measurement system is lacking)	[15], [17], [60], [25], [41], [44], [30], [29]
Global economic crisis	[25], [34]
Global challenges due to differences countries' infrastructure, traditional structures and cultural heritage	[19], [59]

Social indicators more qualitative nature and many of social indicators cannot return with a number. Identification and selection of relevant social indicators is very challenging. Because social indicators are different in companies and institutions at international, regional and national levels.	[19], [61], [34], [29]
The lack of support from stakeholders	[22]
Different goals, interests, power levels, organizational culture, managerial approaches and perspectives of supply chain partner's	[19], [35], [22], [25], [37]
Lack of appropriate decision-making tools and lack of data-driven decision-makings	[32], [62]
Lack of sustainability goals in the corporation vision and lack of management involvement	[44], [58]
Lack of monetary incentives. Lack of financial resources	[57], [58], [40]
Difficulty of identifying illegal or unsafe practices of second tier or third-tier suppliers	[46]
There is a lack of research on the food supply chain in relation to issues	[23]
Lack of attention and perceived value to the issue of sustainability	[55], [59]
Lack of external auditing for social issues	[46]
Lack of companies' experience, knowledge and expertise about social sustainability	[64], [40]
No legal requirement for practicing or reporting sustainability	[64]
Lack of government involvement in the food system. Lack of governmental leadership in outlining the vision for sustainability and responsibilities of food retailers. Lack of power over suppliers.	[51], [40]
Long supply chains due to globalization, therefore complexity of supply chains' configuration	[46], [52], [40]
Lack of guidelines how to follow legislation rules. It is difficult to find a generic model that is able to determine the social sustainability requirements for all these stages of various supply chains.	[17], [41], [31], [52], [40]

4. RESULTS AND DISCUSSION

Research on social sustainability is still at preliminary stage with majority of the studies not supported by quantitative findings. The results show that there are few studies focusing on the social dimension of sustainability in food supply chains. Especially, utilization of more quantitative research methods such as surveys to collect data from business organizations is necessary to validate the developed theoretical models. On the other hand, compared to other categories, in many studies more internal social manifestations are mentioned since other categories are more complex due to multi-stakeholders. Therefore it would be appropriate to start with internal indicators as the first step for social performance measurement. Solution approaches like dynamic programming, goal programming and genetic algorithm are used to solve complex real case problems. Despite that social sustainability is multidisciplinary in nature and also a large number of uncertain factors associated with the decision making further add to the complexity of the problem. In future research mathematical programming models based on the social sustainability variables with either single objective or multi-objective can be developed; also the models can be analyzed with using techniques such as LP, NLP, dynamic programming etc. Finally, there is no generic methodology that could be applicable to all industries. In addition, studies which consider the social dimension in supply chain management are all generally based on empirical case studies, so there are no generic models which include all three dimensions of sustainability.

The complex links between supply chain practices and social performance are still to be uncovered, so that this is still an interesting area for future research. Research about social sustainability has mostly focused on

theoretical and conceptual models such as perspectives, approaches and logic. The topic of social sustainability is particularly important for developing countries, because social issues have been challenging in developing countries. Therefore more research about social sustainability can be conducted on developing countries.

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Influence of a Turkish NGO on Sustainable Farming Supply Networks

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Abstract

In recent years, human beings have become more conscious of how much damage they have sustained through farming activities to the living and non-living environment they have lived with. Therefore, new approaches that are harmonious with nature, use resources properly, consider animal welfare, target sustainable development, and imbued every chain of farming supply networks with sustainability awareness have started to spread all over the world. During utilization of these approaches, it is important that ministries, universities, public institutions, non-governmental organizations (NGOs), professional organizations act in cooperation. This study focuses on the potential influences of one of the Turkish NGO on sustainable farming supply networks. By conducting a case study, that NGO is analyzed in its embedded network of supply management processes. We focus on the case NGO's stakeholder management processes and organizational structure as compared to the NGO's sustainability goals. Supplier development, sourcing, resource enhancement, coordination and training issues are analyzed. The study concentrates on the possible social, environmental and economic influences of that case NGO on sustainable farming. We also try to understand how the case NGO influences and forms public opinion by utilizing instruments such as campaigns, meetings, protests and suing. In addition, the study aims to identify possible cooperation areas for organizations and NGOs towards sustainability targets for future researches.

Keywords: sustainability, farming, supply network, case study, NGO

1. INTRODUCTION

Turkey has different climate features due to its geographical position. Different climatic features create different landforms and accordingly, Turkey realizes its economic development for years with a variety of sectors such as forestry, animal husbandry, agriculture and industry.

Since the beginning of the civilizations, agriculture has been the main source of life. Although the importance of agriculture in Turkey's economy was partially reduced in recent years, it has still great importance in terms of meeting domestic food needs, exporting, providing input to the industrial sector and employment opportunities. Due to this socio-economic importance of the agricultural sector, it is essential to take precautions to minimize the effects of climate change and to provide food safety nowadays.

Climate change, also called global warming, refers to the increase in average temperatures measured on land, sea and air of Earth as a result of the greenhouse effect, which is caused by greenhouse gases such as carbon dioxide, diazot monoxide, methane, water vapour, chlorofluorocarbon etc. released to the atmosphere by humans [1]. In recent years, climate variability and the effects of the climate change on agricultural and crop production have been examined in many scientific investigations. According to these, the biggest threats mentioned are; increase in demand for water or rise in sea level and unexpected floods, decrease in yield and accordingly increase in prices and inflation, decrease in crop availability, more diseases and damage [2]. Various reports are being prepared with the participation of public institutions and organizations, private sector representatives, non-governmental organizations and academic circles in order to minimize these effects of the climate change and raise awareness and cooperation in this issue. Sustainable farming is one of the approaches adopted within these reports.

This paper focuses on sustainable farming supply networks and analyzes the potential influences of one of the Turkish NGO on sustainable farming supply networks by conducting a case study. The remaining parts of the

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study are organized as follows: In the following section, sustainable farming concept, sustainable supply networks' content and what a non-governmental organization is, are presented. The research questions and analytical framework are given in the third section. In the fourth section, the methodology and its details are explained. Fifth section includes a brief information about the case NGO. Case findings (both within and across organizations) and survey results are reported in section six. Finally the study concludes in the seventh section.

2. CONCEPTUAL BACKROUND

2.1. Sustainable Farming

After the Brundtland Commission defined "Sustainable Development" in the report "Our Common Future" in 1997 and The United Nations Conference on Environment and Development held in Rio in 1992 examines this issue on a broad platform, sustainability has become the subject of many issues. In terms of agriculture, the definition of sustainable farming was initially described by Hansen and Jones in 1996 [3] as "the ability of farming systems to continue into the future". Sustainable farming, with more specific definition, means to produce abundant food without depleting the earth's resources or polluting its environment. It is also a concept to develop systems for raising crops and livestock and living with a harmony with future generations [4].

As its definitions suggest, sustainable agriculture is based on long-term solutions rather than short-term partial solutions. It covers whole-system and attempts to meet the following three fundamental objectives simultaneously in the light of the triple bottom line concept: environmental conservation, economic viability and social responsibility ([5],[6]). If any of these objectives is more or less important than the others, the equilibrium breaks down and there cannot be a complete mention of sustainable agriculture. Therefore, sustainable agricultural indicators need to be examined for each objective.

The indicators that are defined in literature for the observation and measurement of sustainable agriculture are as in Table 1 ([4],[5],[7],[8],[9]).

2.2. Sustainable Supply Networks

In response to sustainable development, companies that adopt sustainability principles have begun to incorporate sustainability into their business strategies and processes. Supply chain management, which is an integrative philosophy to manage the total flow of a distribution channel from supplier to the ultimate user [10], is one of these critical business processes. Carter and Rogers [11] define sustainable supply chain management (SSCM) as the strategic, transparent integration and achievement of an organization's social, environmental and economic goals in the systemic coordination of key inter-organizational business processes for improving the long-term economic performance of the individual company and its supply chain.

Management of sustainability challenges effectively within the supply chain is an important issue. Having shared vision and objectives that include common sustainability elements throughout the supply chain, dealing with the resistance to change for sustainability collaboration, managing the complexity within the supply chain due to the institutional factors such as culture, regulations, politics and infrastructure differences require partnership [12]. For this reason, in a complex global production environment, it would be more value-added to think of the supply chain as a network, rather than just a relationship between suppliers and customers.

Supply networks "consist of interconnected entities whose primary purpose is the procurement, use, and transformation of resources to provide packages of goods and services. Supply networks comprise chains through which goods and services flow from original supply sources to end customers [13]". The supply network concept is more complex than the supply chain concept because it is both inter-organization and intra-organization focused. For this reason, much work has been done in the literature on how an effective supply network structure should be and which actors should interact in a supply network. The detailed classification of supply networks can be found in [13], [14] and [15].

Table 5.Sustainable agriculture indicators

Dimension	Objective
	Maintain and create employment
	Improve work conditions and organization
	Encourage young people take over their parent's farms and continue farming

	Improve the quality of rural life
	Improve the nutritional / health status of the family members
	Ensure that the number of rural families increases or remains steady
SOCIAL	Increase farmer's knowledge and skills
	Create awareness of resource conservation
	Improve participation in decision making
	Support to access to resources and services
	Provide social equity
	Provide equality in income and food distribution
	Increase average of crop production
	Decrease expenses for input
	Ensure monetary income from outside the farm
	Improve economic efficiency and net worth
	Improve profitability from year to year for farm enterprises
ECONOMIC	Increase benefit-cost ratio of production
	Reduce debts
	Improve marketing channels for farm products
	Diversify farm and non-farm activities
	Decrease purchasing off-farm feed and fertilizer
	Consider forming a cooperative with other farmers
	Support organic certification and the national organic program
	Preserve and improve water quality
	Improve water resource management
	Control erosion, flooding
	Preserve physical/chemical/biological fertility
	Preserve and improve air quality
	Preserve natural specie and biotopes
	Preserve, enhance and improve landscape quality
ENVIRONMENTAL	Prevent crop diversification
	Increase usage of animal/organic manures

Avoid usage of pesticides, herbicides and fungicides

Reduce energy consumption

Develop the use of renewable energy resources

Increase crop rotation

Support usage of alternative crop

Maintain ground cover year-round by using cover crops and mulches and by leaving crop residues in the field.

Use fallow system

Follow the trend of change in climatic conditions

Make wildlife abundant

Provide buffer areas between fields and water bodies to protect against nutrient and sediment movement into lakes and streams.

When looking at the sustainability implementation in supply networks, three main topics are highlighted: (i) a sustainability-oriented supply network; (ii) collaboration for sustainability in supply network; and (iii) sustainability risk management. In the sustainability-oriented supply network, the focal firm, which is sometimes called as leading firm, takes an active role. The focal firm sets vision, goals and objectives under the long-term sustainability targets umbrella and develops performance measurement system for all the actors in supply network. All the key performance indicators for three sustainability dimensions –environmental, social and economic- are considered in measurement system. Collaboration for sustainability in supply network is a driving force. Through collaboration, a focal firm and its partners share information, develop long-term relationship and improve sustainability knowledge. Sustainability risk management is another important issue to consider for sustainability supply networks. Monitoring partners' environmental and social certification and standards establish long-term strategic partnership [12].

2.3. Non-Governmental Organization

The term "non-governmental organization (NGO)" was initially used in 1945 by United Nations (UN) to express the differentiations in its Charter [16]. Although there is no general definition of NGO in the literature, it has been expressed by some authors as "private organizations", "international pressure groups" or "voluntary agencies" [17].

There are some features that an organization must have in order to be a NGO. A NGO must be independent from the direct control of any government and cannot be constituted as a political party. In addition, a NGO must be non-violent and non-profit [16]. However, local cooperatives that may seek to make a profit for their members and their communities are considered as non-profit. In light of these features, a NGO is defined as an independent voluntary association of people acting together on a continuous basis, for some common purpose, other than achieving government office, making money or illegal activities [18]. Thus civil society groups such as people's associations, membership organizations and service providers are all NGOs.

When the connection between sustainability and NGOs is examined, NGOs seem to have a powerful role for sustainable development. With the ever increasing and complex nature of environmental and social problems, governments alone are not enough to produce solutions to these problems, and NGOs, public institutions, professional organizations and other stakeholders collaborate in the solutions [19]. They provide partnership with stakeholders in supply networks, encourage the stakeholders to adopt sustainable practices and develop effective strategies to solve sustainability problems through strategic partnerships. They also amplify the public visibility and change the market trend by directing customer's behavior to use sustainable products [20].

In literature, there are many studies that examine the substantial contribution of NGOs on sustainable agriculture [21]. According to them, co-ordination among individual producers, implying an effort to strengthen peasant organizations, enhancement the rural poor's capacities for self-management and negotiation, seed and input

distribution systems, irrigation development and management, providing financial donation and work with farmer groups to design, conduct and evaluate on-farm trials are the NGOs' prior action areas [22].

Although NGOs may be more dominant from the government on sustainable agriculture development, the main limitations of NGOs should not be overlooked. NGOs have limited capacity, resource and technical skills in contrast to government. In this circumstance, NGOs seek support from other national or international sources, such as universities. Besides, government links with wider scientific community both national and international. Information generated by NGOs remains poorly disseminated due to the lack of communication with public sector or other NGOs. ([22], [23])

3. RESEARCH QUESTIONS AND ANALYTICAL DIMENSIONS

Based on the research on supply chain sustainability, in this research, our aim is to understand how a Turkish NGO contributes to and constitutes sustainability of Turkish farming supply network.

In this respect, the research questions that drive this study are:

- What are the economic, environmental and social goals and influences of the case NGO?
- Which kind of processes, projects and resources are utilized by the case NGO for its sustainability goals?

Analytical dimension of the study was operationalized to collect, organize and analyze data as presented in Table 2.

Table 6.Analytical dimensions

Dimensions	**Conceptualization of the Dimensions**
Sustainability	1) Economic Improve economic efficiency and net worth, ensure income for ecological producers, increase ecological crop production, improve marketing and selling for ecological arm products 2) Environmental Maintain physical/chemical/biological fertility, stay away from usage of pesticides, herbicides and fungicides, maintain water quality and ensure energy saving 3) Social Maintain and create employment activities, increase farmer's knowledge and skills, maintain rural life conditions, increase ecological awareness, increase access to ecological food
Farming supply network	1) Components Suppliers, producers, intermediaries, food companies, other NGOs 2) Processes Learning, training, research, communication, supplier development, campaign

4. METHODOLOGY

To explore the NGO dynamics and their influence on sustainability, this paper is based on a case study approach [24]. We adopted a single case approach that builds on interview, observations and analysis of inter-intra organizational documents across the supply network of an influential NGO that demonstrates sustainability

dynamics [24],[25]. We used pseudo-names to avoid revealing the real identity of the organization and its embedded network. In Table 3, pseudonym for the case organization, its main intention of operations is presented.

Table 7.Case site information

Pseudonym of case	**Case details**
Weco NGO	An organization that became institutionalized in 2002 and is located in Istanbul, Turkey. Intends to create consciousness and awareness for ecological life in individuals and society, to offer solutions to the problems that arise in a way which is not reversible as a result of degradation of ecological balances, to support life in harmony with nature.

A semi-structured interview process was followed as suggested by Choi and Hong [26] and open-ended questions were used in the face-to-face interview process with one of the directors of Weco. The interview data was linked to the research questions in accordance to the analytical dimensions. In order to ensure internal reliability, we supported the findings with documents and web sources from Weco NGO and its network. The procedure followed during the case study is presented in Table 4.

Table 4.Procedure followed during the case study

Phase 1: Semi-Structured Questions

- What are the sustainability goals of your organization?
- What are the stakeholders in the farming supply networks that you are interested in? How do you collaborate with them?
- How do you deploy your resources for your sustainability efforts in multiple supply networks?
- What is your experience and knowledge in sustainable supply networks and supplier development?
- How is your relation with other local, national and global NGOs? How do you collaborate with them?

Phase 2: Critical Incident Technique

- Please give us examples of incidents when your organization achieved acting as a learning and change agent for sustainability in farming supply networks and tell us about how these examples influenced the operations of your supply network in general.
- Please give us examples of incidents when your organization achieved successful campaigns and/or boycotts related to sustainability and tell us about how these examples influenced the operations of your supply network in general.

Phase 3: Content analyses of written documents and reports

5. THE CASE NGO

The case NGO, Weco, is a non-governmental organization operating in Istanbul, Turkey. It is founded in 1990 and has been operating as an institution since 2002. The organization is officially a member of the National Steering Committee for Ecological Agriculture of the Ministry of Agriculture and Rural Affairs, active member and supporter of International Federation of Organic Agriculture Movements (IFOAM), only representative of European Centre for Ecological and Agricultural Tourism (ECEAT) and World Wide Opportunities on Organic Farms (WWOOF) in Turkey. The organization is also a participant of "No GDO Platform" and a member of the European Vegetarian Union (EVU) and Association of Cities and Regions for sustainable Resource Management (ACR +) due to its widespread use of ecological agriculture, its efforts to protect our seeds, soil and other natural and agricultural resources.

Weco continues its activities with the main objectives of creating examples, supporting existing ones and providing information circulation for sustainable farming. The organization is based on membership and volunteerism and derives its income from membership affiliations, donations, aids and organized activities.

6. ANALYSIS AND THE FINDINGS

An analysis of the both intra-organizational and inter-organizational relations and operations of the case NGO in its embedded supply network clearly reveals a set of insights that must be handled properly. The study findings depict NGO influences regarding sustainability in farming supply networks.

The sustainability dynamics of the case NGO are summarized in Tables 5-7. By comparing the sustainability related experiences of the case NGO in accordance to our analytical framework, a summative picture was obtained.

Table 5.Goals and partners of the case NGO

NGO	Goals	Partner associations	Governmental partners	Local administrative partners	Partner NGOs
Farming NGO	Building individual and collective ecological life consciousness, providing solutions to sustainability problems, supporting living in harmony with the nature	Almost all national and international associations dealing with ecological farming and sustainability	Ministries of Agriculture, Forest and Environment; Commissions of Turkish Grand National Assembly, Agricultural City Administrations	Municipalities	Climate Action Network, various platforms for nature and human rights

Table 6.Case NGO programs and projects

Analyzed Programs of the NGO	Aim	Projects	Participants	NGO Resources
Sustainable Production and Consumption	Forming and enhancing sustainable production and consumption cycles	• Ecological bazaars • Ecological agriculture • Ecological farm tours • Seed networks	Volunteers, small and medium producers	Volunteers, members
Political Monitoring	Monitoring and supporting politics for honorable living	• National organic agriculture politics • Rural population politics • National nature friendly agriculture politics	Volunteers, members	Volunteers, members
Information Circulation	Supporting free circulation of sustainability related information	• Bulletin, journal, handbook and farmer newspaper • Radio program • Guide for youth • Brochures, posters	Volunteers, members	Volunteers, members
Rural Life	Preserving and supporting rural life	• Ecological living, research, practice and training centers	Volunteers, members	Volunteers, members

Table 7.NGO program and projects outcomes

Program	Project	Economic	Environmental	Social
Sustainable Production and Consumption	• Ecological bazaars	Small and medium producers' access to consumers, ability to advertise ecological production and consumption, disintermediation of traders in the supply chain	Incentive for ecological production and consumption	Consumers' access to fair priced ecological food, women's access to labor opportunities
	• Ecological agriculture	Dozens of new ecological farms	Incentive for ecological agriculture	Training and learning ecological agriculture
	• Ecological farm tours	Touristic endeavors, monetary and labor support to the farm owners	Incentive for ecological farming	Transfer of ecological knowledge, create employment opportunities
	• Seed networks	Barters among dozens of farms and thousands of acres fields	Saving and cross fertilizing of traditional seeds	Helps preserving traditional seed heritage
Political Monitoring	• National organic agriculture politics	Support national organic program and certification	Preserving Turkish agricultural biodiversity	Create awareness related to organic production and consumption
	• Rural population politics	Support rural population economics	Make rural life abundant	Create awareness related to maintenance of rural life
	• National nature friendly agriculture politics	Support national nature friendly agriculture	Developing nature friendly agriculture policies	Create awareness related to clean production, clean food and clean consumption
Information Circulation	• Bulletin, journal, handbook and farmer newspaper	Marketing and communication channel for sustainability	Incentive for sustainability	Sustainability knowledge transfer
	• Radio program	Marketing and communication	Incentive for sustainability	Sustainability knowledge transfer

		channel for sustainability		
	• Guide for youth	Marketing and communication channel for sustainability	Incentive for sustainability	Sustainability knowledge transfer
	• Brochures, posters	Marketing and communication channel for sustainability	Incentive for sustainability	Sustainability knowledge transfer
Rural Life	• Ecological living, research, practice and training centers	Support local sustainability practices	Make rural life abundant	Sustainability research and training, improve rural life quality, increase the number of rural families

7. CONCLUSION

The main aim of this research was to understand the influence of a pioneer NGO to sustainability dynamics of farming supply networks of a developing country. We adopted a case study approach towards this aim.

This case showed that an NGO could create widespread sustainability awareness, mobilization and dynamism for producers, consumers, other NGOs, companies, government, local administration and municipalities in a developing country, in less than two decades. By providing information, arranging conferences, training, farm tours, establishing ecological bazaars, supporting producers, taking part in influential political organizations, the case NGO played an important role in shaping the values and practices of sustainable farming systems.

We observed that NGO influenced disintermediation shortens farming supply networks with fair prices for both consumers and producers. Even in the farming tours, consumers experience production and they become prosumers. As a result of NGO's knowledge transfer routines, more socially and environmentally sustainable farming practices take root.

The case NGO acted as a platform builder for sustainability related communication, training, research, practices, contribution to law, heritage preservation. Web based traditional seed barters and keeping track of the local traditional methods such as the case of beekeeping are examples of networking and database platforms.

This case demonstrated that NGOs can influence and shape sustainability values, attitudes and practices of all components of the sustainable farming supply networks in each of the economic, environmental and social dimensions.

8. FURTHER RESEARCH DIRECTIONS

It will be interesting for future research to increase the number of case NGOs conducting a multi-case study and replicate the findings. Therefore, validation of this model will offer critical insights with respect to causal patterns. It will be beneficial to analyze the views of consumers, producers and food companies related to the NGO influence on sustainable farming supply networks. In addition, other NGOs' cooperation related views and critics should be studied in the future.

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Determination of Satisfaction due to Land Consolidation Projects of Yenipazar District in Aydin

S. Pinar Tunali[1], Necdet Dagdelen[2]

Abstract

To develop land consolidation (LC) studies is one of the ways to increase efficiency of resource management and economic sustainability in agriculture. To that end, General Directorate of Agricultural Reform has been established and subsequently LC studies have been accelerated. Recently, primary target of Ministry of Food, Agriculture and Livestock is to complete LC in whole irrigated agricultural land.

In addition to this, determining efficiency of Land Consolidation Projects (LCP) is as important as completing the LCPs. In this study, it is aimed to determine social and economic efficiency value, which is an important criteria for determining the efficiency of LCPs. Aydin - Yenipazar Participatory LCP, which had been consolidated in 2011, was chosen as the field of study. The data obtained from the surveys made in 4 villages of the project area, were evaluated and farmer satisfaction rate was determined as 89%. Furthermore, the consolidation rate, which is a significant success indicator, varied between 43% and 46% for these 4 villages. As a result of the study, it was found that the project has achieved a good outcome in Turkey's conditions.

Keywords: Land consolidation, consolidation efficiency, consolidation rate, Yenipazar Province

1. INTRODUCTION

It is accepted worldwide that the most important solution for the future of the agricultural activity is rural land development. Recently, agricultural LC studies in many countries are carried out to increase the efficiency, consequently to ensure the sustainability of production. Besides, LC is used as an effective tool in sustainable rural development plans (e.g. [1]). Especially short and long term precautions ought to be continued to improve for agriculture which is one of the most effected sector by drought. Reference [2] expressed that one of precautions dealing with water consumption and drought and policy can be used is LC with other Land Development Services (LDS).

The first LCP in Turkey was carried out within a research project before investment of the State Planning Organization with the Food and Agriculture Organization of United Nations (FAO) in Karkin Village, in Cumra Town, Konya City at 1961. Shortly after the LCP in Karkin, large scale LCPs were made in Turgutlu, Manisa and Menemen Plain within the boundaries of Manisa and Izmir Cities at 1967 for the purpose of increasing the agricultural production and improving the irrigation projects (e.g. [3]). When LC studies in Turkey are analyzed, it is found the completed LCPs in the area of 450000 ha between the years of 1961-2002, 132000 ha between the years of 2003-2007 and 4818283 ha after the year of 2008 since today. Based on this information, it is concluded LC studies have been accelerated recently in Turkey.

Primary goal of LC studies is to improve agriculture, to improve efficiency and quality in agricultural production, to supply economical labor force, thus to get the increase in the net revenue of agricultural enterprises (e.g. [4]). Therefore, farmer families' standard of living will be able to increase by improving some of production factors (e.g. [5]). It is underlined that one of the priority issues within the scope of IX. Five year Development plan was speeding up the LC studies (e.g. [6]). Reference [7] claimed that conclusions of LCPs should had been evaluated

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ideally, moreover to propound the gain and the problems came up with these studies were going to make a significant contribution to the next projects.

The first scientific study based on land observations was on Karkin Village consolidation area in Konya – Cumra (e.g. [8]). After the project was completed, a decrease of 44% was seen in the number of parcels.

Surveys performed at 94 different enterprises from two villages in Edirne / Ipsala by reference [9], changes before and after consolidation has been analyzed. The thoughts of farmers about LC, negative and positive effects of LCPs to farmers were defined; furthermore effectiveness of LC was determined by considering water use efficiency, agricultural efficiency and socioeconomic efficiency.

The effect of LC on the land prices was studied by surveys done with 50 agricultural enterprises in Alanozu Town in Konya. As a result of the study, an increase in irrigation and transportation opportunity, a significant increase in plant production efficiency, thus an increase considerably in land prices was detected (e.g. [10]).

Project satisfaction after Aydin Center-Yenipazar Participatory LCP completed in 2011 and after LCP in Alhan, Culhan, Derekoy, Hamzabali villages in Yenipazar Town within Aydin Center-Yenipazar Plain LDS was searched in this study.

2. MATERIAL VE METHODS

2.1. Characteristics of Study Area

The study was conducted LCP in Alhan, Culhan, Derekoy, Hamzabali villages in the LCP areas of Yenipazar - Aydin (Figure 1). Main sources of the study are statistical data belongs to before and after LCPs and survey researches data on the area.

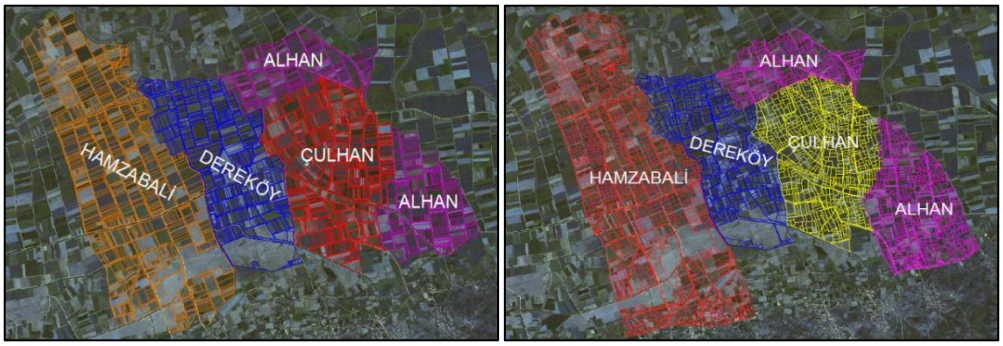

Figure 1. Study area before and after the LCP

LCP was finished in 2011 and information about the villages are given at Table 1.

Table 1. Information about Project Area

Accommodation Unit	Area (ha)	Number of enterprises (unit)	Average size of an enterprise (da)	Consolidation Rate (%)
Alhan	340	573	5.93	43
Culhan	380	638	5.96	43
Derekoy	366	482	7.59	43
Hamzabali	750	819	9.16	46
Total	1 836	2 512		44
Average			7.16	

The LC area is an 1836 ha area size as shown at Table 1. Total number of enterprises on the area is 2512. Considering the average size of enterprises, the biggest area is in Hamzabali Village. Consolidation rate is 80% in Germany and 82.14% in Spain (e.g. [11]). These rates are much higher than the rates achieved by the study.

However the LCP done in this area can be reasoned as successful considering the consolidation rate is 42.4% of LCPs in Turkey (e.g. [4]; [5]). The root cause of the low consolidation rate of Turkey in comparison with other European countries is that joint-owned lands are left as they are due to farmers' demands at interviews while project phase of LC.

2.2. Method

After LCP was completed, a survey work conducted with 100 participants from Alhan, Culhan, Derekoy and Hamzabali Villages to determine if the farmers were satisfied with the project or not. Thus defining consolidation efficiency, which is one of criteria for LC assessment, was aimed by examining enterprises' point of view. Moreover, social effectiveness assessment was done to indicate how life standards of farmers changed. After survey research finished, some necessary checking and arrangements was done and questionnaires were transferred to EXCEL. Answers to questions in the survey, is expressed as percentage in tables and shown with the charting method visually.

3. RESULTS AND DISCUSSION

Survey results of Aydin Center - Yenipazar Participatory LCP and the project of Aydin Center –Yenipazar Plain LDS are evaluated below.

3.1. Farmers' objections to the LCP's

The contractor of the project in the LC area declares the subdivision plan and new property lists by publishing and it may be objected while publishing. In the objection case, project unit carries out a study to solve the disagreement. Participation of farmers of the study area and the evaluation of the objections to the published proclamation are given at Figure 2 and 3.

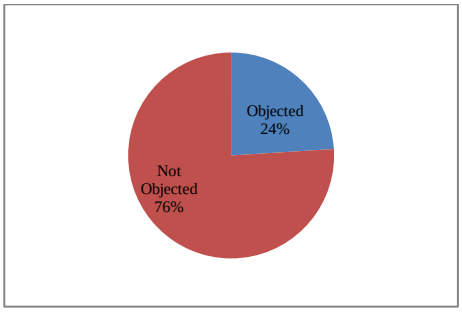

Figure 2. Farmers' objections to the LCP's proclamation while publishing

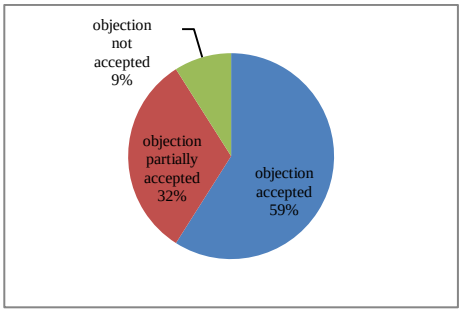

Figure 3. Assessment of objections of farmers who objected to the LCP's proclamation while publishing

Farmers objected to the LCP's proclamation while publishing at the LC area in Alhan, Culhan, Derekoy and Hamzabali villages. The objectives were evaluated and 59 % of farmers, objected to proclamation, expressed "came true as required", 32% of them expressed "came true "came true partially" and 9% of the farmers indicated "didn't come true".

3.2. Satisfaction and Consent of Farmers in the Area

Positive or negative views and satisfaction of farmers about the project is given at figures below.

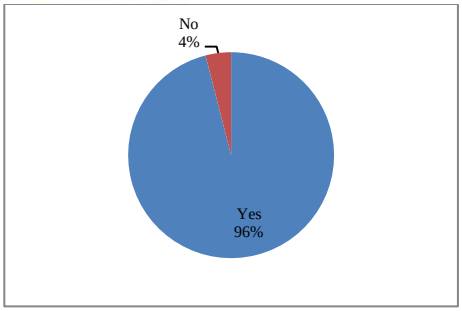

Figure 4. Rate of consent of farmers to consolidation work

The success of LCPs is related directly with the farmers' level of consciousness. Explaining the projects correctly to farmers before starting the consolidation studies causes farmers to approach the project milder. It is seen that 96% of farmers in the area gave approval to the project at Figure 4. The approval rate indicates that consolidation was explained to farmers correctly and farmers realized the benefits of that the consolidation was going to provide.

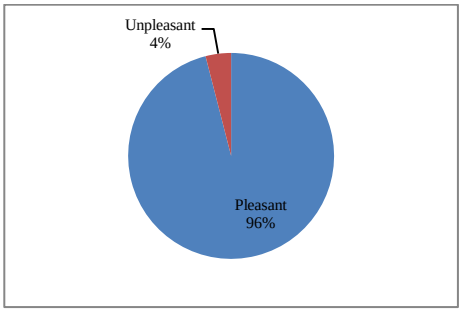

Figure 5. Satisfaction of the farmers from the field roads after the consolidation

Only 4% farmers are unpleasant with new roads after LC seen in Figure 5. In the interviews done during survey studies, farmers mentioned that the old drainage ditches had been broken and new ones had been started to be constructed in some areas. Deterioration of roads has occurred while these studies. In these fields, land owners expressed their dissatisfaction of the new roads. Deteriorated road problems are going to be removed by rearrange the road maintenance work after drainage works.

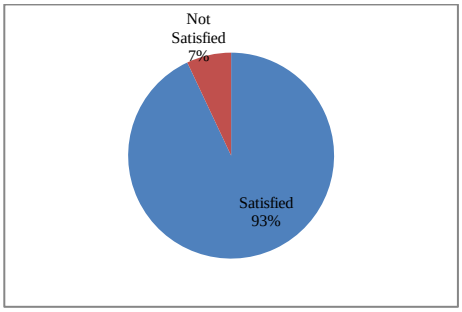

Figure 6. Farmers' satisfaction rates of field locations after LCP

Furthermore, 93% of enterprise owners expressed that they were pleased with new locations of their lands (Figure 6).

At Figure 7 and 8 show the rate of change at input costs and farmers' standard of living after completion of the LCP.

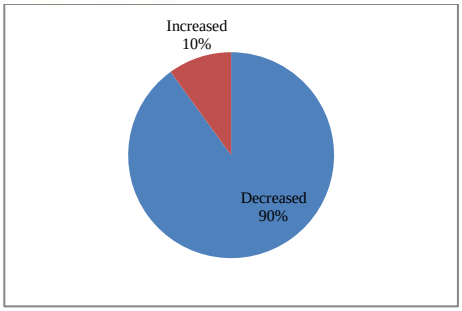

Figure 7. Decrease in input costs of enterprises after consolidation studies

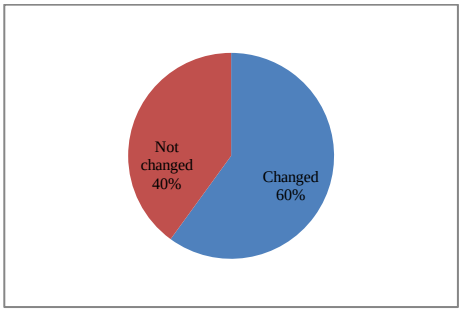

Figure 8. The change of farmers' standards of living in the positive direction as a result of LC

90% of enterprise owners having land in the study area states that input costs decreased and 60% of them state that their standard of living changed in the positive direction after consolidation. This result reveals that the project affected farmers in a positive way clearly. Pie charts in Figure 9 and 10 show that the meeting rate of farmers' expectations and farmers' satisfaction rates of field locations after LCP.

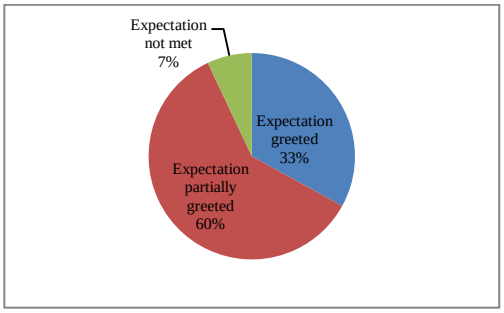

Figure 9. The meeting percentage of farmers' expectations as a result of consolidation works

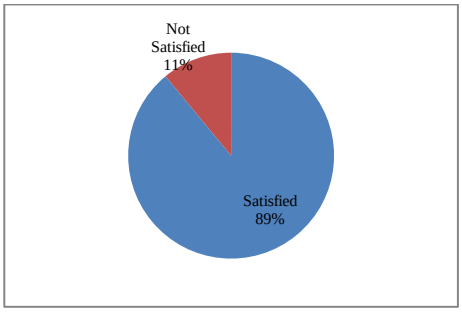

Figure 10. Farmers' satisfaction of the LCP

33% of farmers indicates that their expectations are met completely, 60% of farmers indicates that their expectations are met partially given at Figure 9 and 10. However the percentage of farmers of whom expectations are not met is only 7%. This dissatisfaction is seen at the enterprises having multi-parceled lands while

interviewing. Low percentage of dissatisfaction indicates that the subdivision studies were done successfully. Furthermore, 93% of enterprise owners expressed that they were pleased with new locations of their lands.

Figure 10 shows 89% of the owner of enterprises is satisfied with the completed project. Reference [12] examined the consolidation performance with regard to satisfaction level of households in rural areas and determined the general satisfaction rate as 76.5%. Although LC studies are done for the benefit of local community, the studies may fail to satisfy the expectations of farmers completely. Therefore, taking farmers' opinions after the project completed may give significant information about how much the expected benefit is met.

Views of enterprises for the project in the LC area before and after consolidation studies are given at Figure 11.

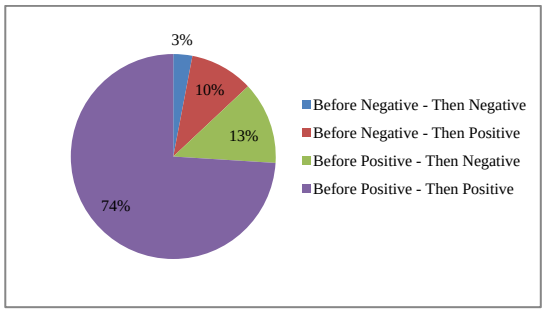

Figure 11. Farmers' view of the project before and after consolidation

Besides providing the physical requirements for LCPs, it is substantial farmers in the study area to be informed about consolidation. Adopting consolidation studies by farmers causes the LCP takes a long time. For this purpose, if farmers know the gains and benefits due to consolidation activities, it is going to affect them to adopt the consolidation studies.

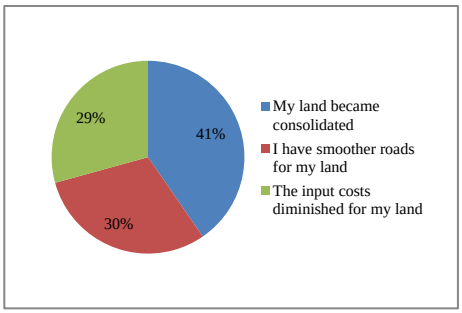

Figure 12. The reasons of farmers' satisfaction with the project after consolidation

When the first three subjects that farmers are satisfied are prioritized according to survey results given at Figure 12; the first answer is "my land became consolidated" with a percentage of 84.8%, second answer is "I have smoother roads for my land" with 63.7% and the third answer is that "the input costs diminished for my land" with 61.5% respectively.

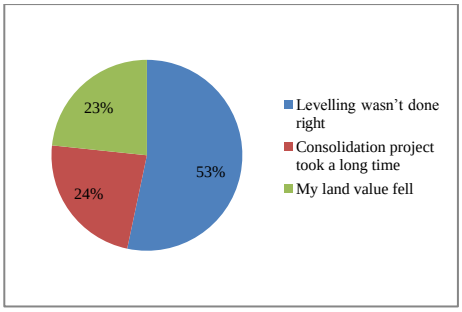

Figure 13. The reasons of farmers' dissatisfaction with the project after consolidation

When the first three subjects that farmers are dissatisfied are prioritized according to survey results given at Figure 13; the first answer is "levelling wasn't done right" with a percentage of 57.1%, second answer is

"consolidation project took a long time" with 25% and the third answer is that "my land value fell" with 25% respectively.

Many factors affect the satisfaction of farmers at rural LCPs such as educational level of farmers, employment characteristics, family sizes, agricultural input quantity, and proximity of agricultural products to market, mechanization level (e.g. [12]). These factors vary by area where consolidation projects are done particularly.

4. CONCLUSIONS

This study aimed to determine the farmers' satisfaction of Aydin Center-Yenipazar Participatory LCP and Aydin Center- Yenipazar Plain LC within LDS project in Alhan, Culhan, Derekoy and Hamzabali villages. LC studies were planned with versatile thinking and the infrastructure services were applied with these projects. Due to the fact that applying the projects lasts long, satisfaction and dissatisfaction of farmers can occur. Satisfaction and dissatisfaction of the farmers were examined and some of the satisfaction factors that were less parceled land, smooth roads, decrease in input costs, and increase in land value, saving of time and levelling are obtained by farmers using their new lands after consolidation studies have finished.

On the other hand, the project took longer than expected caused a decrease to income of farmers up to a certain extent. Besides, some farmers expressed that their new land value decreased compared to old one. From this point of view, it is accurate to say that finishing the project in the expected time is a weighty issue for farmers.

Satisfaction after consolidation having such a high rate as 89% in survey results shows that farmers took kindly to the consolidation project and found it beneficial. The satisfaction rate indicates that the project engineers succeeded most particularly.

Consolidation rate LCP was in between 43-46% in the study area. Consolidation rate was determined above the average of Turkey (42.4%) hence the project was planned and worked out very well in the area especially in Hamzabali Village (46%). The project reaches a result that reveals a positive development on agricultural efficiency in the area.

In recent days, LCPs in Turkey are conducted first in the area that the irrigation projects have already been installed. Considering conducted projects, the problems arose from unfinished LDS studies. Therefore, conducting concurrently the land development studies, irrigation and drainage especially, with LCPs ensues as a necessity.

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Environmental Stresses Applied to Microalgae and Their Effect on Biomass, Lipid and FAME Composition

Ece Polat[1], Ebubekir Yuksel[2], Mahmut Altinbas[3]

Abstract

Microalgae based biorefinery is an important concept, based on its nature relies on the commercial by-products. This term has a wide range application from fuel to food ingredients, and variety of products such as protein, antioxidants and oils are produced from biomass in the biorefinery. Lipid and triacylglycerol are preferred microalgae byproducts due to their energy rich nature and their potential of use as a good energy alternative to limit the fossil fuel consumption; conversely, microalgae can have large amount of biomass without large amount of lipid. The lipid accumulation can be induced under some stress conditions such as photoperiod, pH, temperature, light intensity, carbon sources, nitrogen and phosphorus amount, salts can directly affect the lipid production of microalgae. In this study, environmental stress factors and their effects onto lipid quality and FAME (Fatty Acid Methyl Ester) composition was investigated.

Keywords: Biorefinery, microalgae, stress, sustainability

1. INTRODUCTION

Energy problem in the entire world is a consequence of inadequate amount of fossil energy sources and some environmental impacts such as the emissions from the combustion of highly calorific value containing fossil fuels; the unregulated disposed of waste raise this problem [1], [2]. The limited amount of energy sources and environmental impacts forces the energy sustainability term by considering the environmental and social influences and price of the energy [1].

Sustainability's aim is the use of energy sources in most favorable efficient manner and is the use of the energy conversion technologies as a part of environment-friend technologies [2]. Sustainable production using green chemistry -which means the whole life cycle of the chemicals is sustainable- should be considered to reach the sustainability term as well as the terms of sustainable energy and sustainable management. Reference [1] indicated that energy sustainability could be reached by promoting the sustainable technology as an alternative energy source to non-renewable fossil fuels, which can be defined as the energy from biomass, wind, solar or water sources or renewable sources.

Reference [3] pointed out that governments concern about the reaching secure and sustainable energy sources with increased global energy demand and economic considerations. Socially accepted, environment friendly and economical technologies can be considered as sustainable energy [1]. For sustainable energy production, the first alternative is the biomass energy that can be obtained by direct combustion, gasification or through biochemical processes [3]. The second option for sustainable energy is the use of green fuels in electrical vehicles or hybrid vehicles that can both use thermal and electrical engines. Moreover, the third option for sustainable energy is the hybrid energy systems that composed of various energy sources such as wind energy

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and solar energy [3]. Companies and universities should cover sustainable management by evaluating the life cycle assessment of the energy demand and by calculating the carbon footprint and energy inputs/outputs [3].

Microalgae is considered as third generation biomass that can be used for both energy and as a part of biorefinery approach by mitigating the greenhouse gas [4]. Microalgae is a promising technology due to its high value added products and biodiesel potential [5] and the potential energy efficiency of the microalgae can be calculated as life cycle energy efficiency ratio which is the division of the total energy output to the total energy input to the system. From the results, you can estimate which cultivation option will best fit to the sustainability term. Microalgae applications can be an important aspect for the sustainability and sustainable environment management.

Microalgae can convert solar energy into biomass due to its photosynthesis nature and bio-treatment of wastewater with microalgae is a common method for the aim of waste management and sustainable energy production [6].

2. ENVIRONMENTAL STRESSES

Lipid formation in microalgae is subjected to environmental growth circumstances such as light intensity, temperature, salinity and nutrient starvation or depletion [7], [8]. The nutrient depleted conditions will change the lipid, protein and carbohydrate storage amount in the microalgae and the cell density and growth rate are both change under such conditions. Nanoparticles can enhance the lipid, pigments and other metabolites accumulations using direct and indirect methods, in which nanoparticles are directly embedded in growth medium or not [9], [10]. In addition, nutrient deprivated or limited conditions can enhance the lipid accumulation and the characteristics of the lipid like [11].

Photoperiod, pH, temperature, light intensity, heterotrophic or mixotrophic cultivation and carbon sources, phosphorus amount, salts are the other environmental stress factors that can affect the biomass production rate of the microalgae and the biochemical compositions of the microalgae biomass [12] and accumulation of triacylglycerol (TAG) can be stimulated using that factors [13].

Salt stress may affect the lipid production of the microalgae based on the effects of ionic, osmotic or oxidative stresses onto the microalgae metabolism. Na^+ may compete with K^+ in the cytosol of the microalgae, water in the cell may be hampered by the osmotic potential and reactive oxygen species (ROS) may create oxidative stress and cause the microalgae to store more lipid [12]. Reference [12] indicated that *Acutodesmus dimorphus* microalgae salinity stress in two-step cultivation has increased the lipid amount by 43% without affecting the biomass. They also used stress hormone abscisic acid (ABA) to evaluate the reactive oxygen species on microalgae biomass and lipid amount. Reference [14] indicated that salinity stress in dual mode cultivation of microalgae, which was isolated from lentic water body, showed high lipid capacity as compared to biomass growth phase. By the time salinity stress induced the lipid production, it also changed the FAME profile of the synthesized lipid. Moreover, it was also stated that phytohormones that control plant growth and development may also affect the microalgae biochemical pathways and can cause a change in the FAME production of microalgae [15].

3. CONCLUSIONS

The microalgae growth under stress conditions can induce lipid formation and the quality of the lipid is important aspect for the sustainable biofuel production. Sustainable biofuel production is relevant for sustainable development considering the energy needs of present day's people without disturbing future generations need.

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Global Sustainable Tourism Council Standards: As a Tool of Sustainable Cruise Tourism

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Abstract

Cruise tourism is one of the world's fastest growing tourist activities. Its traditional function provides transportation, accommodation and destination excursions. Today, more than 450 cruise ships sailing worldwide with almost 25 million of cruisers among more than 2000 destination. Cruise tourism is characterized by bringing large numbers of people to concentrated areas of destinations for brief periods, the industry also has potential to present significant future environmental challenges. A sustainable approach to the cruise industry has emerging worldwide in recent years while sustainability concept became important at the Bruthland Report in the 1987 via "Our Common Future" slogan. This study is reviewed relevant peer-reviewed literature, corporate policies, and reports regarding the cruise industry efforts to develop sustainability. The aim of this research is to examine applicability of current sustainable practices for cruise destinations because industry efforts by ship-side already exceed international standards prescribed by IMO still any common standards for cruise destinations isn't constituted. It is found that Global Sustainable Tourism Council Criteria provide contemporary practices for touristic destinations worldwide while green port practice has carried out around Europe, particularly in Baltic region toward cruise terminals but not on the global scale yet. In this research it is discussed whether GSTC's standards is a useful tool for sustainable cruise tourism destinations according to new Holistic Port-Destination Approach (HPDA). Resulting from each cruise port destinations has their own characters, many of them particularly in the Mediterranean Region may share common values such as history, culture and nature that are to be sustained by common standards developed with a holistic approach as like GSTC's need to be understood as a strong reference for cruise destination policymakers, cruise stakeholders and other beneficiaries.

***Keywords**: Sustainable Cruise Destination, GSTC standards, Cruise Port-Destination*

1. INTRODUCTION

Cruise tourism is one of emerging ocean industries regarding to its long-term potential for innovation, employment creation and economic growth; however, it has impacts without sustainable good practices [1]. As a part of maritime and coastal tourism industries, cruise tourism is fastest growing segment of leisure tourism, increasing 7.2% annually since 1990 [2]. The growth of cruise tourism is seen in raising competition on coastal resources and the new generation cruise ship design as floating village which is likely to create large environmental impact while providing local economic benefit to some extent. Total worldwide cruise fleet represents more than 400 ships which carried almost 25 million passengers in 2017, and it is estimated 27.2 million passenger cruise in 2018 [3]. There are more than 2000 destination available to travel by cruise ships. The Caribbean, the Mediterranean, North of Europe, North America, Alaska, Brazil, Asia, UK and Ireland are main cruise regions. According to a research, more than a half of cruisers say that the are interested in cruising

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for the next vacation. The Mediterranean (30%) is the second most popular destinations behid Caribbean Region (40%) which is the most attractive region for cruisers [3].

Cruising is a leisure product which consists of package transportation services, onboard facilities and shore excursions in more than two different places. Destinations and cruise ship travel together attract vacationers to take a cruise like two peas in a pod. Destination is the second important consideration makes vacationers motivate to take a cruise after costs [4]. According to a study done in previous years, more than two in three cruisers (who have taken cruise at least one time before) choose to take cruise because of having chance to visit several destinations. It is also found out that 10% cruisers took his/her first cruise within the past five years [4]. To sum up, destination is paramount in a vocation decision, followed by pricing regarding experimental studies carried out by the International Cruise Lines Association [5].

The growth of cruising tourism is increasing competition and pressure on the coastal resources and infrastructure additionally burdened by the new generation of cruise ships designed as floating resorts of mass tourism that create large environmental burden while providing limited economic benefits to local communities [6]. Economic benefits to local communities can be expressed cruise tourism expenditure in port destinations which consists of following items:

- Destination expenditures by cruisers which may result from shore excursions (one can purchase pockets tours or spend individually such expenditure as transportation, entrance of attractions such as museums etc.) and retail purchases of clothing and jewelry, purchases of food and beverages;
- Destination expenditures by crews which may result from shore excursions and retail purchases of clothing and jewelry, purchases of food and beverages;
- Expenditures by cruise lines for port facilities such as water, bunkering, docking services such as pilotage etc.
- Expenditures by cruise lines for victualing such as fruits, vegetables etc.
- Expenditures by cruise lines for technical support such as repairing once ship needs

Although there are some studies to find average shore based spending such as spending per passenger in a specific destination which found it significant such consequences cannot apply to the importance of the economic contribution for all destinations. For instance, according to an economic contribution analysis of cruise tourism based economy in a destination (Antigua) spending during 2011/2012 is estimated an average of $65.30 per passenger and $18.15 per crew which consist of basically shore excursions. On the other hand, regarding [7], Brida (2010)'s study, cruise passengers seem to spend less than 30% of the expenditure of a land tourist. According to the World Travel and Tourism Council, 'the economic contribution of cruise tourism to the Caribbean economies is arguably negligible' [8]. Even today, cruise tourism is more accessible when comparing to ten years ago. More people around the word afford to take cruise. So, economic contribution per passenger basis are likely to be reduced. Moreover, the distribution of income generated by cruise industry is not in balance. That is, most of destination ports have tiny benefits from cruise port expenditure because of unbalanced income distribution of economic contributions between cruise lines and locals' stakeholders. A question may arise in this point is "Does major cruise industry players such as destination governments, residents, key operators etc.) measure benefits with impacts to project sustainable future of cruise tourism in the destination?". This question is very crucial, and it contain main perspective of GSTC Criteria: first perspective requires sustainable destination management and second does require maximization of benefits for host community and minimization of negative impacts. Cruise tourism may generate social benefits to the destination such as cultural integrity with diversity apart from economic benefits. It may bring popularity to a specific destination. On the other hand, there are economic, social and environmental impacts based on destination cruise tourism.

Sustainable development of cruise tourism is conducted by both scientific and sectoral approaches. To protect marine environment from ship born contaminator such as wastewater, air emission and its disposal facilities at seaports etc. International Maritime Organization adopt many regulations including key conventions, codes, guidelines. To protect marine environment, the MARPOL 73/78 (International Convention for the Prevention of Pollution from Ships) is a key convention and there are other conventions about oil pollution (INTERVENTION, OPRC), dumping wastes and other matter (LC), anti-fouling (AFS), ballast water (BWM) etc. (URL: imo.org). Those regulations are abided by IMO member states and ships on their own responsibility. In this field the United States Environment Protection Agency, the Council of European Reunion, the European Seaport Organization, International Maritime Organization and Cruise Line International Association (CLIA) and other entities are particularly active. Cruise ship operator based efforts on sustainable cruise tourism is seemed to be more than destination side. Moreover, there are more practices and rules that seagoing ships have to comply with than destinations In literature, environmental, social and economic impacts of cruise tourism

have defined from different point of view but still a common standards of sustainability has not been put forward. Besides, sectoral reports such as cruise ship operator annual sustainability report (especially of most popular ones), association's studies, regulator studies such as reports by CLIA are also found which mostly conducted by cruise ship operators however; still there is not a common standards or criteria to measure how sustainable is a cruise destination with regard to environmental, economic and social-cultural aspects.

Measuring benefits and negative impacts generated by cruise industry is a crucial to define sustainability in a port destination. There are few researches concerning the impacts of cruise tourism in the destination although there are many of economic benefits. This may result from researches needs a new approach to understand sustainability concept, to project future studies on cruise tourism sustainability. Respond to defined necessity this study treat GSTC Criteria as a tool for cruise industry toward cruise port destinations. The aim of this study is to understand what are the main perspectives of GSTC Criteria and to examine its applicability to a specific cruise port destination.

2. CRUISE TOURISM IMPACTS ON DESTINATIONS

Cruise tourism impacts can be expressed into three categories which are social, economic and environmental impacts. The impacts are based on not only operational activities of cruise ships but also passenger circulations toward destinations. To understand how sustainable is the cruise industry, to mitigate cruise ships operational activities born impacts is not enough, though destination efforts such as monitoring, assessment and measurement are required. For this reason, in this section, the impacts from cruise activities are demonstrated toward cruise port destination.

2.1. Social Impacts

It has been observed that a highly concentrated tourism generates more negative perceptions from residents towards tourist. Crowds disrupt usual routing and activities associated with cruise tourism can themselves be a problem [8] (Klein, 2005). This situation is not creating problem for only residents but also for domestic visitors. Common impacts that tend to multiplied by volume of cruise ships in the destinations associated with cruise tourism are congestion, cultural heritage degradation and community disruption [9].

Congestion: Cruise passenger visitor flows may disrupt or congest local traffic and pedestrian routes. This type of congestion, termed People Pollution, crowds areas used by inhabitants

Cultural heritage degradation: Impacts to a destination's cultural heritage generally result from poor management of large-scale visitation. Large visitor flows cause wear and tear on infrastructure, facilities, attractions and sites.

Community disruption: Local communities and traditional cultures may be impacted, especially in rural areas where their intangible heritage forms an attraction despite their not wanting to interact with cruise passengers.

2.2. Economic Impacts

In spite of a common belief on cruise tourism that is seen as an economic benefit generator for destinations it has some economic impacts which are detailed as follows [9]:

- Economic benefit and long-term vitality: Cruise tourism has been criticized for generating less spending per passenger in the local economy than non-cruise tourists, with passengers staying less time and less tax collected from entry via cruise terminals than airports or via overnight lodging taxes.
- Less employment than other forms: Cruise tourism may also generate less employment at the destination than other forms of tourism, especially at transit ports.
- Keeping the majority of revenues within the cruise line and not for the local communities.
- Unbalanced distribution of revenues resulting from cruise passengers in destination: some businesses generating the majority (over 75%) of revenues from cruise passengers, while similar businesses receive less than 25% of their revenues from cruises.
- Leakage and economic multiplier effect: Cruise lines operate their own tendering services and shore excursions, the operation's revenues may stay within their parent company or global partners rather than local parners
- Reputational risks: The impacts of cruise tourism may lessen its attractiveness and favour among other segments of tourists, who find less authenticity in a mass-scale cruise destination

2.3. Environmental Impacts

Cruise ships are less than 1% of the global merchant fleet but account for an estimated 25% of all waste generated on ships, with up to seventy times more waste generated than a typical cargo ship. Although cruise tourism is a small slice of global tourism but a large or primary source of arrivals for specific destinations, its impacts on a specific city, attraction, or natural - cultural resource can bring the risk of irreparable damage [9]. The cruise ships, their passengers, or their suppliers may cause environmental impacts such as: Impacts from physical arrival of cruise ships to port destinations and navigational operations. Due to navigational operations and arrival operations cruise tourism environmental impacts are: Marine degradation, Air pollution (cruise emissions), Waste (solid and liquid), Noise pollution, Light pollution, Aesthetic problems and others.

As cruise tourism is a sub-industry of nautical and coastal tourism ocean industry it consists of both leisure and maritime characteristics. According to strict rules set by maritime organization such as the International Maritime Organization, regional and global associations such as Cruise Lines International Associations, Baltic Port Organizations, as well as local organizations such as port authorities, municipalities ships can be punished a large sum of money as it is monitored-well. This also includes reputational risks for cruise companies especially ones has responsible cruise passengers.

Cruise tourism can be evaluated based on sewage treatment, air emission reduction, water quality and security as well as transparency. Transparency is a critical factor that consciousness cruisers consider in their decision making process. A huge amount of consumption of water and food on cruise ships, may cause serious environmental degradation along seas. According to the International Convention of MARPOL contaminators are categorized regarding their damage to human and marine life so that ships can manage their wastes. The Convention, MARPOL, regulates not only pollution based on ships routine operational activities but also accidental pollution and includes six technical Annexes as follows: Annex I "Regulations for the Prevention of Pollution by Oil (entered into force 2 October 1983)"; Annex II "Regulations for the Control of Pollution by Noxious Liquid Substances in Bulk (entered into force 2 October 1983)"; Annex III "Prevention of Pollution by Harmful Substances Carried by Sea in Packaged Form (entered into force 1 July 1992)"; Annex IV "Prevention of Pollution by Sewage from Ships (entered into force 27 September 2003)": Annex V "Prevention of Pollution by Garbage from Ships (entered into force 31 December 1988)"; Annex VI "Prevention of Air Pollution from Ships (entered into force 19 May 2005)". A type of liquid waste called "black water" treat marine life because it consists of fecal matter, bacteria, viruses, pathogens etc. Another pollutant called greywater from laundry, pool, bath etc. can be seen less harmful depends on their treatment conditions. Solid waste is another pollutant. The International Convention such as MARPOL regulates discharge conditions of waste from ships. However, such conventions are not enough without destination-based efforts such as monitoring, reporting, ruling etc.

According to the CLIA report sustainable efforts by ship-side has already exceed international standards. However, ship-side efforts in itself is not enough to ensure sustainable cruise tourism. Via a balance between both cruise ship side and destination side sustainable cruise tourism can be developed as a whole. Destinations are needed to be cooperated also they should apply sustainable good practices. Because when the cruise industry industry, cruisers, the environment and host communities are addressing current and future social, economic and environmental impacts together challenges can be solved. This sound calls holistic approach for port destinations together with cruise operators.

3. SUSTAINABLE CRUISE TOURISM

Sustainable tourism is rising based on growing consumer demand as leisure industry suppliers are developing new green programs and governments as well as international agencies. Regarding cruise tourism sustainability also is on rise by ship side as leisure industry suppliers are developing green programs and government as well as international associations such as CLIA (Cruise Lines International Association) that promote new policies to encourage sustainable practices in cruise tourism. But what does "sustainable tourism means in fact and how can it be measured on the basis of destination and ship based activities? According to United Nations Environment Program (UNEP) on Tourism: «Sustainable tourism development meets the needs of the present tourists and host regions while protecting and enhancing the opportunity for the future» [11]. By sustainable point of view it is envisaged as leading to management of all resources in such a way that economic, social, and aesthetic needs can be fulfilled, while maintaining cultural integrity, essential ecological processes, biological diversity and life support systems [10]. An easy way to define what means does "sustainable" term is to apply the first definition based on the Brundtland-Report as follows: 'Sustainable development meets the needs of the present without compromising the ability of future generations to meet their own needs'.

3.1. Cruise Tourism Segmentation Analysis

To develop sustainable cruise tourism strategies, one should understand the industry's segmentation and the experiences sought within the respective segments, as well as the value chain within a destination. There are four main segments based on passenger demographics, itinerary characteristics, cruise duration and ship characteristics variables.

3.1.1. Passenger Characteristics

Cruise ships as a floating resort can consider multinational place. Besides, there are some cruise segments are formed for vacationers who want to travel with people from his own country. Regarding cruise employers who called crews are mostly from third-world country such as Philippines, Vietnam, and Indonesia for their cheap labor possibility. So, cruise ships can be considered a floating resort that involves many cultures. Besisdes, regarding cruise profile analysis, studies are mostly carry out towards the North American cruise passengers as they are the biggest part of source market. CLIA defined some common characteristics of the North American cruisers as follows [12]:

- The avarage age of the cruisers is 49; Annual income earned by one third of cruisers is from $ 100.000-199.000, 28% from $60.000-69.000. On average, the annually household income earned by cruisers was $114.000 in 2014 however today middle-income earned cruisers are taking cruise more.
- The most majority of cruisers are employed (72%); The most majority of cruisers are educated at least college level (69%); The most majority of cruisers are married (84%) and they are likely to travel in pairs (53%), and tend to have cruise often accompained by a spouse (80%).
- More than one-quarter of cruisers travel with children
- The majority of cruisers want to plan to take a cruiser for the next vacation (%80); The greatest benefit cruisers derived from their cruise activity is the ability to see several destination in one trip.

According to the research done by the CLIA, 42% of cruisers later returned to a destination first visited during their cruise. When weighing cruise vacation options, cruisers placed cost and destination as top factors in their selection [12]. Therefore, destination should be considered as a fundemantal pillar of cruise industry.

More than 450 cruise ship navigate around World oceans. River cruising market is getting interesting while proportion of ocean cruise is the biggest of the cruise industry. Those cruise ships attracts different segment of passengers regarding their demand on ship size, cruise destinations, shore activities offered by cruise companies, targets (family, single, couples etc), themes (romantic, discover etc.). Briefly cruise segments are aggregated in four titles: (1) Budget, (2) Contemporary, (3) Premium, (4) Luxury. These segmentations are determined by a set of variables [9]: Passenger demographics, Itenerary characteristics, Cruise duration, Ship features.

The categorization has also changed as cruise ships have grown. In 2007, the largest cruise ship could hold 3,600 passengers. **Now**, the industry's largest ships, the *Allure of the Seas* and the *Oasis of the Seas,* can hold **6,360** passengers. Cruise ship sizes are also categorized not only its size in gross tonnage (gt) but also in passenger numbers. Small, mid-size, large and mega size ships are illustrated in the Table 1.

Table 1. Ship Categorization [9.

Ship Size	**Gros Tonnage**	**Passenger Capacity**
Small	< 40, 000	< 1,000
Mid-size	40,000-80,000	800-2,500
Large	80,000-150,000	2,000-4,000
Mega (**VLCV**)	> 100,000	> 4,000

Ship size is not directly correlated with segmentation. In fact, within the industry, segmentation is generally determined by the weight of the ship rather than passenger capacity, as some lighter vessels may carry more passengers and vice versa [9].

Segmentation analysis based on cruise passenger segments is considered to understand cruise ship potential impacts on a cruise destination. Passenger demographics, itinerary characteristics, cruise duration and ship characteristics are given briefly in the Table 2.

Table 2. Segmentation in Cruise Tourism [9].

Segments	**Passengers Demographics**	**Itinerary characteristics**	**Cruise duration**	**Ship Characteristic**
Budget	lower-income level, and young people.	Mediterranean, "hop-on/hop-off"	3–7 days.	Small ships with minimum on-board facilities and services
Contemporary	first-time cruisers, families, couples	Visited common destinations	3–7 days.	Large, new ships; resort-type facilities, family entertaintment
Premium	Regular cruisers, Over 40 age Group, often professionals	Rarely visited ports	longer than 7 nights.	Smaller than contemporary; On-shore excursions make profit
Luxury	Couples and singles with a taste for super luxury resorts	Focused on unusual ports, important profit generator.	More than 10 days.	Smaller ships, Highest crew-perpassenger ratio

The Segmentation analysis is crucial in order to see characteristics of cruisers who are potential visitors to a destination for destination managers. Because each segments have different level of impacts [9]. As it is seen on Table 2., for instance, visitors of contemporary segments tend to generate the biggest environmental problems. Due to bringing large numbers of people to concentrated areas for a short time period (avarage of time stay in a port 8-10 hours), the impacts of cruise tourism in the destination are multiplied by volume. Therefore, cruisers of contemporary segment test limits of carrying capacity, especially for boutique port-destinations while luxury and premium segments impact less. The impacts of luxury and premium segments are also differ from contemporary. Passenger from luxury or Premium segments tend to seek unique destination experiences and authenticity local experiences attract them while arranged shore excursion or package programs, which mostly organized cruise lines, attract contemporary segments. Such shore excursions for contemporary segments cause economic leakage as like mass tourism. Because revenues of more than a half of cruisers expences in the destination gained by cruise companies or their global partners.

3.2. Holistic Approach for Sustainable Cruise Tourism Port Destination

The impacts of cruise tourism on a port destination vary from many aspects such as environmental, economic and social impacts, and cover the entire destination not only port area. A destination in itself basically consist of host community, visitors, destination stakeholders and managers while a cruise port destination issues are interested by additional stakeholders such as port authorities, cruise passengers, cruise companies and their suppliers. Therefore, cruise port destination can be consider the most complex destination that need to have a holistic approach to ensure sustainability.

To satisfy the definition of sustainable tourism, cruise destination should take a holistic and integrative was well as interdisciplinary approach which includes all aspects of sustainability. In some regions, especially in Europe, currently there are some promising practices on sustainable cruise tourism such as Green Cruise Port project in the North Europe. Although Green Port practices is aimed to connect all stakeholders it is not holistic as it addresses only environmental issues such as its criteria mostly relating with emission control, energy efficiency etc. in port area.

To ensure sustainability for entire destination, understanding all impacts of cruise tourism and roles of stakeholders toward whole destination should be the first step. Host destination communities play a major role

in sustainable tourism because communities are impacted by visitation and at the same time they are part of the reason for a tourist's visit. Due to the existence of different types of stakeholders: public, private, and community stakeholders, sustainable tourism should be applied to an entire destination, as well as each type of entity in the value chain The measurement of sustainability is an important pre-request for managing system based on destination tourism. If sustainable development is one of the tourism industry's major contemporary objectives, then the industry needs to be able to measure its performance and impacts in this area. For that reason the logic of GSTC Criteria is a good way for framing a holistic approach model to sustainable tourism for cruise destination as the Criteria are designed to be used by all types and scale of destinations.

4. THE GSTC CRITERIA

The GSTC Criteria are administrated by the Global Sustainable Tourism Council. Those criteria are aimed to support destination tourism management organization as following functions:

- Basic guidelines are provided for destinations which wish to become more sustainable
- Help consumer to understand sustainable tourism destinations
- Personal sustainability efforts in public are informed also for media the Criteria act as a common denominator to recognized destination
- For destinations, the Criteria help to meet a broadly-accepted baseline via certification
- For education and training bodies such as school or universities a basic guidelines is provided
- All in all, a starting point for developing sustainable tourism in a destination is provided for all stakeholders (governmental, non-governmenteli private etc.)

A framework developed by GSTC can be used by all types and scales of destinations [13]. Four main aspects of the GSTC for sustainable development of destination are: Management, Socio-economic impacts, cultural impacts, environmental impacts. As it is illustrated in the Table 3. the GSTC Criteria present total 105 performance indicator and each combined indicators are categorized into four main section which has 41 sub-criteria [13]. The criteria consist of four main sections: (A) Demonstrate effective sustainable management, (B) Maximize economic benefits to the host community and minimize negative impacts, (C) Maximize benefits to communities, visitors, and culture; minimize negative Impacts, (D) Maximize benefits to the environment and minimize negative impacts. Each section has its own criteria and indicators as illustrated in the Table 3.

Table 3. The GSTC Criteria in numbers [13].

Sections	Number of Criteria	Number of Indcators
A	14	43
B	9	21
C	6	13
D	12	28

Due to the fact that these conbined indicators and criteria were conceived as the beginning of a process to make sustainablity the standard practice in all forms of tourism, cruise port destination management can benefit from them to reach a common understanding of sustainable destination.

5. CONCLUSIONS

Shipping industry has key standards, rules and regulations to protect ocean and marine environment such as MARPOL. However, cruise industry is not only shipping industry so ship-side regulations such as IMO standards are not capable to ensure sustainability for whole industry as its feature reflects not only maritime characteristics but also tourism. For many cruise ship operator's environmental practices has already exceed the international maritime standards especially whose target luxury and premium segments. On the contrary, the contemporary or budget segments whose rate in the market is growing most, tend to generate the biggest environmental impacts such as passenger traffic in the destination and attraction sites while cause economic leakage because they are offered also motivated to by shore excursions organized by cruise operator or their global partners but not locals. These kind of applications seem very mechanical more than leisure. Cruise tourism activities in a destination are mostly organized by financial considerations for the welfare of cruise

operators more than local stakeholders. These course of events in the cruise industry may obolish its main resource, the destination, in the near future. Still there are many incentives and promotions show cruise ship as a destination. These practices, which are contrary to cruise nature, are the biggest obstacles in sustainable tourism. As a response to the obstacles, first cruise port destinations should aware of their importance in the cruise industry, and then organize their own sustainable standards. The cruise destination should have an effective organization including private, public and non-governmental partners as well as cruise operator and suppliers and reliable measurement technics capable of a holistic approach toward sustainability. A quality management system may useful for destination organization to achieve its sustainable goals. The GSTC Criteria and its approaches can be considered as a basis upon which sustainability plans and strategies can be built. These may enable proper measurements, planning, monitoring and serve as the foundation for collaborative efforts within and across destinations. It is seen that via GSTC Criteria detailed assessment is an overarching best practice when evaluating cruise tourism development opportunities, risks, impacts and current operations. As a result of this study, it can be clearly suggested that the GSTC Criteria may provide an initial framework for a Holistic Port-Destination Approach (HPDA).

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Conventional Cotton Fiber Plant Breeding or Transgenic Cotton Fiber: The Situation in Turkey

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Abstract

Cotton is an important industrial plant with its wide usage and high employment potential. Cotton related textile industry has also a vital economic importance not only for developing countries but also for developed countries. Cotton fiber may be used in textile sector whereas its seed is used for oil-feed industry and its linter is used for the regenerated cellulosic fiber and paper industry. Moreover, recently cotton oil usage has been considered as a good alternative for the petroleum. Fiber yield and quality are the major determinants of the cotton crop. Hence improvement of fiber properties can be provided by the conventional cotton fiber plant breeding. Selection is the basic way for the variety increment of cotton crop. The success of the selection depends on the superior feature of the crops selected. Hybridization breeding technique can also be applied between two different varieties as well as with two inbred lines. Self-fertilization and backcross techniques are also commonly used methods for breeding. On the other hand, "transgenic cotton" has also been introduced recently which is improved with the aim of increase the productivity with more economical cultivation by using modern biotechnology in cotton. It is claimed that it is a new solution for the fight against climatic or geographical obstacles such as drought and salinity. In this study the detailed information about the cotton cultivation and the breeding techniques in Turkey will be mentioned. Additionally, after giving the detailed information about transgenic cotton, the advantages and the disadvantages of transgenic cotton will be discussed by comparison with the conventional cotton plant breeding.

Keywords: Breeding Techniques, Cotton, Self-fertilization, Transgenic Cotton

1. INTRODUCTION

Cotton has always been considered as a strategic plant of textile industry. Cotton which is the main consumable na natural fiber type has been cultivated in different type has been cultivated in different areas of the world. Table 1 reveals the cotton fiber growing countries in the world where Turkey has the 8th place after India, China, USA, Pakistan, Brazil, Australia and Uzbekistan [1-4]. The world cotton yield is 695.95 (kg/ha) in average whereas Turkey has cotton yield of 1475 (kg/ha) leading to 3rd place in the rankings. India, China, USA, Pakistan, Uzbekistan, Brazil, Turkmenistan, Turkey and Australia are the main countries which constitutes 80% of the cotton cultivation region of the world [3-5].

Table 8 Major cotton fiber growing countries in the World (.000 mt) [5]

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	Country	2012-2013	2013-2014	2014-2015	2015-2016	2016-2017*
1	India	6.290	6.766	6.562	5.746	5.775
2	China	7.300	6.950	6.550	4.988	4.871
3	United States	3.770	2.811	3.553	2.806	3.738
4	Pakistan	2.002	2.076	2.305	1.537	1.663
5	Brazil	1.310	1.734	1.563	1.289	1.485
6	Uzbekistan	1.000	910	885	832	789
7	Australia	1.018	885	528	629	960
8	Turkey	745	688	720	640	703
9	Turkmenistan	370	337	333	315	292
10	Burkina Faso	264	270	298	244	285
Total yield of ten countries		24.069	23.427	23.297	19.026	20.561	21.994
World total yield		26.783	26.173	26.222	21.328	22.985	24.604
Total ratio of the ten countries (%)		89.87	89.51	88.85	89.21	89.45	89.39

(*) Estimated

Turkey has about 2.8% share in the world's cotton fiber cultivation according to the yield of 2015/16 (Table 1), there has been increasing cotton fiber cultivation in Turkey since 1990's [6]. Cotton fiber has a significant role in the national economy of Turkey. According to the fiber yield, yield of cotton fiber for the year of 2015/16 Turkey has the 3rd rank after Australia and Israel (Table 2). Although the cotton fiber yield is very high in Turkey, there is an increment in cotton import of Turkey from 381 000 tons to 755 000 tons between the years of 2000 and 2015. This result was attributed to the insufficient domestic production of cotton fiber and to the increasing trend of new textile manufacturing investments in Turkey

Turkey locates in the north boarder of the appropriate cotton cultivating locations between the north parallels of 32-36. Climate and soil are the most important factors that limit the cotton cultivation areas. Turkey provides conventional and organic cotton types. Genetic potential, environmental conditions and breeding techniques are major parameters that influence the amount and quality of the cotton crop. Currently the Aegean region has the greatest share in cotton output of Turkey. Quality of the cotton fiber of this region is also the highest comparing to the other regions outputs. In Cukurova area, output is subject to significant fluctuations and in general, it exhibits a declining trend. Cukurova Region was an important area in 1980's in terms of Turkey's cotton production for both cultivating areas and total output. After the 1990's, the production in the region was in decrement trend because of both the cost increases owing to the raid against increasing number of vermins and disease and also the reduction of planting areas because of the pricing policy in practice.

The Ministry of Food, Agriculture and Livestock-(MFAL) is the principal state organization involved in agriculture and rural development in Turkey. The Ministry coordinates and implements the agricultural R&D activities through the General Directorate of Agricultural Research and Policy (GDARP). The GDARP is the headquarter of the national agricultural research system and it is liable for determining national research strategy, constituting research priorities and assigning available financial resources to the programs and assisting the government in developing and improving agricultural policy. Other major contributors in cotton research are universities, the Scientific and Technological Research Council-TUBITAK, Scientific Research Project Coordination Department of Universities and the private sector companies. The Cotton Research

Institute in Nazilli-Aydin was established in 1934 and it is the primary mono crop multidisciplinary research institute in Turkey [7].

A plant breeder aims to succeed a favorable combination of genes for incorporation into a new crop. This has been succeeded with the knowledge about the inheritance of gens. Breeding programs may be much easier for the specific aims such as resistance which is a monogenic manner. Nevertheless, many important agronomic targets related to crop development, are polygenic and reveal a specific continuous variation which is much more difficult to be evaluated during the breeding. In this case, the trait is managed by the number of genes each of that affects the characteristics of the plant. These genes are called as "quantitative trait loci" (QTL) of which mapping and tracking is used for augmenting traditional methods of plant and animal breeding with the help of marker-assisted selection. However, determining the positions of DNA markers on the chromosomes is not easy as it seems in cotton. Inadequate DNA sequence information and the relatively large size of the cotton genome (especially in the allotetraploid cottons) are the biggest barriers for determining the genome mapping for cotton. The International Cotton Genome Initiative was founded with the objective of coordinating cotton genome research in 2001. Afterwards more comprehensive genetic maps for the Diploid (D) and allotetraploid (AD) cotton genomes were also published [8].

Selection is the basic way to increase the variety for cotton crop. The success of selection depends on the superior feature of the crops selected. Additionally, the breeding methods for self-fertility of the cotton may be sorted out as; introduction, selection and hybridization breeding. Hybridization breeding technique can be applied between two different varieties as well as with two inbred lines. If the parents are inbred lines, the new combinations are called as heterozygous (F1). Figure 1 displays self-fertility process which provides inbred line for the hybridization technique. In self-fertility process, the female parent is isolated with the nylon pipette of 2-3 cm in order to avoid from drying by wind effect and foreign fertilization. During the pollination process; pollen vectors are applied onto the female parent and the plant should be isolated again. It may take two to three years for the self-fertilization to be completed. After the hybrid cotton seeds are collected from the plant; the new F1 seeds are cultivated. Afterwards selection process for the new F2 seeds takes place. Process continues until a homogenies line is obtained by selecting. This technique is called as PEDIGRI Method. Bulk selection method differs from Pedigri technique where the seeds are selected until the end of 4^{th}-5^{th} generation. The disadvantage of this method is that it works with a very large amount of seed.

2. CONVENTIONAL PLANT BREEDING OR TRANSGENIC COTTON?

Plant breeding began 10000 years ago with selecting the best plants in the field. When Gregor Mendel discovered the law of genetics about 150 years ago, the speed of plant breeding increased considerably. After the hybrid breeding in the 1930s, cross breeding, tissue and cell culture methods in 1960s and new DNA techniques in 1980's were discovered respectively. Plant breeding has been developed by molecular genetic approaches that may permit manipulation and insertion of genes. It was observed that foreign genes introduced into the plant genome provided new features for the crop quality. Transgenic crops grown in the world today contain soybean, rice, tomato, potato as well as cotton. The characters including nutritional quality, insect resistance, disease resistance, herbicide resistance and salinity tolerance have been developed [9].

Four species in the genus *Gossypium*, tribe *Gossypiaeae* and family *Malvacea* are the main types of cultivated cottons. The old world cultivated cottons, *G.arborfeum* and *G.herbaceum* are diploid (2n=26) which mean it contains two sets of chromosomes, one haploid set from each parent. The chromosome number is 13. The new world commercial cotton fibers are the tetraploid (2n=4x=52) cottons *G.hirsutum* (Upland cotton) and *G. Barbadense* (Pima, Sea Island and Egyptian cottons). Their cells include four haploid sets of chromosomes or two diploid sets. Improvement of cotton varieties firstly began with the cotton domestication for textile production. There was an increasing demand for the fiber strength and quality in the international textile market [10]. Plant breeding programs were generally for the varieties used in commercial cotton production. An attempt from the Commonwealth Scientific and Industrial Research Organization (CSIRO) provided an elite cotton cultivation suited to Australian conditions, which incorporates the best useful characteristics from varieties. An increase of 20% in average cotton fiber strength and %5 in cotton fiber length have been recorded for the last 15 years. It is obvious that plant selection and breeding have led to many improvements in the cotton germplasm however they have also some disadvantages. A large amount of time and effort are needed for plant growth, reproduction and selection. When the desired gene is introduced into species, backcrossing is needed to restore the genetic background. Hence, it takes 6-10 years to complete the breeding for a new cotton variety development [11].

Figure 1. Self-fertilization processes

Name of the lately certificated some seeds of Nazilli Cotton Research Institute may be listed as IPEK607, SEZENER, NAZ07, ES1, ES2, SC2009, SC2079 etc. [12]. Another breeding technique called "Backcross Technique" is used for limiting the heterogeneity by producing a hybrid similar to whichever of the two varieties has the more valuable genetic constitution transferred from the other parent. Backcrossing has the advantage of obviating the necessity for rigid selection generation after generation in F2, F3, F4 etc. The hybrid becomes more and more homogenous by this way [13].

Transgenic Cotton was improved aiming to increase the productivity with more economical cultivation by using modern biotechnology in cotton. It was also claimed that biotechnology in cotton is much more environmentally friendly production since there is less pesticide usage. Transgenic cottons have been a solution for the fight against climatic or geographical obstacles such as drought and salinity in various regions of the world as well as for the fight against insects and weeds. With the increase in the usage of genetically modified organisms, different opinions have emerged about their reliability. Large manufacturers and importers of agricultural biotechnology products argue that biotechnology products have many advantages over products produced by traditional methods and they guide the farmers and the producers to these products. However, many consumers and environmental organizations are expressing their concerns about human health and potential environmental impacts and demand for strict controls over such biotechnology products.

Currently global nutrition and other industrial plant demands are in the risk of threat by the monopolization of a few worldwide organized companies. If that occurs, few multinational corporations will shape the agricultural products among the world. As a result, small seed-buyer companies will no longer be able to cope with the high-priced seeds. By this way, it is expected that external dependence will increase for the agriculture sector in developing countries. In this context, it is vital to determine the policies of genetically modified agricultural organisms in order to prevent the risks attributed from the biotechnology usage in agriculture and to ensure the sustainability of the conservation of biological diversity by human-animal and plant health protection of as well as in order to get benefit from developing new technologies safely. Table 2 reveals the transgenic planting areas by product that 68% of total world cotton planting area uses the transgenic cotton at the total area of 25.1 million hectare. On the other hand, Table 3 reveals the transgenic cotton producer countries and their total planting area of transgenic cotton as well as with the ratio of transgenic cotton to the total cotton planting area (%). Although there is some small amount of scientific studies in the universities regarding the transgenic cotton in Turkey, transgenic cotton fiber production, planting and cultivation are not carried out in Turkey. Since transgenic cotton cultivation is not allowed in Turkey [13-17].

Table 9 Transgenic planting areas by product [18]

Products	Total Planting Area (million hectares)	Transgenic Planting Area (million hectares)	Ratio (%)
Cotton	**37**	**25.1**	**68**
Soybean	**111**	**90.7**	**82**
Corn	**184**	**55.2**	**30**
Colsa	**36**	**9**	**25**

Table 10 Transgenic cotton producer countries and their total planting area of transgenic cotton (million hectares) [18]

Rank	Country	Transgenic Planting Area (million hectares)	Ratio of transgenic cotton to the total cotton planting area (%)
1	USA	3.58	%90
2	Brazil	0.65	%67
3	Argentina	0.445	%99
4	China	3.9	%75
5	India	11.6	%95
6	Pakistan	2.9	%90
7	South Africa	0.027	%95
8	Australia	0.2	
9	Burkino Faso	0.5	
10	Sudan	0.1	

3. CONCLUSIONS

Nazilli Cotton Research Institute (Aydin, Turkey) is a big foundation under the Republic of Turkey Ministry of Food Agriculture and Livestock which has been investigating on conserving of genetic stock, developing source material, breeding, collection and evaluation of data on cotton in National Scale since 1934. Although there is some small amount of scientific studies in the universities regarding the transgenic cotton in Turkey, transgenic cotton fiber production, planting and cultivation are not carried out in Turkey. Since transgenic cotton cultivation is not allowed in Turkey. The quality of Turkish cotton fibers is being tried to be improved with the past, current and upcoming researches and efforts which have been undertaken by the Nazilli Cotton Research Institute, the Turkish universities, private sector companies and with their bilateral cooperation and collaborations. In Turkey, these mentioned institutions and companies are working to improve the properties and quality of different types of cotton fiber genotypes (white, off-white and naturally colored) by using the conventional plant breeding techniques such as a selection breeding and crossing leading to the production of better and more productive superior varieties of cotton fibers. All these efforts about cotton fibers are so important and will add up to the more sustainable World.

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Determination of Credit Rating Tendencies of Turkish SME's; A Survey on West-Mediterrenean Region Companies of Turkey

Osman Kursat Onat[1], Osman Akin[2]

Abstract

Credit rating is widely known as a rating system to rate and classify coutry economies. But rating system can be used for personal and corporate ratings. Ratings for countries and also for companies are widely discussed in aspect of accuracy and extent. Many decision maker may benefit from those applications to decide faster and more accurately. But rating system and process may be considered expensive. So forth new efforts to base rating methodolgies on more accessible system becomes crucial. Financial statements may be considered as a basic instrument to rate companies. Main motivation of this idea is detailed explanation of asset, liability, capital, income and expense items in financial statement such as balance sheet and income statements. Also cash flows and changes in equities can be watched afterwards. In this manner awareness of the companies about credit rating is indefinite. In this study awareness and perspectives of Turkish SME's about credit rating is searched in scope of East-Mediterrenean region. Results mainlu show that most of SME's agree on potential benefits of ratings and ratings based on financial statements.

Keywords: Credit Rating, Small and Medium Enterprises, East-Mediterrenean Region

1. INTRODUCTION

Economical advancement worldwide mainly affect types of business models and other business progress. All stakeholders in world economy have an importance because of affecting results of companies. In this aspect financial information is affected from all around the economy.

All types of financial information are important and evenly crucial for actual and potential financial information users. Financial information users may source from inside and/or outside of companies. Owners, investors, creditors, debtors and etc. May be counted some types of financial information users. In this manner reliability, accuracy and durability of financial information is vival for all couterparts of economy. Those properties of financial information was not so much questioned until Enron scandal. Reports of independent audit firms were wholely accepted true and errorless. But Enron scandal caused many generally accepted truth to be questioned. Countries took many precautions and apply sanctions about this process. Public oversight board is one of the most influential progression on the process.

Credit rating is an alternative system to declare objective opinion about financial situation of people, companies, institutions and countries. Credit rating is an opinion about credit risk. Credit ratings can also speak to the credit quality of an individual debt issue, such as a corporate or municipal bond, and the relative likelihood that the issue may default. Ratings are provided by credit rating agencies which specialize in evaluating credit risk. (S&P, 2014). Mainly credit ratings are focused on credit and debt turnaround risks. This focus may be on a person, company and country.

2. CREDIT AND CREDIT RATING BACKGROUND

As soon as humans started to communicate, it is certain that they started borrowing and repaying. In this manner history of credit stretches 5.000 years (Thomas, et al., 2002, p. 2). It is something that has been crucial within many economies, to finance trade and commercial endeavours, but has seldom been a glorious activity. Most

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early religions frowned on the charging of interest, largely because of the exremel high interest rates being charged, and draconian penalites for non-payment. It was only in the 1500s that protestant and church accepted teh lending of money for interest. The real growth of credit accompanied the industrial revolution, not only to finance factories and infrastructure, but also the consumer goods they produced. While concept of credit scoring had been touted in 1940's and in 1960 it started gaining wide acceptance. Until the end of 90's different variations of credit scoring has been used in commercial life. The year 2000 saw Moody's launch of RiskCals, which was the first commercial use of credit scoring to assess company financial statements. (Anderson, 2007, p. 53). So forth different variations of financial statements are being used to assess credit scorings and other tools.

3. RESEARCH AND FINDINGS

Tendency of Turkish SME's to credit rating was reseached in West-Mediterrean region of Turkey.

3.1. Aim of Research

Aim of the research is to survey awareness and determine tendencies to benefit from credit rating systems for SME's.

3.2. Scope and Limits

Research was performed among 122 companies. Many of companies are production companies but other types are varying. Research was performed in Turkish East-Mediterrenean region provinces Burdur, Isparta and Antalya.

3.3. Deifinitive Statistics

Below definitive statistics about sample were presented.

a) Industry

Table 1 : Industry Distribution Rate of Companies

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Production	52	42,6	42,6	42,6
	Trade	13	10,7	10,7	53,3
	Service	57	46,7	46,7	100,0
	Total	122	100,0	100,0	

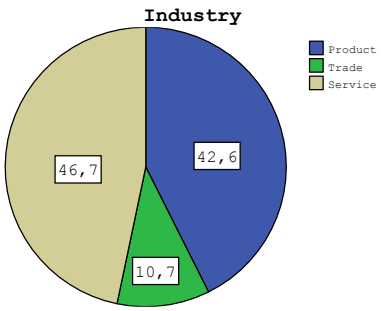

Figure 1: Industry Distribution of Companies (Percentage)

a) Number of Employee

Companies mainly consists of small (number of employee between 1-50) companies and other companies goes through medium sized ones.

Table 2: Number of Employee

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1-50	71	58,2	58,2	58,2
	51-100	19	15,6	15,6	73,8
	101-150	7	5,7	5,7	79,5
	151-200	8	6,6	6,6	86,1
	201-500	17	13,9	13,9	100,0
	Total	122	100,0	100,0	

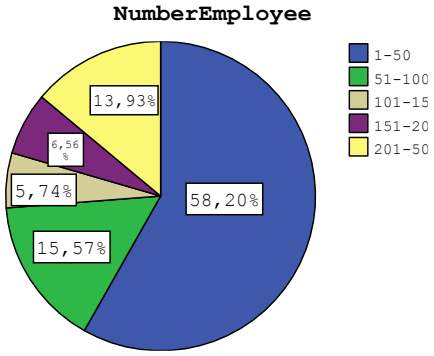

Figure 2: Number of Employee

b) Operation Year

Operation year of companies vary mainly between 11 years and more. This situation realize that results depend on more experienced companies.

Table 3 : Operation Years of Companies

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1-5 Years	28	23,0	23,0	23,0
	6-10 Years	21	17,2	17,2	40,2
	11-15 Years	26	21,3	21,3	61,5
	More than 16 Years	47	38,5	38,5	100,0
	Total	122	100,0	100,0	

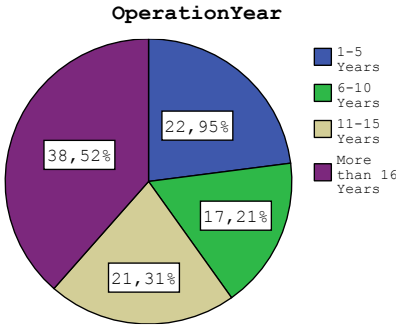

Figure 3: Operation Years of Companies

c) Financial Statement Audit

Companies were asked have their financial statements audited. 27 percent of companies are annually having their financial statements audited. Rest of companies don't progress audit process because of not being under legal obligations.

Table 4 : Audit percentage of companies

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	33	27,0	27,0	27,0
	No	89	73,0	73,0	100,0
	Total	122	100,0	100,0	

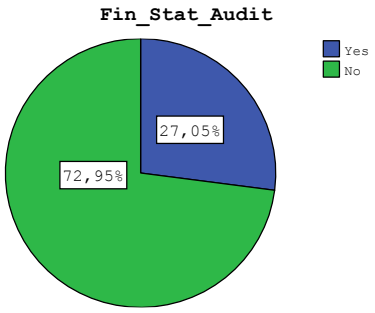

Figure 3: Financial Statement Audit Percentage of Companies

Hypotheses

Hypotheses tested under the study are as abelow;

H1: Companies know credit rating concept.

H2: Companies have detailed information about credit rating process

H3: Credit rating can be performed based on financial statement

H4: Credit rating in as additional cost for companies

H5: Credit rating may support foreign investment and increase market value

H6: National credit rating agencies are priorly preferred

H1,H2 hypotehese aim to determine awareness level of companies about credit rating agencies. H3 hypotehis aim to determine operation types of rating agencies. H4 and H5 hypotheses aim to determine perspectives of companies to credit rating. H6 and H7 hypotheses target to determine companies's preferences about credit rating institutions.

Findings

Statistical analysis was performed with One Sample T-Test. Data was collected via 14 questioned survey. Hypoteheses were designed according to the questions. Mean and standard deviation statistics of variables presented below.

Table 5 : Statistical Results

	N	Mean	Std. Deviation	Std. Error Mean
Q1	122	4,33	,828	,075
Q2	122	3,56	1,193	,108
Q3	122	2,35	1,075	,097
Q4	122	2,57	1,259	,114
Q5	122	2,37	1,241	,112
Q6	122	3,20	1,103	,100
Q7	122	3,84	1,053	,095
Q8	122	3,30	1,271	,115
Q9	122	3,63	1,398	,127

Q10	122	4,29	,983	,089
Q11	122	3,84	1,188	,108
Q12	122	3,04	1,417	,128
Q13	122	3,63	1,261	,114
Q14	122	2,30	1,238	,112

Question 14 has the least mean and first question has biggest mean. Mean scores of other questions vary between 3,04 and 4,29. Statistical analysis results about hypotheses are presented below.

Table 6: Results of One Sample T-Test

	t	**df**	**Sig. (2-tailed)**	**Mean Difference**	**95% Confidence Interval of the Difference**	
					Lower	Upper
Hypothesis 1	17,721	121	,000	1,328	1,18	1,48
Hypothesis 2	5,162	121	,000	,557	,34	,77
Hypothesis 3	-3,739	121	,000	-,426	-,65	-,20
Hypothesis 4	2,565	121	,012	,295	,07	,52
Hypothesis 5	4,987	121	,000	,631	,38	,88
Hypothesis 6	5,528	121	,000	,631	,41	,86

Hypothesis 1 was accepted ($p<0,05$) and result shows that participants have a basic awareness about credit rating concept. This basic awareness may be useful impelementing credit rating based system in companies.

Hypothesis 2 was accepted ($p<0,05$) and result reveal that participants have detailed information about credit rating process. So awareness of companies of credit rating have been found high.

Hypothesis 3 was accepted ($p< 0,05$) so pariticipants agree with idea of financial statements can be used for credit rating process.

Hypothesis 4 was accepted ($p< 0,05$) and results execute credit rating is an additional cost for companies. But mean variance is low (2,565) so companies focus more on benefits of credit rating process.

Hypothesis 5 was accepted ($p< 0,05$) and companies ally with idea of credit rating could benefit companies to attract foreign investors and increase market value.

Hypothesis 6 was accepted ($p < 0,05$) and many companses desire to get support for credit rating from national firms.

4. RESULTS

Credit rating process is very important for economies, companies and also for people. In this manner true rating methodologies and advanced rating system wil ensure lenders and borrowers so forth sustainability of economy

will empower. With empowering of economical system whole cycle will sustain and develop via increase of per capita growth and income.

In this study we researched awareness and perspectives of Turkish SME's specially in east-mediterrenean region. According to results many of companies has awareness about credit rating concept and also most of companies know progress systems of credit rating agencies.

Additionally companies ally with idead of having a credit rating score will benefit them gathering foreign investment and increasing market value. With this sense those companies are tended to enter credit rating system and this system could support development of economical activities.

Finally, according to results, Turkish SME's have a high and positive awareness about credit rating. Further studies are aimed to detail study.

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Development of A Financial Statement Based Credit Rating Methodology; A Research on Turkish SME's In Scope of East Mediterrenean Region

Osman Akin[1], Osman Kursat Onat[2]

Abstract

Credit rating methodology is mainly based on econometric and complex calculations. Because of this complex status many stakeholders in economic activity do not tend to rating activities. This phenomenon limits rating system with big enterprises. This is commonly caused of rating process is thought to be too expensive. In this manner cheaper and faster methodogies are required to be developed. Some researchers focus on financial statements as best known indicators for a company's assets, liabilities, capital, incomes and expenses. Many of details about those items are also explained in financial statements. So forth many potential investors, venture capitals, angel investor and other economical counterparts may benefit from financial statements to have an idea about a company. In this manner financial statements can also be used for credit rating. In this manner this study is performed to develop a financial statement based credit rating methodology for SMEs. In this study important factors in financial statements were researched on Turkish SMEs specific to Mediterrenean region. A rating methodology was developed based on survey.

Keywords: Credit Rating, Financial Statement, Model, Tuirkish SME's

1. INTRODUCTION

"Encyclopedia of Banking & Finance" by Charles J. Woelfel states that a credit rating is a letter or number used by a mercantile or other agency in reports and credit rating books to denote the ability and disposition of various businesses (individual, proprietorship, partnership or corporation) to meet their financial obligations.2 It is an assessment of the credit worthiness of individuals and corporations. It is based upon the history of borrowing and repayment, as well as the availability of assets and extent of liabilities.3 It also states that ratings are used as a guide to the investment quality of bonds and stocks, based on security of principal and interest (or dividends), earning power, mortgage position, market history and marketability (KUMAR, SHARMA, MARWAH, SHEKHAWAT, & SİNGH, 2013, S. 3-4).

Credit ratings establish a link between risk and return. An investor or any other interested person uses the rating to assess the risk-level and compares the offered rate of return with his expected rate of return.4 Credit rating is extremely important as it not only plays a role in investor protection but also benefits industry as a whole in terms of direct mobilization of savings from individuals (KUMAR, SHARMA, MARWAH, SHEKHAWAT, & SİNGH, 2013, S. 3-4).

Credit ratings have been extensively used by bond investors,debt issuers, and governmental officials as a surrogate measure of riskiness of the companies and bonds. They are important determinants of risk premiums and even the marketability of bonds. The development of the corporate credit rating prediction model has attracted lots of research interests in academic and business community. Although of interests in accurate quantitative prediction of corporate bond rating, due to lack of scientific credit rating methodology and

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sufficient data accumulation to construct the model, the traditional approach produce an internal rating on the basis of credit officer's judgment to a significant extent in the real world (Lee, 2007).

Rating provides a marketing tool to the company and its investment bankers in placing company's debt obligations with a investor base that is aware of, and comfortable with, the level of risk. Ratings also encourage discipline amongst corporate borrowers to improve their financial structure and operating risks to obtain a better rating for their debt obligations and thereby lower the cost of borrowing. Companies those get a lower rating are forewarned, as it were and have the freedom, if they desire, to take steps on their financial or business risks and thereby improve their standing in the market. During the great American depression years, high levels of default triggered the growth of credit rating as an essential input for the investors. The recognition for credit rating received a new impetus when Government Pension Funds, Insurance Companies etc. were directed not to invest in securities rated below a particular grade by credit rating agencies. This led to the growth in the awareness of credit rating as a primary tool of risk assessment (Kumar, Sharma, Marwah, Shekhawat, & Singh, 2013, s. 4).

2. LITERATURE

There are many studies developing credit rating methodologies via econometrical methods. Below are some citations.

Lee (2007) , used support vector machines to develop credit rating methodology.

Huang etc. (2004), used support vector machines and neural networks for developing credit rating methodology and conducted a market comparative analysis on the differences of determining factors in the United States and Taiwan markets.

Chiu etc. (2010), used data envelopment analysis method for credit rating in Taiwan banking industry.

3. DEVELOPMENT OF CREDIT RATING METHODOLOGY

3.1. Methodology and Data

Credit rating methodology was developed based on financial statements. Also importance level of financial statement items were determined via survey. Survey was performed in West- Mediterrenean Region of Turkey in Isparta, Burdur and Antalya provinces.

3.2. Descriptive Statistics

a- Industries

Survey was applied on 122 companies in West- Mediterrenean Region. Companies were grouped according to their core business'.

Table 1 : Industry Percentages

	Frequency	Percentage	Valid Percentage	Cumulative Percentage
Production	52	42,6	42,6	42,6
Trade	13	10,7	10,7	53,3
Service	57	46,7	46,7	100,0
Total	122	100,0	100,0	

b- Employee Number

Most of companies are grouped under SME and have employees between 1-50 .

Table 2: Employee Number Percentage

	Frequency	Percentage	Valid Percentage	Cumulative Percentage
1-50	71	58,2	58,2	58,2
51-100	19	15,6	15,6	73,8
101-150	7	5,7	5,7	79,5
151-200	8	6,6	6,6	86,1
201-500	17	13,9	13,9	100,0
Total	122	100,0	100,0	

c- Operation Year

Most of surveyed companies range as companies operating more than 10 years.

Table 3: Operation Year Percentage

	Frequency	Percentage	Valid Percentage	Cumulative Percentage
1-5 Years	28	23,0	23,0	23,0
6-10 Years	21	17,2	17,2	40,2
11-15 Years	26	21,3	21,3	61,5
More Than 16 Years	47	38,5	38,5	100,0
Total	122	100,0	100,0	

d- Audit Situation

Audit of financial statements increase reliability, fairness and accuracy of financial statements.

Table 4 : Audit Percentage

	Frequency	Percentage	Valid Percentage	Cumulative Percentage
Yes	33	27,0	27,0	27,0
No	89	73,0	73,0	100,0
Total	122	100,0	100,0	

e- Hypothesis Results

Below hypotheses were analyzed according to survey results.

H1: Companies are aware of cedit rating.

H2: Companies have detailed information about credit rating.

H3: Credit rating can be performed based on financial statements.

H4: Credit rating is an additional cost for companies.

H5: Credit rating may attract foreign investors.

H6: Native credit rating agencies may primarily be preferred.

Results of analysis according to One Sample T- Test were shown below.

Table 5: One Sample Statistics

	N	Mean	Standard Dev.	Std. Error Mean
S1	122	4,33	,828	,075
S2	122	3,56	1,193	,108
S3	122	2,35	1,075	,097
S4	122	2,57	1,259	,114
S5	122	2,37	1,241	,112
S6	122	3,20	1,103	,100

S7	122	3,84	1,053	,095
S8	122	3,30	1,271	,115
S9	122	3,63	1,398	,127
S10	122	4,29	,983	,089
S11	122	3,84	1,188	,108
S12	122	3,04	1,417	,128
S13	122	3,63	1,261	,114
S14	122	2,30	1,238	,112

Cizelge 5 : Tek Orneklem Istatistikleri

Below results of T-Test wee presented.

	t	df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
					Lower	Upper
Hypothesis 1	17,721	121	,000	1,328	1,18	1,48
Hypothesis 2	5,162	121	,000	,557	,34	,77
Hypothesis 3	-3,739	121	,000	-,426	-,65	-,20
Hypothesis 4	2,565	121	,012	,295	,07	,52
Hypothesis 5	4,987	121	,000	,631	,38	,88
Hypothesis 6	5,528	121	,000	,631	,41	,86

Cizelge 6: Hipotez Testi Sonuclari

According to results H1, H2, H3, H4, H5 and H6 hypotheses were accepted. In this manner all companies are aware of credit rating and they accept that credit rating will be useful and beneficial to their companies. Also they support idea of credit rating is an additional cost for companies.

3.3. Credit Rating Methodology

Importance of financial statement items were determined via survey by using 5- Likert scale.

Table 7 : Mean Significance of Financial Statement Items

	Current Assets	Non-Current Assets	Short Term Liabilities	Long Term Liabilities	Equities	Profitability
Mean Significance	4,67	4,25	3,81	3,89	4,34	4,50

Category coeeficients were determined via Analytica Hierarchy Process and presented below.

Tabel 8 : Category Coefficients

	Liquidity	Financial Structure	Operation Ratios	Economical Structure	Profitability
Category Coefficients	0,42	0,212	0,16	0,104	0,104

Sub categories and ratios were determined for categories.

Table 9: Sub Categories and Coefficients

Liquidity		Financial Structure		Operation Ratios		Economical Structure		Profitability	
Current Ratio	0,60	Equity/ Total Liabilities	0,40	Inventory Turnover	0,30	Non-Current Assets/ Total Assets	0,25	Net Profit / Equity	0,40
Asit-Test Ratio	0,40	Total Debts/ Total Liabilities	0,30	Receivable Turnover	0,30	Current Assets/ Total Assets	0,25	Net Profit/ Total Asset	0,30
		Equity/ Total DEBTS	0,30	Asset Turnover	0,20	Inventory / Total Assets	0,30	Net Profit/ Net Sales	0,30
				Equity Turnover	0,20	Cash / Total Assets	0,20		

Afterwards credit rating scores are calculated via coefficients and sub-category coefficients.

Table 10 : Credit Rating Score Coefficient Table

	Category Coefficienst	**Sub Category Coefficients**	**Point**
Liquidity	**0,42**		
Current Ratio	0,42	0,6	0,252
Asit-Test Ratio	0,42	0,4	0,168
Financial Structure	**0,212**		
Equity/ Total Liabilities	0,212	0,4	0,0848
Total Debts/ Total Liabilities	0,212	0,3	0,0636
Equity/ Total Debts	0,212	0,3	0,0636
Operation Ratios	**0,16**		
Inventory Turnover	0,16	0,3	0,048
Receivable Turnover	0,16	0,3	0,048
Asset Turnover	0,16	0,2	0,032
Equity Turnover	0,16	0,2	0,032
Economical Structure	**0,104**		
Non-Current Assets/ Total Assets	0,104	0,25	0,026
Current Assets/ Total Assets	0,104	0,25	0,026
Inventory / Total Assets	0,104	0,3	0,0312
Cash / Total Assets	0,104	0,2	0,0208
Profitability	**0,104**		
Net Profit / Equity	0,104	0,4	0,0416
Net Profit/ Total Asset	0,104	0,3	0,0312
Net Profit/ Net Sales	0,104	0,3	0,0312
		TOTAL	**1**

Cizelge 10: Kredi Derecelendirme Skoru Katsayi Tablosu

Credit Rating Model is as below

Credit Rating Score : 0,252 (Current Asset) + 0,168 (Asit-Test Ratio) + 0,0848 (Equity/Total Liability) + 0,0636 (Total Debt / Total Liability) + 0,0636 (Equity/ Total Debts) + 0,048 (Inventory Turnover) + 0,048 (Receivable Turnover) + 0,032 (Asset Turnover) + 0,032 (Equity Turnover) + 0,026 (Non-Current Asset/ Total Asset) + 0,026 (Current Asset / Total Asset) + 0,0312 (Inventory / Total Asset) + 0,0208 (Cash / Total Asset) + 0,0416 (Net Profit / Equity) + 0,0312 (Net Profit / Total Asset) + 0,0312 (Net Profit / Net Sales)

Table 11 : Credit Rating Scores and Meanings

Kredi Derece Skoru	**Notasyon**	**Anlami**
95-100	A+	Financially Durable Caompany
90-94	A	Financially Durable but some long term risks
85-89	B+	Suitable for mid-term debts.
75-84	B	More sensitive than higher category
65-74	C	Highly speculative company
55-64	D	Risky in aspect of debt payments
45-54	E	Out of acceptable risks
0-34	F	No credibility

7. RESULTS

In conclusion our credit rating methodology suggests a brief and financial statement based model for credit rating of companies. So forth credit rating methodologies may be cheaper and faster for companies. More detailed methodologies can be deveoped credit rating.

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The Effects of Hydrogen Peroxide and Sodium Hypochlorite Oxidizing Treatments on the Color Properties of Naturally Colored Green Cotton

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Abstract

The cultivation of naturally colored cotton has captured the attention lately due to the increasing environmental concerns and problems. The green color in cotton fibers is owing to a lipid biopolymer (suberin) sandwiched between the lamellae of cellulose microfibrils in the secondary wall. Naturally colored green cotton fiber does not need dyeing or coloration process due to their inherent color characteristics leading to more ecological and sustainable textile production. Naturally colored cotton growers and producers have less requirement for the pesticides, insecticides since these varieties have already insect and disease-resistant qualities as well as they exhibit property for drought and salt tolerant leading to more environmental friendly cotton fiber production. The colorimetric (CIE L, a*, b*, C*, h^o, K/S etc.) properties of studied naturally green colored Turkish cotton fiber were explored before and after scouring (with NaOH), and oxidizing processes with hydrogen peroxide and sodium hypochlorite (with different sodium hypochlorite concentrations and different oxidizing treatment periods and at different pH levels, with or without scouring process as a precursor treatment etc.) in comparison with their greige (un-treated) counterpart. The application of scouring process with NaOH to naturally green colored cotton fiber increases the color yield levels leading to darker appearance. Similarly, hydrogen peroxide and sodium hypochlorite oxidizing processes resulted in an increase in the color yield levels of naturally green colored cotton fibers leading to darker appearance. Even at high sodium hypochlorite concentrations such as 200 ml/l at pH 12 and room temperature for 48 hours, the naturally green colored cotton fibers maintain their color.*

Keywords: green cotton, naturally colored cotton, oxidizing, sodium hypochlorite, hydrogen peroxide, color

1. INTRODUCTION

It is known that naturally colored cotton originated around 5,000 years ago in the Andes region. Therefore, naturally colored cotton is not a novel concept and its cultivation history dates back 5000 years [1-4]. Naturally colored cottons, containing natural cotton fibers with natural pigments, have been planted for thousand years but have captured limited interest till the recent years owing to their short fiber length and poor fiber strength features [5, 6]. With the sophisticated genetic breeding techniques, nevertheless, naturally colored cotton fibers in various shades of green and brown have been effectively manufactured with existing conventional textile machineries [7]. Unlike conventional cotton fibers dyed with synthetic dyes, the colors of which tend to fade, the natural color of the naturally colored cotton fiber actually deepens after repeated washings [8]. Apart from their inherent color characteristics, these fibers also display natural flame resistance properties leading to increased attention for different end-use applications [9-10]. Naturally colored cotton fiber is naturally pigmented fiber which grows in different shades of green and brown. Historical records also state the existence of browns with the shades of pink and lavender tints [11]. Naturally colored cottons have a minor niche market and naturally colored cotton fibers available today are usually shorter, weaker, and finer than regular Upland cottons, however these fibers can be spun effectively into ring and rotor yarns for many different applications [12]. These fibers also can be blended with conventional off-white cotton fibers or mixed amongst themselves. Naturally colored cotton fibers are currently grown in China, Peru, and Israel. Also, Turkey produces naturally

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colored cotton fibers in different shades of brown and green. Different shades of brown and green naturally colored fibers are the main colors which are available in the market. Other different colors such as mauve, mocha, red are also available in Peru in a very limited supply and some other new shades are under investigation. The color for brown and red-brown naturally colored cotton fibers appears to be in vacuolar tannin material bodies in the lumen of the fiber. The different shades of brown and red-brown are mostly because of catechin–tannins and protein–tannin polymers [13].

On the other hand, green color in naturally colored cotton fibers is because of a lipid biopolymer (suberin) sandwiched between the lamellae of cellulose microfibrils in the secondary wall [13-14]. It is right point to state that brown naturally colored cotton fibers (and white lint) do not comprise suberin. Green naturally colored cotton fibers are categorized by high wax content (14 –17% of the dry weight) while white and brown fibers comprise about 0.4 –1.0% wax [13]. Latest research studies regarding naturally colored cottons reported that naturally colored brown cotton fiber is very similar in morphology to off-white (white) cotton fiber while naturally colored green cotton fiber is different as it comprises suberin. Suberin comprising primarily bifunctional fatty acids can theoretically generate a three dimensional network in the existence of glycerol, which is also found in green cotton fiber nevertheless not in white cotton fiber. How this 3D network affects the structure of the individual crystallites of cotton fiber cellulose was examined in that study. According to their outcomes, the researchers stated that the presence of suberin does not affect the structure of the individual crystallites nonetheless obstructs the development of the crystallites in the naturally colored green cotton fibers [15]. In the literature, it is stated that green is the second important commonly occurring lint color in cotton fibers. Therefore, green color in naturally colored cotton fibers is less common than brown shade and ensues primarily in two shades such as green and lighter green shade. Green color is more prone to fading and naturally green colored cotton fiber fades quicker than the naturally brown colored cotton fiber. Extended exposing to sunlight during boll opening resulted in quick fading of green color and the color turns to white, off-white or brownish shades. It is also reported that part of lint that is not directly subjected to sunlight preserves its original lint color [16]. It is known that the loom state cotton fiber fabric contains approximately 8-12% natural impurities of total weight of the cotton fiber [17]. Alkali treatment, scouring or hydropilizing treatment are generally applied to cotton fibers in order to remove these impurities in the cotton fibers. Although bleaching and/or dyeing processes may generally not be applied to naturally colored cotton fibers, scouring process (alkali treatment or hydropilizing treatment) is generally applied to naturally colored cotton fibers in order to increase the hydrophilicity levels of cotton fibers. In comparison to off-white cotton fibers, naturally brown colored cotton fibers have similar percentage of wax in their content however naturally green colored cotton fibers have much higher wax content in the fiber. This higher wax content of naturally green colored cotton fiber with pectin and lignin could decrease the moisture absorbency of treated naturally green colored cotton fibers with warm water and NaOH solution to decrease the hydrophobic content and enhance moisture regain of green cotton fibers. After alkali treatment process, naturally green colored cotton fibers displayed higher moisture absorbency and decrease on the crystalline region of the fiber. [18].

Hypochlorites as bleaching substances are still popular even though the anti-chlorine lobby and ecological pressures against the usage of hypochlorites in textile processes. Sodium hypochlorite, a sodium salt of hypochlorous acid (HOC1), solution is strongly alkali (pH ~ 11.55) and the free caustic presence in the solution acts as a stabilizer. After bleaching with hypochlorite, the fiber is generally treated with dilute hydrochloric acid to neutralize any alkaline present in the fabric. An antichlor treatment with sodium thiosulphate or bisulphite can be also advised to eliminate any residual chlorine from the fabric. Finally, the fabric is then washed with water to rinse out acid from the fabric [17]. Hydrogen peroxide is an oxidizing agent and also very common for cotton bleaching process. As mentioned earlier, even though bleaching process may generally not be applied to naturally colored cotton fibers, the behavior of naturally colored cotton fibers and their colorimetric property changes (such as color permanency performance and shade shifting possibility etc.) after the application of bleaching treatments such as hydrogen peroxide and sodium hypochlorite oxidizing treatments can arouse curiosity and interest. Therefore, in this study, colorimetric (CIE L*, a*, b*, C*, ho, K/S etc.) properties of studied naturally green colored cotton fiber were investigated before and after scouring (with NaOH), and oxidizing processes with hydrogen peroxide and sodium hypochlorite (with different sodium hypochlorite concentrations and different oxidizing treatment periods, with or without scouring process as a precursor treatment etc.) in comparison with their greige (un-treated) counterpart.

2. MATERIALS AND METHODS

Naturally green colored cotton unique fiber type was selected and cultivated for this study under the control of the Turkey Nazilli Cotton Research Institute in the Aegean region of Turkey. This utilized naturally green colored unique Turkish cotton fiber is Gossypium hirsutum L. Visual appearance and properties of the used naturally green colored cotton fiber type are given in the Table 1.

Table 1. Detailed information of used Turkish naturally green colored cotton fiber [19]

Registered Name of the Cotton Fiber	**Akdemir**
Visual appearance	
Color of the fiber	Green
Scientific Species Name	*Gossypium hirsutum* L.
Registered fiber length (UHM) (mm)	25.8
Registered fiber fineness (micronaire)	3.3
Registered average fiber strength (1000 lb/inch^2)	72.9
Registered Ginning efficiency (%)	21.6
Average Days of maturity (days)	116
Plant type	In conical form

Scouring and Oxidizing Processes

Scouring process (with NaOH), conventional bleaching process [with hydrogen peroxide (H_2O_2), and sodium hypochlorite (NaOCl)] and the combination application of scouring and bleaching processes together (scouring + bleaching) were applied to studied naturally colored green Turkish cotton fiber type in order to examine their colorimetric (CIE L^*, a^*, b^*, C^*, h^o, K/S) properties before and after different wet pre-treatments. The application procedures of implemented scouring and bleaching processes for studied naturally colored green cotton fibers are shown in **Table 2**. In this study, there are three different types of pre-treatment processes. First one is only scouring process with sodium hydroxide. The second one is a direct bleaching process with hydrogen peroxide or sodium hypochlorite without any scouring process involvement (directly from greige to bleached). The third process type is the combination sequential usage of scouring and bleaching processes (scouring then bleaching = scouring + bleaching with hydrogen peroxide or sodium hypochlorite). Moreover, different sodium hypochlorite oxidizing treatments (in varying concentrations: 40-100-200 ml/l sodium hypochlorite at various pHs: pH 11, pH 11.7, and pH 12) were applied to naturally green colored cotton fibers. Scouring and hydrogen peroxide bleaching processes of naturally green colored cotton fibers were carried out at 90ºC for 30 minutes and 60 minutes, respectively, using Atac Lab Dye HT model IR sample dyeing machine via the exhaustion process. Different sodium hypochlorite oxidizing treatments were applied to green cotton fibers at ambient room temperature (~20ºC) for 6, 24 and 48 hours. In this study, the effects of bleaching with sodium hypochlorite at their inherent natural pH levels but without the involvement NaOH on the color properties of naturally green colored cotton fiber was also examined at ambient room temperature (The rightmost hand side column of Table 2). Afterwards, all treated naturally green colored cotton fibers were washed firstly with warm water for 10 minutes then rinsed under tap water for 10 minutes. After washing cycles, fibers were flat-air-dried at room temperature. Then, the changes in the colorimetric properties of green naturally colored cotton fibers were determined after these pre-treatment processes in detail in comparison with their greige cotton fiber counterpart.

Table 2. Application conditions of implemented scouring and oxidizing processes to the naturally green colored cotton fiber

Application Conditions	Scouring	Bleaching with hydrogen peroxide	Bleaching with sodium hypochlorite	Bleaching with sodium hypochlorite
Concentrations	1 ml/l sequestering agent 1 ml/l non-ionic wetting agent	2.5 g/l caustic soda 2.5 ml/l hydrogen peroxide (50%) (H_2O_2)	3 g/l caustic soda 1 ml/l non-ionic wetting agent	1 ml/l non-ionic wetting agent 40-100-200 ml/l sodium hypochlorite

	% 2 caustic soda (NaOH)	2 g/l non-ionic wetting agent 1 g/l stabiliser	40 ml/l sodium hypochlorite (at pH 12)	(at pH 11, 11.70, 12)
Temperature (°C)	90	90	20	20
Time	30 minutes	60 minutes	6, 24, 48 hours	6, 24, 48 hours
Liquor ratio	1/25	1/25	1/25	1/25
After treatment (Washings)	Rinsing at 50 °C for 2 minutes then cold washing for 2 minutes	Rinsing at 50 °C for 2 minutes then cold washing for 2 minutes then neutralization with 1ml/l acetic acid for 2 minutes afterwards cold washing for 1 minute	Rinsing at 20 °C for 30 minutes with 10 g/l sodium sulfite	Rinsing at 20 °C for 30 minutes with 10 g/l sodium sulfite

Colorimetric Measurements

The CIE *L**, *a**, *b**, *C**, and h^o co-ordinates were measured and the *K/S (Color strength)* values calculated from the reflectance values at the appropriate wavelength of maximum absorbance (λ_{max}) for un-treated and treated naturally colored green cotton fiber samples using a DataColor SpectraFlash 600 (DataColor International, Lawrenceville, NJ, USA), spectrophotometer (D65 day light, 10º standard observer). Each naturally colored green cotton fiber sample was read in four different areas, twice on each side of the fibers for consistency, and the average value was calculated and reported. The definitions and color measurement equations are shown below [20].

L* = lightness, darkness (100 = white, 0 = black);

a* = red (+a), green (-a);

b*= yellow (+b), blue (-b)

Kubelka-Munk equation $(\mathbf{K/S}) = (1 - R)^2/2R$

$\boldsymbol{C}$ * (Chroma) $= [(a^*)2 + (b^*)^2]^{1/2}$

$\boldsymbol{h^o} = \arctan(b^*/a^*)$

3. RESULTS AND DISCUSSION

Color Properties of naturally green colored cotton fibers before and after bleaching with hydrogen peroxide

When Table 3 and Figure 1 were examined, the color yield of the greige (un-treated) naturally green colored cotton was 3.7 (K/S). After scouring treatment, the color yield value increased to 6.77 (K/S) leading to darker appearance. This determination is in line with the results of the study of Kang et. al. [21]. In their study, the influence of scouring process on the colorimetric properties of naturally colored cotton fibers was investigated. Three naturally colored cotton fibers (buffalo brown, coyote brown, and green cotton) were treated with two alkali solutions (sodium carbonate and sodium hydroxide) and one enzyme solution (mixture of pectinase and cellulase). In their research, similar darkening effect was obtained for colored cotton fibers after alkali treatment. After alkali treatment, the shade of cotton fiber became deeper and darker, and the alkali treatment solutions were also deeply colorized. Their outcomes displayed that the naturally colored cotton fibers became swollen and pigment in the colored cotton fibers moved toward the outer layer of the cotton fibers following alkali treatment. The colorized solutions could be expressed by the release of pigments from the cotton fiber [21]. Direct bleaching with hydrogen peroxide without the scouring treatment application as a precursor treatment resulted in 5.75 (K/S) leading to higher color yield than greige (un-treated) green cotton fiber (Table 3 and Figure 1). It is important to state that only scoured green cotton fiber exhibited stronger color yield with darker appearance in comparison with only bleached, with hydrogen peroxide, green cotton fiber (6.77 versus 5.75 K/S). Also scoured+ bleached, with hydrogen peroxide, green cotton fiber displayed higher color yield value than greige green cotton fiber (5.44 versus 3.70; Table 3). It can be stated that overall scouring process alone, bleaching process alone with hydrogen peroxide and scouring + bleaching process with hydrogen peroxide led to stronger color yield with darker appearance in comparison with greige (un-treated) naturally green colored cotton fiber. These measured results are actually in line with the visual observation from Table 3.

Table 3. Color properties of naturally green colored cotton fiber before and after hydrogen peroxide bleaching processes

Pre-Treatment type	*L**	*a**	*b**	*C**	*h°*	K/S	
Greige (un-treated)	63.4	1.5	22.3	22.3	86.1	3.70	
Scoured	50.4	-0.3	17.4	17.4	91.0	6.77	
Bleached with hydrogen peroxide	50.1	1.1	17.0	17.0	86.2	5.75	
Scoured+ Bleached with hydrogen peroxide	52.5	2.2	19.0	19.2	83.5	5.44	

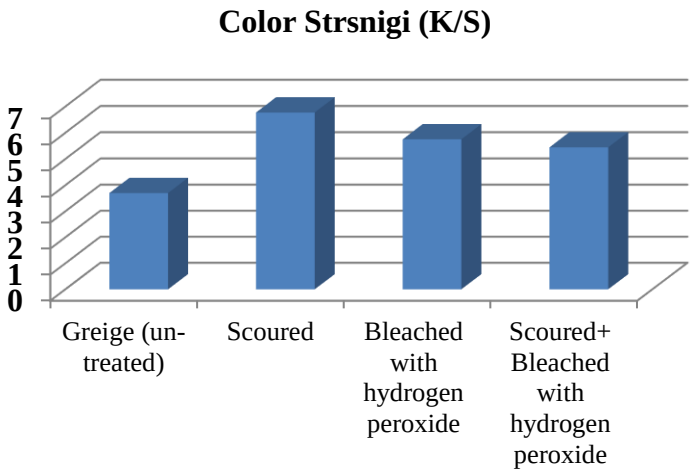

Figure 1. Measured color strength levels of green cotton fiber after scouring and hydrogen peroxide bleaching processes

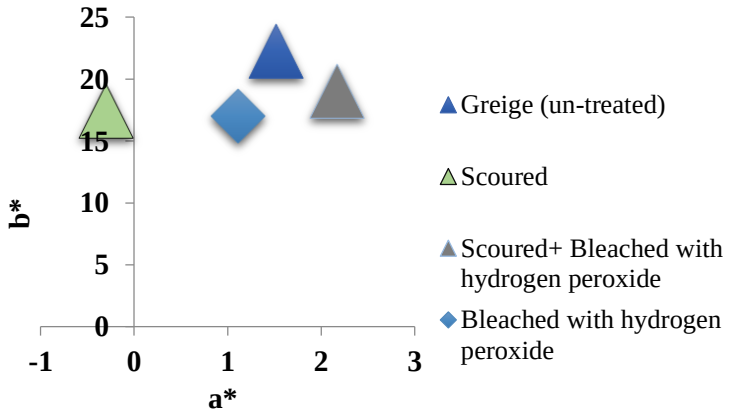

Figure 2. a* -b* plot

Lightness (*L**) values of naturally green colored cotton fiber decreased after all three treatment types of scouring process alone, bleaching process alone with hydrogen peroxide and scouring + bleaching process with hydrogen peroxide leading to darker appearance in comparison with the greige green cotton fiber, as expected, which is in parallel with the aforementioned color yield increase after these processes (Table 3). When *a*-b** plot (Figure 2) is examined, scoured naturally green colored cotton fiber were slightly less yellow and slightly more green. When it comes to hue angle (h^o) results (Table 3), the hue angle of naturally green colored cotton fiber increased after scouring alone treatment from 86.1 to 91.0. Green cotton fiber bleached with hydrogen peroxide alone treatment displayed similar hue angle level with the greige green cotton fiber. On the other hand, scouring + bleaching with hydrogen peroxide combination process resulted in lower hue angle value than greige green cotton fiber (83.5 versus 86.1, Table 3). These measured slight hue shifts were in line with the visual observation from Table 3.

Color properties of naturally green colored cotton fiber before and after bleaching with sodium hypochlorite

When Table 4 and Figure 3 were examined, bleaching treatments with sodium hypochlorite in company with NaOH, without scouring process involvement as a precursor treatment, (direct bleaching without scouring process) displayed higher color yield values with higher K/S values (5.54, 5.49, 5.92; Table 4) than the color yield value of greige green cotton fiber (3.7).

It was found that the period (in hours) of hypochlorite bleaching application at room temperature did not exhibit an important influence on the color yield level of green colored cotton fiber. Scoured and then bleached, with sodium hypochlorite in company with NaOH, green cotton fibers also displayed high color yield values (K/S of 6.34, 6.56, and 6.29 for 6, 24 and 48 hours, respectively; Table 4 and Figure 3) which were slightly lower than the color yield of only scoured green cotton fiber (6.77, K/S).

Table 4. Color properties of naturally green colored cotton fiber before and after sodium hypochlorite bleaching processes

Pre-Treatment type	***L****	***a****	***b****	***C****	h^0	K/S	
Greige (un-treated)	63.4	1.5	22.3	22.3	86.1	3.70	
Scoured	50.4	-0.3	17.4	17.4	91.0	6.77	
Bleached (with 40 ml/l hypochlorite at pH 12) for 6 hours	53.6	0.6	18.3	18.3	88.0	5.54	
Bleached (with 40 ml/l hypochlorite at pH 12) for 24 hours	54.6	1.0	19.3	19.3	87.0	5.49	
Bleached (with 40 ml/l hypochlorite at pH 12) for 48 hours	53.3	0.6	19.0	19.0	88.1	5.92	
Scoured + *Bleached (with 40 ml/l hypochlorite at pH 12) for 6 hours*	52.0	0.6	19.0	19.0	88.1	6.34	

Scoured + *Bleached (with 40 ml/l hypochlorite at pH 12) for 24 hours*	51.0	-0.1	18.8	18.8	90.4	6.56	
Scoured + *Bleached (with 40 ml/l hypochlorite at pH 12) for 48 hours*	49.7	-0.2	17.2	17.2	90.8	6.29	

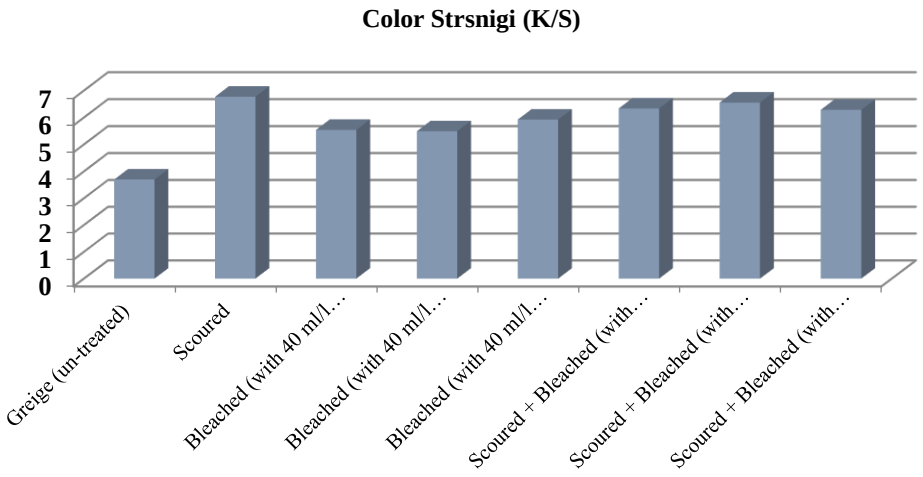

Figure 3. Measured color strength levels of green cotton fiber after scouring and sodium hypochlorite bleaching processes

Lightness (L*) values of naturally green colored cotton fiber decreased after all three treatment types of scouring process alone, bleaching process alone with sodium hypochlorite and scouring + bleaching process with sodium hypochlorite leading to darker appearance in comparison with the greige green cotton fiber, as expected, which is in parallel with the aforementioned color yield increase after these processes (Table 4 and Figure 3). When a*-b* plot (Figure 4) is examined, both bleached (bleached with 40 ml/l sodium hypochlorite at pH 12) green cotton fiber and the scoured and then bleached (scoured + bleached with 40 ml/l sodium hypochlorite at pH 12) green cotton fiber sample were slightly less red and slightly less yellow in comparison with greige green cotton fiber. Only scoured naturally green colored cotton fiber were slightly greener and slightly less yellow when compared with sodium hypochlorite bleached green cotton fiber samples (Figure 4). It is known that sodium hypochlorite solution is strongly alkali (pH ~ 11.55) and the free caustic presence in the solution behaves as a stabilizer.

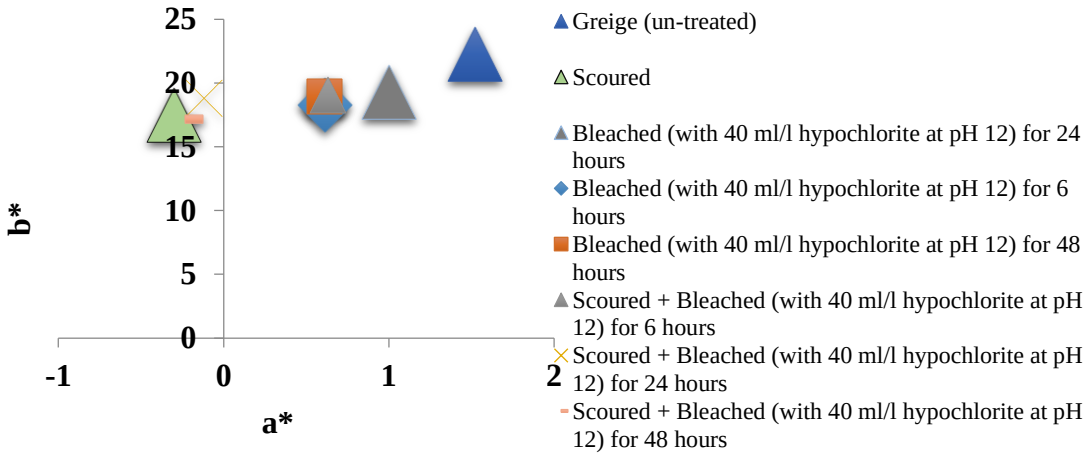

Figure 4. a* -b* plot

The effects of bleaching with sodium hypochlorite at their inherent natural pH levels but without the involvement NaOH on the color properties of naturally green colored cotton fiber was also examined at ambient room temperature. When Table 5 and Figure 5 were investigated, the bleaching process pH value was found to vary depending on the sodium hypochlorite concentration in the bleaching process. As the sodium hypochlorite concentration increases, the pH value of the bleaching bath increases. It is obvious that the color yields of naturally green colored cotton fibers after various hypochlorite bleaching processes are lower than the color yield of scoured green cotton fiber (Table 5 and Figure 5). It seems that the period of sodium hypochlorite bleaching does not cause any significant change in color yield. However, the increase in sodium hypochlorite concentration causes significant changes in color yield. As the sodium hypochlorite concentration increases, the color yield value decreases and the lightness (L^*) value increases leading to lighter appearance with lower color yield levels.

The naturally green colored cotton fiber bleached (with 200 ml/l sodium hypochlorite, such high concentration, at pH 12) for 48 hours displayed significantly lower color yield value than the color yield of scoured green cotton fiber (3.77 versus 6.77, K/S; Table 5 and Figure 5). However, it is right place to point out that this sample (bleached with 200 ml/l sodium hypochlorite at pH 12 for 48 hours) exhibited similar color yield level with the greige (un-treated) naturally green colored cotton fiber (3.77 versus 3.70, K/S; Table 5 and Figure 5). Naturally green colored cotton fibers do not lose their color after sodium hypochlorite bleaching. Sodium hypochlorite bleached naturally green colored cotton fibers are redder and yellower than the scoured naturally green colored cotton fiber (Figure 6).

Table 5 Color properties of naturally green colored cotton fiber before and after sodium hypochlorite bleaching processes varying in sodium hypochlorite concentration and application period

Pre-Treatment type	***L****	***a****	***b****	***C****	h^0	K/S	
Greige (un-treated)	63.4	1.5	22.3	22.3	86.1	3.70	
Scoured	50.4	-0.3	17.4	17.4	90.1	6.77	
Bleached (with 40 ml/l hypochlorite at pH 11) for 6 hours	52.1	0.1	17.9	17.9	89.6	5.80	
Bleached (with 40 ml/l hypochlorite at pH 11) for 24 hours	52.2	0.1	18.9	18.9	89.6	5.74	
Bleached (with 40 ml/l hypochlorite at pH 11) for 48 hours	53.4	0.1	18.3	18.3	89.4	5.50	
Bleached (with 100 ml/l hypochlorite at pH 11.7) for 6 hours	57.7	2.3	21.4	21.5	84.0	4.82	
Bleached (with 100 ml/l hypochlorite at pH 11.7) for 24 hours	58.2	2.8	21.4	21.6	82.5	4.66	
Bleached (with 100 ml/l hypochlorite at pH 11.7) for 48 hours	58.0	1.61	19.89	19.95	85.4	4.35	

Bleached (with 200 ml/l hypochlorite at pH 12) for 6 hours	63.8	3.82	23.5	23.81	80.8	3.65	
Bleached (with 200 ml/l hypochlorite at pH 12) for 24 hours	62.5	3.34	22.29	22.54	81.5	3.65	
Bleached (with 200 ml/l hypochlorite at pH 12) for 48 hours	61.6	3.32	21.77	22.02	81.3	3.77	

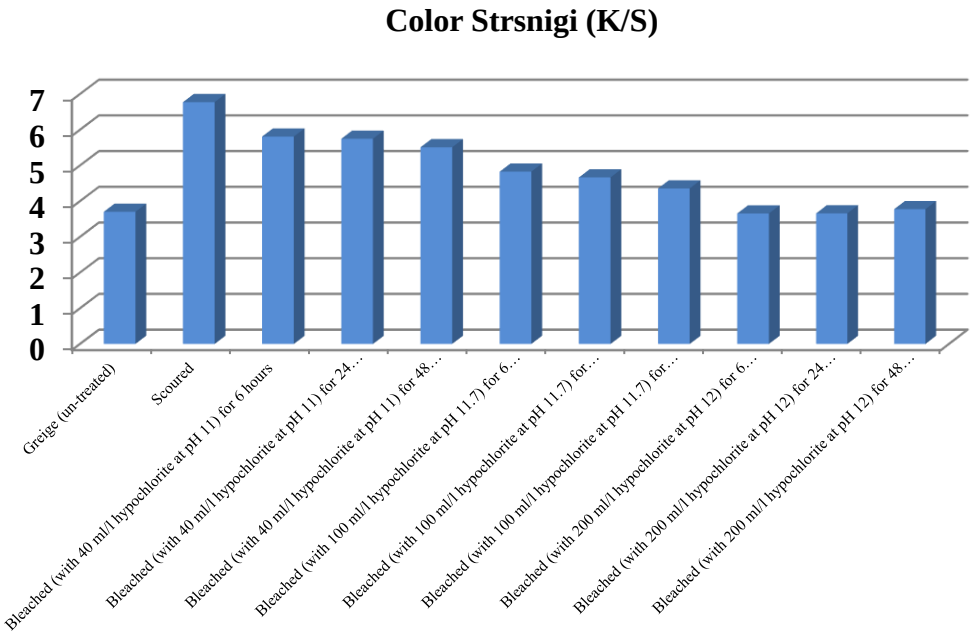

Figure 5. Measured color strength levels of green cotton fiber after scouring and sodium hypochlorite bleaching processes varying in sodium hypochlorite concentrations

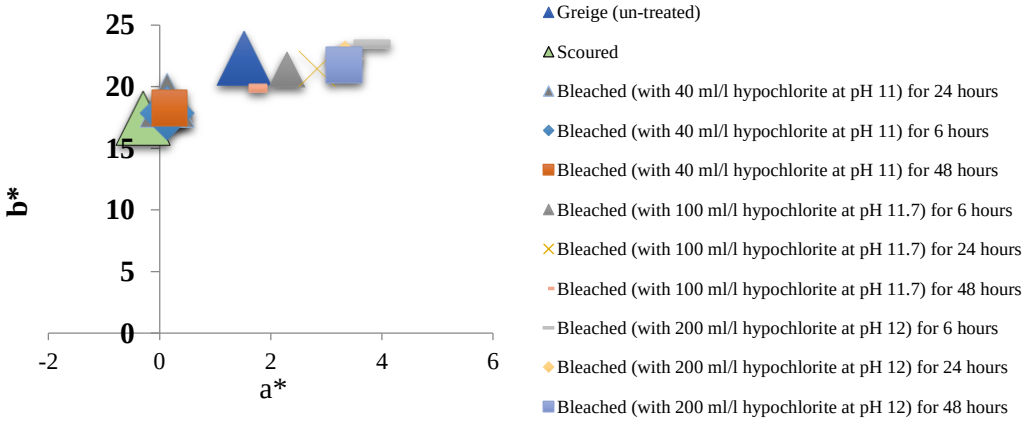

Figure 6. a* -b* plot

4. CONCLUSIONS

The cultivation of naturally colored cotton fiber has captured the attention lately due to the increasing ecological concerns and problems. In this study, colorimetric (CIE *L**, *a**, *b**, *C**, h^o, *K/S* etc.) properties of studied naturally green colored Turkish cotton fiber were explored before and after scouring (with NaOH), and oxidizing processes with hydrogen peroxide and sodium hypochlorite (with different sodium hypochlorite concentrations and different oxidizing treatment periods, with or without scouring process as a precursor treatment etc.) in comparison with their greige (un-treated) counterpart. Naturally green colored cotton unique fiber type (Gossypium hirsutum L) was selected and cultivated for this study under the control of the Turkey Nazilli Cotton Research Institute in the Aegean region of Turkey. According to the results of this study, the application of scouring process with NaOH to naturally green colored cotton fiber increases the color yield levels and darkens the color leading to darker appearance. It is known that natural inherent pigments inside the naturally colored cotton fibers moves toward the outer layer of the naturally colored cotton fibers after alkali scouring process leading to darkening effect and therefore darker appearance. Hydrogen peroxide and sodium hypochlorite bleaching oxidizing processes resulted in an increase in the color yield levels of naturally green colored cotton fibers leading to darker appearance. The further increase of the sodium hypochlorite concentration leads to the decrease on the color yield levels leading to lighter appearance. However, this drop in color yield is close to the color values of the un-treated greige naturally colored green cotton fiber sample. Even at high sodium hypochlorite concentrations such as 200 ml/l at pH 12, the naturally green colored cotton fibers maintain their natural color.

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Sustainable Exploitation Of Corn Cob Wastes Through Acidogenic Fermentation

Panagiotis Kandylis[1], Maria Kanellaki[2]

Abstract

Worldwide corn production is continuously increased in order to satisfy the growing demand for more food. However this leads to the production of a large amount of solid wastes that either left in the field or at best used as animal feed of low quality. It is estimated that the production of 1 kg of corn leads to almost equal amount of solid wastes. In the present study a more sustainable exploitation of corn wastes (especially corn cob) was studied. Firstly corn cob waste biomass was effectively pretreated using NaOH solution, in order to improve its structure for the following acidogenic fermentation. The effect of alkaline pretreatment on biomass structure (using scanning electron microscopy and porosimetry) and on biomass lignin content was also evaluated. The anaerobic acidogenic fermentation experiments of the pretreated corn cob waste biomass were carried out using an up-flow anaerobic sludge blanket reactor (UASB) culture, either as free cells or immobilized on corn cob and kissiris. In all cases the immobilized cells increased the organic acids yields during the acidogenic fermentation. The main organic acids produced were lactic, acetic and butyric acid. The organic acids could be subsequently used either as chemicals or as substrate for the production of ester-based biofuels, as a cost-effective and environmentally friendly alternative for second generation biofuels production.

Keywords: alkaline pretreatment, corn cob, lignin, lignocellulose, organic acid

1. INTRODUCTION

Worldwide corn production is continuously increased in order to satisfy the growing demand for more food. However this leads to the production of a large amount of solid wastes. It is estimated that the production of 1 kg of corn leads to almost equal amount of solid wastes from which almost 17% is corn cob [1]. However the majority of the corn cob waste is left unutilized in harvested fields, causing various environmental problems such as soil and water erosion [2]. Therefore several researchers have proposed the use of corn cob lignocellulosic biomass for the production of ethanol [3], [1], [4] and lactic acid [2], [5]. In the present study a more sustainable exploitation of corn wastes (especially corn cob) through acidogenic fermentation was studied. The employment of acidogenic fermentation on lignocellulosic waste biomass is very promising for the production of several chemicals and even new biofuels [6].

2. MATERIALS AND METHODS

2.1. Corn Stalk

Corn stalks were provided by a local farm in Mornos river valley near the city of Nafpaktos, Central Greece. After corn harvesting, corn stalks were collected, separated and classified into flower, leaf, cob, husk and stem. In the present study only the corn cobs were used.

2.2. Pretreatment

Corn cobs were pretreated using NaOH in different concentrations (5 g L^{-1}, 10 g L^{-1}, 15 g L^{-1} and 20 g L^{-1}) for 1 hour. The temperature of the solution was maintained at 80-90ºC. After pretreatment the solid part washed with deionized water until pH≈8 and filtered (average pore diameter of filter 1 mm). The corn cob biomass was collected and then dried in a freeze drying system for 24 h. The dried bagasse was milled to powder (less than 1 mm).

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2.3. Anaerobic Acidogenic Fermentations of Pretreated Corn Cob

2.3.1. Culture and Growth Media

The acidogenic fermentations were carried out using a mixed culture from an up-flow anaerobic sludge blanket reactor (UASB) at the Department of Chemistry, University of Patras, Greece [7]. The culture was grown at 37°C in a medium that contained (g L^{-1}) cellobiose 50, $NaHCO_3$ 4, yeast extract 4, and aqueous NH_3 with 50% H_3PO_4 solution at a COD:N:P ratio of 100:5:1 [8].

2.3.2. Cell Immobilization and Acidogenic Fermentations

Cell immobilization was carried out using the same methodology described by Lappa et al. [7] with a modification of the growth medium (cellobiose was used instead of sucrose). In brief, a 250 mL bioreactor was filled with 100 g either kissiris or non-treated corn cob and equal volumes of 20 g L^{-1} cellobiose medium and anaerobic culture suspension. The system was left to ferment for two days at 37ºC without feeding in order to achieve cell immobilization. Subsequently, the immobilized culture was used to ferment the medium that contained the pretreated corn cob biomass as the only carbon source. The broth also contained (g L^{-1}): $NaHCO_3$ 4, yeast extract 4, and aqueous NH_3 with 50% H_3PO_4 solution. The bioreactor was sealed to maintain anaerobic conditions and fermentations took place at 37°C. Anaerobic fermentations were also carried out with free cells. All experiments were carried out in triplicate and the data are presented as mean values.

2.4. Analytical Methods

The recovery rate of the solid fraction of corn cobs was calculated using the following formula [9]:

$$\% \text{ recovery} = \frac{W_{pre}}{W_{raw}} \text{ x } 100\%$$

where W_{pre} and W_{raw} were the weight of the pretreated and raw corn cobs, respectively.

The average pore diameter and cumulative surface area of pores were measured using a Micromeritics TriStar 3000 porosimeter using Brunauer-Emmett-Teller (BET) surface area analysis and Barrett-Joyner-Halenda (BJH) pore size and volume analysis.

The acid soluble lignin content was analyzed according to the standard of National Renewable Energy Laboratory [10].

The organic acids produced during the anaerobic acidogenic fermentations were analyzed on a HPLC system (Jasco Inc., Japan) with a Photodiode array detector [7].

Immobilization was confirmed by scanning electron microscopy (SEM). The dried samples were sputter-coated with gold in BALTEC MED020 sputter-coater and examined in a scanning electron microscope (JSM5600LV, JEOL, Japan), operating at an accelerating voltage of 25kV.

3. RESULTS AND DISCUSSION

In the present study a more sustainable exploitation of corn cob through acidogenic fermentation was studied. The process employed are presented in Figure 1. More specifically, corn cob was pretreated using dilute alkaline solution (NaOH) at 80-90ºC for lignin removal. After pretreatment the residual solid biomass of corn cob was dried and milled. The pretreated corn cob biomass was subsequently used for anaerobic acidogenic fermentation with a mixed UASB anaerobic culture for organic acids production. The produced organic acids may be used either as chemicals or as substrate for a new biofuel production.

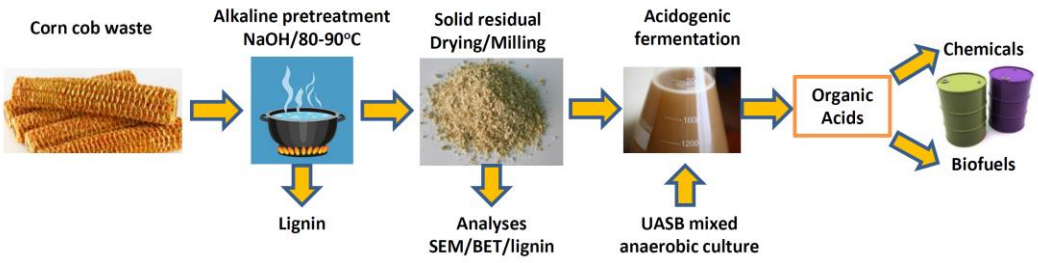

Figure 2. Sustainable exploitation of corn cob wastes through acidogenic fermentation

3.1. Alkaline Pretreatment

Alkaline pretreatment and especially with NaOH solution, has been extensively studied in pretreatment of several lignocellulosic materials. Alkaline pretreatment with NaOH is considered a mild pretreatment method for low lignin content materials like corn stalk. The effect of NaOH pretreatment on solid recovery of corn cob is shown in Figure 2. It can be concluded that the solid recovery was significantly affected by the NaOH concentration. After pretreatment, the solid recovery rate of corn cob was 75.8% for 5 g L^{-1} NaOH and then decreased, with the increase of NaOH content, to 55.8% for 20 g L^{-1} NaOH. The same trend was also observed in the case of wheat straw [11] and corn leaves with lower recovery rates [12]. Since lignin is easily to be degraded under alkaline conditions [13], the reduction of the solid recoveries was likely caused by lignin degradation and removal.

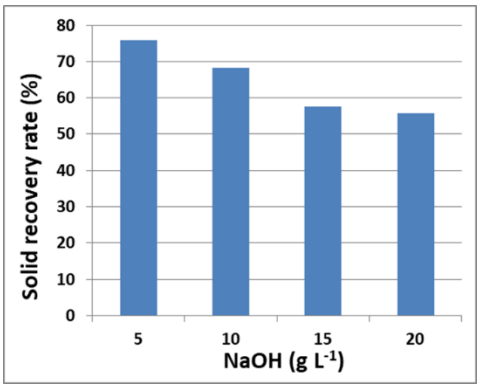

Figure 3. Effect of alkaline pretreatment of solid recovery rate of corn cob waste

3.2. Lignin Removal

The main result and advantage of sodium hydroxide pretreatment is the disruption of the lignin structure and thus improvement of the accessibility of enzymes to cellulose and hemicelluloses [14]. The lignin content in corn cob is 15% w/w and is not relatively high compared to other agricultural residues and wastes [15], and also compared to the other parts of corn stalk. Only corn husk presents lower lignin content, which is almost 11% w/w [16]. The removal of acid soluble lignin in the corn cob of the present study was up to 22% after alkaline treatment using 20 g L^{-1} NaOH. As the NaOH content increased, an increase also observed in acid lignin removal (Figure 3). The same effect of NaOH concentration was also observed in the case of wheat straw [11]. These results are important and very promising for potential enzymatic hydrolysis of the biomass, improving the accessibility of enzymes to the remaining cellulose of corn cob. In fact several studies have demonstrated strong positive correlations between lignin removal and sugar released by enzymatic hydrolysis [11], [17], [18]. In addition is well known that lignin directly acts as a physical barrier, restricting cellulase access to cellulose, and reduces the enzyme's activity through non-productive binding [19].

3.3. BET Analysis

The results from the BET analysis (surface area, pore volume and size), indicated that as the NaOH content increases during delignification, the corn cob biomass undergoes a collapse of the smaller pores, and therefore its surface is minimized. Similar observations reported in wheat straw [8]. However in the case of alkaline pretreated corn leaves an increase of the total surface area of pores with the increase of NaOH concentration was observed [12]. Probably a mild pretreatment is more appropriate for corn cob.

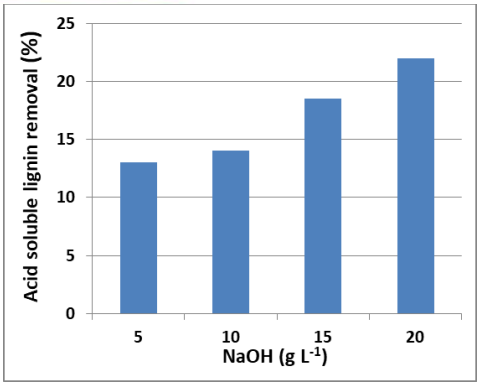

Figure 4. Effect of alkaline pretreatment on acid soluble lignin removal

3.4. Anaerobic Acidogenic Fermentation of Alkaline Pretreated Corn Cob Biomass

The pretreated corn cob biomass was subsequently used for anaerobic acidogenic fermentation with a mixed UASB anaerobic culture. The UASB culture was used either as free cells or immobilized on kissiris or non-treated corn cob (Figure 4). The results indicated that the use of immobilized cells presented a promoting activity on the yield of the acidogenic fermentation of corn cob biomass. Several studies have confirmed the promoting effect of kissiris on acidogenic fermentation of several sugars such as sucrose, raffinose, lactose, glucose and agricultural and food wastes and side streams like vinasse, whey and wheat straw [7], [20], [21]. In the present study in all cases the main organic acids produced were lactic, acetic and butyric acid.

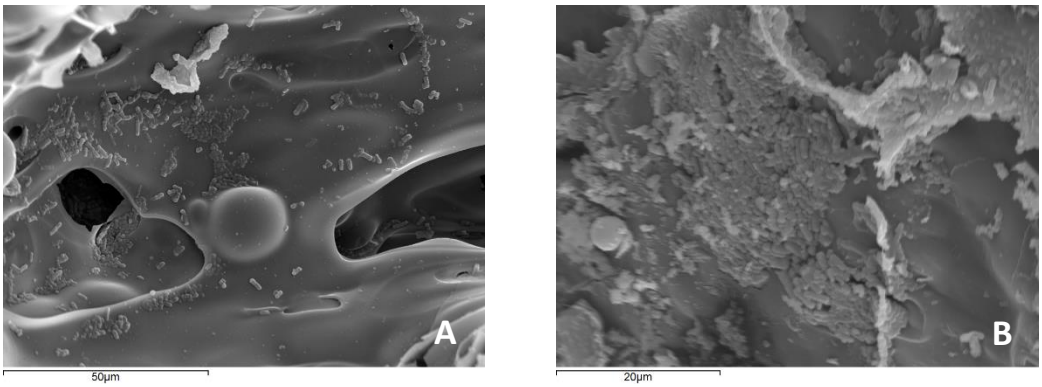

Figure 4. SEM photographs showing the immobilized cells of UASB culture on kissiris (A) and non-treated corn cob (B)

4. CONCLUSIONS

Acidogenic fermentations were performed on dilute alkaline pretreated corn cob biomass. Alkaline pretreatment led to the removal of significant amount of lignin, however extended pretreatment resulted to the reduction of surface area (BET analysis), probably due to the collapse of small pores. The subsequent acidogenic fermentation of the pretreated corn cob biomass revealed the promoting effect of immobilization (either on kissiris or non-treated corn cob). Significant amounts of organic acids were produced and mainly lactic, acetic and butyric acid. The proposed exploitation of corn cob wastes is very promising since the produced organic acids could be subsequently used either as chemicals or as substrate for the production of ester-based biofuels, as a cost-effective and environmentally friendly alternative for second generation biofuels production [6].

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BIOGRAPHY

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Analysis Of Perspectives And Awareness Of Accounting Students' Corporate Governance Concept

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Abstract

In last decades some of the major problems of companies have been fraud and corruption. Fraud and corruption may be caused from personal and corporate reasons. In this manner prevention of fraud and corruption is considered vital for sustainability of companies. Many researchers suggested many solutions. Corporate governance – in other names good governance – to a large extent have been considered as most efficient solver for above mentioned problems. Many international non-governmental organizations (NGO's) and charities issued principles for good governance for companies. So forth accounting, as a discipline and science, contains important implications at generally accepted accounting principles (GAAP) of many countries. It can be said that main logic of accounting facilitates good governance applications. Aim of accounting education is not only teaching account basis, calculation and recording systematic but also adopting ethical values, a large vision for business world and cost-profit approach

Key Words: Corporate Governance

1. INTRODUCTION

In last decades, some of the major problems of companies have been fraud and corruption. Fraud and corruption may be caused from personal and corporate reasons. In this manner prevention of fraud and corruption is considered vital for sustainability of companies. Many researchers suggested many solutions. Corporate governance – in other names good governance – to a large extent have been considered as most efficient solver for above mentioned problems. Many international non-governmental organizations (NGO's) and charities issued principles for good governance for companies.

Transparency, accountability, responsibility and fairness are accepted as corporate governance principles all over the world. It is assumed that institutionalization will be stronger within the application and use of these principles (Iscan & Erdogan, 2009).

The lack of corporate governance policies of the private and public sector is the main reason of the financial crises that are experienced in different countries today. For this reason, the concept of corporate governance has become

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increasingly important to cover all business disciplines. Developed countries and international financial institutions have started to give great importance to this issue. These entities have become interested in to the quality of corporate governance practices before investing or allocating credits (Poyraz, 2005:158).

2. COOPERATE GOVERNANCE

It is difficult to make a single definition for explaining the concept of corporate governance. Many different institutions around the world and experts have developed different definitions of corporate governance. Corporate governance can be defined as the relationship between the company's shareholders, members of the board of directors, managers, employees, and other institutions, organizations with the certain rules and standards (Ozturk, 2004, p. 25).

World Bank defines corporate governance as codes and practices that allow an institution to attract human capital and financial capital, while creating value for its shareholders in the long run (World Bank, 1999, p. 8). OECD defines corporate governance as the system in which companies are guided and controlled (OECD, 1998).

The reasons for corporate governance becoming such a significant issue are the failures in the management of the partnership, the abuses, and the financial crises in the developing markets (Clark ve Demirag, 2002). There are basically two groups in the businesses especially as joint stock companies. One of them is the executive and the other is the shareholder. There is a high possibility of a conflict of interest between shareholders and managers. Corporate governance sets out general principles that ensure harmony between these two groups, which can enter into a conflict of interest, and other groups with interests (interest holders). The OECD published these principles in six titles in April 2004 (OECD, 2004: 2). Corporate governance has been shaped around four generally accepted principles. These principles are; transparency, accountability, fairness and responsibility.

The principle of transparency means that the information about the current situation and events is accessible, concrete and understandable. The transparency principle helps to ensure stability in the markets during times of uncertainty by emphasizing the need for participants to be informed about market expectations (TBB,1999). As a requirement of the transparency principle, informative policy should be created for the shareholders, the latest developments in the world should be evaluated taking into consideration the country conditions, the information which is included in the periodic financial statements and reports should be attached to a standard. To sum up, transparency principle includes regulations aimed at making information accessible. In accountability principle it is necessary to prove the correctness of the decisions and accept the responsibility. The accountability principle foresees the disclosure of the management function and responsibilities, the ordering of shareholders and managers' demands, and the monitoring of the receipt of objective decisions by the board of directors. The Accountability principle is concerned with the interests of stakeholders and explains the rules for the regulation of relations between the stakeholders and the enterprises. It includes enterprises, stakeholders, shareholders, employees, buyers, customers, suppliers, trade unions, state and even potential investors (Tuzcu , 2003).

Fairness or equality principle regulates the rights of shareholders' and the equal treatment to shareholders In this principle , shareholders' right to get information ,examine, vote, attend to the general assembly, receive dividends are mentioned. Besides, keeping of relevant records of shareholders properly and the sale and free transfers of shares are considered (Ege, 2004).

3.PURPOSE OF THE STUDY

Financial crises in growing economies and corporate scandals arising from fraud and errors in accounting have led to a decline in confidence in the firm. In order to restore this confidence, the concept of corporate governance has emerged and every day it has become increasingly important for companies. A number of principles have been published by the OECD and CMB in order to increase the applicability of corporate governance approach and to build trust. The concept of corporate governance is a system in which shareholders, administrators, and employees are protected. Good corporate governance has been instrumental in achieving the goals of accounting professionals and growing firms as it adopts principles of fairness, accountability, public disclosure and transparency.

Corporate governance has been used and promoted by companies because it is made up of generally accepted principles. No doubt that the most important factor in the further development of corporate governance is that those who deal with the accounting professions and adopt this system.

In this study, it is aimed to evaluate the accounting students' aspects of corporate governance concept.

4.APPLICATION

4.1.Questionnaire Form And Scales

Questionnaire method is used as data collection tool in research. In questionnaire form five interval likert type scale is used. "1" is given to strongly disagree, "2" is given to disagree, "3" is given to undecided, "4" is given to agree, "5" is given to strongly agree. Moreover, four questions are asked to find out the accounting students' demographic structure.

4.2.Data Preparation

The collected data are uploaded to the SPSS 20.00 program. Preparation of the data should be performed before the analysis of the data is carried out.

4.3.The Missing Data

After checking the missing questions' percentage, it is calculated that the missing questions' percentage is lower than 15 percent in comparison with all questions. Therefore, assignment to missing questions is not needed.

4.4.Extreme Values

No "Z" and "T" scores which are above +3 and -3, are found. No survey is canceled, and a total of 445 questionnaire data are analyzed.

4.5.Reliability

Reliability analysis is a method which is developed to assess the reliability and properties of the scales, surveys used in the survey (Kalayci, 2008: 403). As a result of the reliability analysis of all the expressions in the questionnaire, Cronbach's Alpha value is calculated as 0,781. This value indicates that the questionnaire applied to the accounting students is very reliable within the scope of the evaluation of the awareness of corporate governance concept.

4.6.Evaluation of Research Findings

Before creating research hypotheses and conducting relevant analyzes, it is necessary to look at the answers given by the students who responded to the demographic questions in questionnaire. These results are given in the table below.

Table 1: Demographic Features

Grade	**Number of People (N)**	**Percentage (%)**
Second Grade	149	33.5
Third Grade	150	33.7
Fourth Grade	146	32.8
Education Type	**Number of People (N)**	**Percentage (%)**
Day Time Education	251	56.4
Evening Education	194	43.6
Gender	**Number of People (N)**	**Percentage (%)**
Male	223	50.1
Female	222	49.9
Age	**Number of People (N)**	**Percentage (%)**
Between 18-20	134	30.1
Between 21-23	268	60.2
Between 24-26	34	7.6
Between 27-29	9	2.0

When we examined the demographic characteristics of the students, it was seen that the majority of the respondents were third grade (33.7%). Looking at the students who responded to the questionnaire, it appears that grades start from the second grade. First grade is not included to research. Because it is thought that first grade students don't have sufficient knowledge about their department yet. When we look at the education type most of the students are day time education students (56.4%). 223 (50.1%) male students and 222 (49.9%) female students participated in the survey. Finally, when we look at the age range of the students, it is seen that 268 people (60.2%) are in the age range of 21-23 years, only 9 people (2%) are in the age range of 27-29 years. It is necessary to look at the average responses of students participating in the questionnaire that measure corporate governance awareness after their answers to the demographic questions

Table 2: Averages of the Responses to the Questions that Determine Accounting Students' Awareness of the Corporate Governance Concept

Questions	**N**	**Average**	**Standard Deviation**
I do not think there is a link between accounting professionals' Information on corporate governance practices and level of responsibility.	445	2.99	1.180
I do not think that there is a positive relationship between experience of accounting professions and having knowledge about corporate governance practices.	445	3.13	1.211

I think that there is no difference between the idea of applying the principles of corporate governance and the thinking about the contribution of accounting science to corporate governance.	445	3.17	1.103
I think that having companies which are applying the corporate governance principles among taxpayers of accounting professionals will not affect the level of responsibility of professional members.	445	3.20	1.115
I think that the contribution of the professional accountants to the corporate governance will change according to their professional experience.	445	3.23	1.136
I think accounting science provides the adoption of corporate governance principles to companies.	445	3.31	1.173
Accounting professionals' level of corporate governance responsibility varies according to their titles.	445	3.36	1.086
Professional accountants' opinions about corporate governance changes according to the titles	445	3.40	1.104
I think that there is an increase in stock performance during the period of compliance with corporate governance principles.	445	3.57	.992
I think corporate governance practices have positive impact on company performance.	445	3.69	1.090
I think that the performance of the employees after compliance with the corporate governance principles increases.	445	3.73	1.027
I think that the related departments of the universities need to have the related courses of corporate governance principles and accounting ethics.	445	3.74	1.078
Seminars on corporate governance and professional ethics should be given to accounting professionals.	445	3.75	1.111
I think the higher level of importance should be given to corporate governance principles and structural and legal grounds for change and development also should be created.	445	3.79	1.118
Total	**445**		

When we look at the table, "*I think the higher level of importance should be given to corporate governance principles and structural and legal grounds for change and development also should be created*" statement has the highest average

(3.79). On the other hand, "*I do not think there is a link between accounting professionals' Information on corporate governance practices and level of responsibility"* statement has the lowest average (2.99). In this case, it is observed that the students are more attached to the idea that more importance should be given to the corporate governance principles and practices, but they are less likely to agree that there is no relationship between the applications and the level of responsibility of the members of the profession. When we look at the standard deviation, "*I think that there is an increase in stock performance during the period of compliance with corporate governance principles*" statement has the lowest number of standard deviation (.992). Nevertheless, "*I do not think that there is a positive relationship between experience of accounting professions and having knowledge about corporate governance practices*" statement has the highest number of standard deviation (1.211). It would be appropriate to analyze and interpret the hypotheses between these responses and the demographic characteristics after looking at the mean and standard deviations of the responses of students.

H1: *There is a significant difference between the gender and the expression which is, corporate governance principles and practices should be given more importance and there must be a structural and legal basis for change and development.*

Table 3: Hypothesis 1 t-test results

Gender		N	Average	Standard Deviation	Difference between Mean	Significance
H 1	Female	223	3.92	1.004	.262	.013
	Male	222	3.66	1.210	.262	

According to results there is a significant difference between the gender and the expression which is ,corporate governance principles and practices should be given more importance and there must be a structural and legal basis for change and development ($p<0.05$). Male students (3.92) agree more than female students (3.66). Hypothesis 1 should be accepted.

Table 4: Hypothesis 2 Anova Test Results

Professional	F	Sig	Mean	Standard Deviation	
H 2	2.695	.046	Age 18-20	3.82	1.156
			Age 21-23	3.78	1.060
			Age 24-26.	3.41	1.209
			Age 27-29	3.00	1.225

According to Anova results there is a significant difference between the age and the expression which is, seminars about corporate governance and professional ethics should be provided to professional accountants ($p<0.05$). The hypothesis 2 should be accepted. It is seen that the students who are in the age range of 18-20 (3.82) are more likely to agree with the sentence than the students in the age range of 27-29 (3.00). One of the most important reasons for this is the fact that the number of students aged 18-20 (N = 134) who answered the questionnaire is higher than the number of students aged 27-29 (N = 9).

Table 5: Hypothesis 3 t-test Results.

Education Type	N	Mean	Standard Deviation	Difference between Mean	Significance
DayTime Education	251	3.22	1.050	.303	.003
H 3 Evening Education	194	3.53	1.111	.303	

The table 5 shows that there is a significant difference between the education type and the expression which is, professional accountants' opinion about corporate governance vary according to their titles ($p<0.05$). Therefore, hypothesis 3 should be accepted. Evening education students (3.53) are more likely to participate than the day time school students (3.22). In other words, evening education students have the idea that their titles will influence their thoughts and opinions about corporate governance.

Table 6: Hypothesis 4 t-test Results

Education Type	N	Mean	Standard Deviation	Difference between Mean	Significance
DayTime Education	251	3.12	1.134	.436	.000
H 4 Evening Education	194	3.55	1.178	.436	

According to table above, it is seen that there is a significant difference between the education type and the expression which is the accounting science has provided the adoption of corporate governance principles to companies ($p<0.05$). Hence, hypothesis 4 should be accepted. Evening education students (3.55) give more importance to the expression than the day time education students. Evening education students are more likely to agree that the adoption of corporate governance principles plays a role in accounting science. Likewise the previous results, it can be said that evening education students have more awareness about corporate governance.

5. CONCLUSION and RECOMMENDATION

It has been observed that female students pay more attention to corporate governance principles and practices than male students. Moreover students' age has a role on thoughts. As the students get older it seems less important to give seminars on corporate governance and professional ethics to professional accountants. It is also find out that day time education students think that professional accountants' opinion about corporate governance vary according to their titles. Evening education students state the accounting science has provided the adoption of corporate governance principles to companies.

Thanks to results of our research and the other studies, many recommendations can be mentioned about the increasing awareness of corporate governance concept. The companies should accept the corporate governance principles to attract the investment. Moreover, the corporate governance courses should be added to the curriculums in order to increase students' awareness. Besides the importance of theories, importance of practical information should be introduced to students. More studies should be conducted about corporate governance concept in various areas to increase awareness.

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Demand, Relevance and Possibilities to Implement Renewable Energy Sources at the Industrial Sector of Paraná State Located in Southern Brazil

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Abstract

Brazil is a privileged country with great water resources that allows low-cost and large-scale hydropower generation. However, the Brazilian electricity is highly expensive because of the many taxes and rates. The first option to attend the demand for energy is through thermoelectric generation, completing a scenario where electricity generation sources are centralized and non-diverse. The state of Paraná, located in southern Brazil, has the energy price even higher than the national average. Paraná's industrial sector is traditionally agro-industrial in contrast with new modern industries implemented in the 1990's; especially the automobile manufacturing that has been greatly impaired by this high cost. The environmental impacts caused by large hydropower projects, air pollution, depletion of natural resources and the risks of depending on a few sources, reflect the need to rethink this electricity generation system. The objective of this article is to identify demands, interest and possibilities to make the consumption of electricity cheaper, cleaner and more diverse to attend Paraná's industries through renewable energy sources. It concludes that Self-generation by biomass is the most promising, and it is already widely used by agroindustry. Green energy at Free Market has become increasingly cheaper and it has attracting more and more industries. In addition, there is a lack of specific incentives for small-scale industries. Finally, it notes a scenario of uncertainties for the coming years based on the instability in public policies that favors the maintenance of a traditional path on the development of the Brazilian electricity sector efficiency projects.

Keywords: Brazil, Industrial Sector, Paraná, Renewable Sources, Self-generation.

1. INTRODUCTION

The current social and economic system has been developing on some pillars, such as large-scale industrial production, over consumption of goods and the use of fossil fuels as main energy source. Since the Industrial Revolution in the XIX century, these non-renewable sources occurred in large-scale and the environmental impact they have caused is striking. In particular, the burning of fossil fuels is a cause to emission of Greenhouse Gases (GHG) and, consequently, of the global warming according to the International Panel on Climate Change (IPCC) [1].

Energy production is the main cause of GHG emissions worldwide, as a consequence of the fact that 86% of all energy produced is from fossil fuels [2] releasing nitrogen monoxide (NO) and mainly carbon dioxide (CO_2). For this reason, it is easy to see that the reduction of the use of non-renewable sources and, therefore, the substitution by renewable and cleaner sources, is a solution to reduce the emission of GHG.

In Brazil, these scenarios are considerably different from the global average. This South American country has an emerging economy strongly depending on the production and export of agricultural and mineral commodities. Consequently, the largest GHG emission is not from energy production or industrial processes, but from land-use change and forestry, which are responsible for more than 50% of the emissions [3]. In addition, the Brazilian river network is one of the largest and most diverse in the world, allowing that the main source of energy generation to be by hydroelectric power plants, which represents 64% of the national energy matrix [4].

In this context, the state of Paraná, located in Southern Brazil, is an interesting object of study because it has an even less diverse energy matrix than the national average, 94.4% of which is hydroelectric power.

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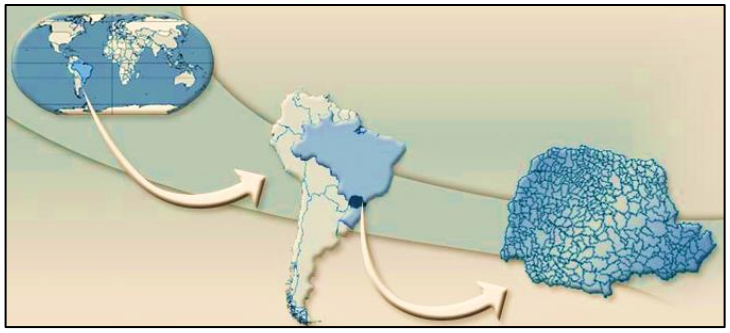

Figure 1.Location of the state of Paraná in Southern Brazil and the location of Brazil in the world map [25]

In addition, GHG emissions are mainly from agricultural activity (33%) and energy production is the third leading cause (25%) [2]. However, it must be considered that the production of hydroelectric power is also a source of GHG emission, mainly methane, due to the decomposition of organic matter under anoxic conditions at the bottom of the reservoirs [6].

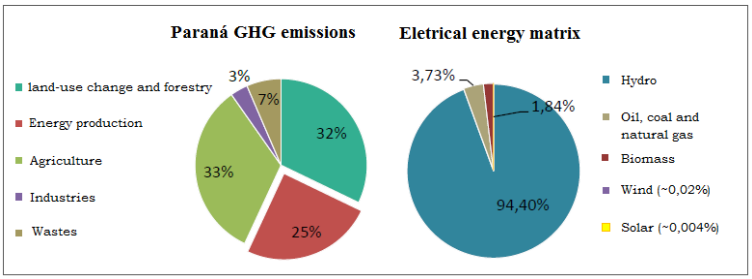

Figure 2.Greenhouse gas emissions by Paraná's economic sector (at left) [2], and Paraná electricity generation matrix (at right) [5].

Global warming is an environmental problem that is closely linked to the energy issue and the attempts to avoid or minimize it causes many international frictions for the possibility of slowing economic growth. Given that industries are the largest consumers of electricity in the state of Paraná, representing 25% of total consumption in 2016 [7], the use of alternative sources of energy by this sector becomes a significant contribution to reduce greenhouse gas emissions without compromising the state industrial development.

Electric power is essential for industrial production; therefore, it also must be analyzed as an economic resource. Although hydropower generation may be quite low-cost, the many taxes and rates on Generation, Transmission and Distribution (GTD) services do not reflect the water privilege of Brazil and Paraná for this purpose.

The energy tariff varies widely throughout the national territory and even within the states, because it is fixed by each local concessionaire. The main concessionaire of Paraná is the Energy Company of Paraná - Copel, which is responsible for supplying energy in 393 of the overall 399 existing state's municipalities. The energy tariff is the price charged in R$/ kWh (Brazilian Real per Kilowatt-hours), and involves costs with GTD, energy losses, state taxes (Tax on Circulation of Goods and Transportation and Communication Services - ICMS, which is presently 29% in Paraná), federal taxes (Social Integration Program – PIS and Social Contribution on Revenues - COFINS), sectorial charges and concessionaire's rates [8]. Copel's rates are the Energy Tariffs - TE and the Tariffs for the Use of the Distribution and Transmission System - TUSD/TUS.

For Copel customers, 40 to 45% of the energy tariff constitutes taxes, rates and subsidies [9]. Comparing to other Brazilian states, Paraná has the fourth most expensive energy tariff among the country's industries, paying 12.5% more than the national average [10]. This scenario harms the industry in terms of competitiveness, because the asymmetry of taxes leads the Paraná's production to have no advantage over some other state or region; and, in general, Brazil loses competitiveness in relation to the industry of other countries.

Therefore, the objective of this article is to identify the demand, advantages and disadvantages, as well as the possibilities of inserting alternative and renewable sources of electric energy in sectors of Paraná's industry. Then to verify, in particular, their applications through self-generation and through buying energy in Free Market, allowing

identifying which factors make difficult or motivate the implementation of these sources, comprising the current public policies.

2. MATERIALS AND METHODS

First, it was necessary to think about reconciling the two fields in question, that is, Industry and Energy with a vision of decentralization and diversity in electricity generation. Thus, it was possible to explore the topic in a bibliographical review, starting with the reading of articles, monographs, dissertations and paper news, consolidating a familiarity with the subject from what is available in the literature. Identifying key data sources was an important step. Copel's information and operation, for example, is fundamental to diagnose the generation, consumption and costs of electricity, since the company is the main responsible for the generation and distribution of the resource in Paraná.

The data from Fiep, the Paraná State Industry Federation was essential. Its initiatives, research, reports and historical data are up-dated and reliable, since it works directly with the industries and reflects the interests of the sector. Fiep is also able to encourage new technologies, such as alternative energy sources, into the state industry. Both Copel and Fiep were fundamental for the accomplishment of this study. An interview with a representative of Fiep, João Arthur Mohr, included another stage of the research with the objective of knowing Fiep's effective actions and projects related to energy. In this way, it was also possible to speculate on the future scenario, in short- and long-term, of the energy issue for the industrial sector.

In general, data and documents analysis, reflection and investigation comprised the methodology that allowed accomplishing the proposed objectives.

3. RESULTS AND DISCUTION

3.1. The Brazilian Free Market of energy

3.1. The Brazilian Free Market of energy

At Regulated Contracting Environment - RCE or Regulated Market, the energy contracting in Paraná state is performed between the industry and COPEL, which is the public generation service concessionaire. This method of contracting does not allow price negotiation, that is, each consumer unit only pays one monthly energy bill, including energy distribution and generation services, with rates established by the Brazilian Electricity Regulatory Agency, ANEEL (Agência Nacional de Energia Elétrica).

The Free Contracting Environment - FCE, also known as Free Market, is a business environment where sellers and buyers can freely trade electric power with each other. This allows industrial and commercial consumers to contract their energy supply, negotiating price, terms and commercial conditions directly with Generators and Marketers.

By contracting energy in a customized way, the activities become more competitive [26]. Beside pays the energy negotiated, Copel's distribution service (or the distribution service of another local concessionaire), which has a regulated rate is also billed. In addition to choosing the type of contract that best benefits its demand, the Free Market consumer can choose to buy only renewable energy and from decentralized production. That happens because the energy can be conventional or incentivized. The conventional one is generated through any sources such as large hydroelectric plants and thermoelectric plants. Incentivized energy is the one generated through renewable sources as such Small Hydroelectric Power Plants, bioenergy, wind and solar power [12].

The incentivized energy is allowed to consumers that demand 3MW in maximum, which are denominated Special consumers [13]. So, there are two types of consumer, Special and Free, provided by ANEEL, regarding the conditions of supply voltage, connection date and contracted demand charge and power source, as shown in the following table:

Table 1. Classification of Free Market's consumers in Special and Free according to the conditions of voltage, date of connection and demand contracted as set by ANEEL's Resolution n. 247/2006

Consumer	Contracted demand	Connection date	Supply Voltage	Energy Source
Free Consumer	Equal or higher than 3,000 KW	After 07/08/1995	Any voltage	Any source (conventional or incentivized)
		Before 07/08/1995	Equal or higher than 69 kV	

			Less than 69 kV	Incentivized
Special Consumer	Between 500 KW and 3,000 KW	Any time	Equal or higher than 2.3 kV	Incentivized

This means that larger industries (therefore, requiring a greater load) may choose to use incentive energy while smaller industries can only purchase this type of source.

For industries, Free Market has been very promising. Since the last few years, the Industry has been consuming much of its electricity through the Free Contracting Environment. In September 2016, the industrial consumption in Brazil hit a record: 70% was through FCE [14].

In Paraná, less than 1% of the industries contract energy at the Free Market, however, the consumption of these units represents 46.9% [15]. This may happen, possibly, because the Free Market in Paraná has attracting, in general, few large-scale industries with the highest consumption of electricity. Therefore, the small-scale industries, which are usually Special consumers, may still find some difficulties to migration into the FCE. Even with incentives such as discounts from 50% of the distribution and transmission rates (TUSD/TUST).

Copel itself entered the Free Market as an energy marketer. In March 2018, the average commercialization price of the company for conventional energy was around R$ 258 / MWh and the incentivized energy was around R $ 305 / MWh [16]. If the cleaner and decentralization sources of energy are more expensive, the Free consumer (that can opt between conventional or incentivized sources) is discouraged from contracting them. Special consumers (as small-scale industries) may face more difficulties in making the transition to Regulated from Free Market, precisely because of the higher prices in incentivized energy.

In addition, Copel also participates in Free Contracting Environment as a generator and distributor of energy. Therefore, initiatives to reduce the costs in GTD in Paraná for Free and Special consumers, which may stimulate access to the Free Market, depend directly from Copel.

3.2 Renewable Self-generation energy by Paraná's industries

Self-generation allows supplying all or part of an industrial demand since it is destined for its exclusive use. In general, there are advantages to the savings in the payment of transmission services (for self-generation in the own industrial plant), reduction of network losses in the power system and an energy produced with better quality. Each industry has its peculiarity in relation to its production and demand for energy so each project is unique and depends on many factors. However, some well-developed sectors in Paraná, such as food of plant and animal origin, pulp and paper, sugar-energy, furniture and wood industries, fit easily in the generation of energy from biomass.

Fossil fuels, as well as biomass, have plant or animal origin (such as natural gas, coal and oil), but they take millions of years to form. Besides the advantage of being renewable, the biomass also has a much lower degree of pollution, especially when it comes to emissions of sulfur dioxide and greenhouse gases. From the industrial point of view, some sectors generate wastes that can be reused according to their energetic potential. Biomass is a low-cost source, since as the raw material costs can be zeroed for some waste, including those produced locally. In the same way, in most cases, its use saves on disposal processes, as well as contributing to the environment.

Western Paraná is already well developed in this respect. The local economy is strongly strengthened by agroindustry, where 26% of all grain crops in the state are produced (mainly soybeans, wheat and corn), as well as 30% of poultry production and 25% of cattle farming of Brazil [17]. Pig farms also have great prominence being well developed in Western and Southwestern Paraná. Still must be mentioned the cassava starch producing, which Paraná is the third largest Brazilian state producer. The processing of cassava for the production of flour or starch generates large amounts of liquid waste with high organic loading rate, which produces biogas through its decomposition.

Animal husbandry allows the generation of biogas through the anaerobic digestion of organic matter such as animal manures, sewage sludge, household and agricultural wastes, industrial effluents and aquatic plants [18]. The digesters are usually of simple construction, low-energy consumption, low operational costs, use to demand small areas and it can be applied in large scale of production. Therefore, it was already a widespread source of energy (not only electric, but also as thermal and steam power) for small agro-producers, but was expanding and requiring the development of more complex industrial systems accompanying the growth and consolidation of agroindustry [10].

Forest residues also have important energy potentials within the timber, furniture and paper and pulp industries. The pulp and paper industries generate a large part of their energy consumed (50 to 60%) from the black liquor produced in the industrial process itself and from biomass in general (wood waste) [19]. That industrial sector

requires a lot of energy for its production, but also has many opportunities to exploits the energetic potential of the pulp, the black liquor and the lignin. An example of exploitation of this potential is a Klabin's industrial plant (operating since 2016), a paper and pulp producer, in the city of Ortigueira (in Eastern Center Paraná). The plant has the potential to generate up to 270 MW, enough to supply all the energy demanding, only with the use of biomass in cogeneration in a closed system that allows the reuse of chemicals and does not generate waste and effluents [20].

The timber industries produce firewood, charcoal or logs, but also a large amount of wood waste, which can also be used to generate electricity through burning. Already the furniture industry has its wastes transformed into pressed wood called briquette. The briquette has 50% of the burning power of the oil fuel, but its price is three times lower [21]. However, the great potential resource for electric power generation in Brazil is the sugarcane bagasse. The sugar-alcohol or sugar-energy industry, which is well developed mainly in Northern Paraná, produces a large amount of waste, which can be used to generate electricity, mainly in cogeneration systems (electric and thermal power). Unlike the wood, the sugarcane cultivation and processing is carried out in large and continuous areas, and the use of waste (bagasse, straw and stillage) is facilitated by the centralization of production processes [22].

At ethanol production, about 28% of the sugarcane is processed into bagasse and practically incinerated in the production of a low-pressure steam, which 37% of this steam is used in the turbines for the electricity generation [23]. The vinasse is another residue of the processing of sugarcane and has polluting potential. To produce one liter of alcohol, it generates 12 liters of vinasse. This residue is usually disposed of in sacrificial areas or used as fertilizers with caveats, but also has the potential to obtain biogas by its digestion. Considering the data from the sugarcane harvest of 2012/2013, the state of Paraná could produce over 167,000,000 m³ of biogas annually, with a potential of 240 GWh of electricity per year [10]. Sugarcane bagasse is the main fuel for self-generation in the food and beverage industrial sector, which is one of the largest and most important in Paraná [5].

In general, any industry with a reasonable production of effluents and organic waste can carry out some type of process for the generation of solid, liquid or gaseous biomass. The industrial sectors presented are the most promising and efficient for this practice in Paraná, in addition to already showing some adherence to this energy use. However, in many cases the efficiency / production is low and the bioenergy is only used to complete the demand. In addition, biogas tends to be moist and could have a chemical composition with corrosion characteristics, what could damage the equipment. Another disadvantage is that the supply of the organic material used often depends on the seasonality of its production and can be altered by environmental and climatic factors.

The self-generation of hydroelectricity by an industry is usually done through auctions of the concession or authorization to consume the energy produced by a plant. The Small Hydroelectric Power Plants and the Hydroelectric Power Station are highlighted as a decentralized solution to hydro generation. However, these plants have some challenges for construction, such as the delay of the Brazilian bureaucratic cycle to installation a SHP, the high investment and long return period, which are factors that make the project unviable for many companies, especially the small-scale industries.

It is also important to explore the possibilities for solar and wind power sources. Both can be used by using the remaining spaces in the industrial plant, such as building roofs in case of solar panels, and open areas, in case of small-scale wind turbines. The fast technological advance for these sources also allows the construction of wind farms and photovoltaic plants with prices lower and lower. Nevertheless, this measure requires areas of size compatible with demand, as well as studies of the incidents of winds and solar radiation.

One of the biggest challenges to make solar and wind power more efficient is the difficulty of storing what is produced by turbines and panels. An immediate way to reduce this problem is to connect the new systems to the existing network. Thus, during the day all energy is consumed, and at night (or while there is no consumption), the rest is supplied to Copel in exchange for credits for later consumption, when it will be necessary to complete the demand.

An industry that has its own source of energy for self-consumption can compensate financially with the sale of its surplus in the Free Market, in addition to being exempt from some charges (as CDE, TUST and TUSD) on self-consumed energy. Considering that, 70% of self-generation in Brazil is already by the industrial sector and independent producers [24], any incentives given for this practice will be positive for the valorization of the industrial sector and will affect the final consumers of these self-generators.

3.2. Actions and visions of the Paraná State Industry Federation - Fiep

The Paraná State Industry Federation defends the interests of the sector and its actions are a reflection of its future directions. Through testimony and interview with João Arthur Mohr, consultant of the Infrastructure Council of Fiep, it was possible to identify not only personal views of the interviewee, but also of the institution he was representing.

While the use of solid biomass of forest residues and sugarcane bagasse is already established, Mohr highlighted the biogas energy exploration by the agricultural industry as very important for the sector, since they often require simple installations and supply a good part of the electric energy demand. In this context, Fiep offers consulting materials with feasibility studies and research into the potential of biogas energy development, as well as introducing new technologies, strategies, current legislation and proposing specific applications for various industrial sectors.

In addition, Fiep also seeks a direct channel to negotiate public policies and action plans in the energy sector. An important action in this context is to get Paraná to join the agreement 16/2015 of the Confaz - National Council of Finance Policy, which exempts the state tax ICMS collection on generation of energy from renewable sources. The other states that have adhered to the agreement, have the tax levied only on what was consumed from the network, without charging on what was self-generated. Thus, in Paraná the ICMS is levied on all consumption, regardless if part of that energy, was generated by the consumer itself. The measurement favors Distributed Generation systems (electric power generation carried out next to or close to the consumer).

Mohr also highlighted Fiep's investments in natural gas in quantity, quality and at a fair price for the industry. For Mohr, the transition to a renewable energy matrix requires a firm energy source to ensure the safety of the system. Natural gas, in addition to ensuring this safety, still has advantages over other fossil fuels, such as LPG and coal, as it is less polluter.

4. CONCLUSIONS

Electricity in Brazil, even more in Paraná, is very expensive and it becomes even more significant when consumption is large, as is the case of industries. Therefore, reducing electricity expenditures is important to enable industrial growth and all the economic and social benefits that result. Fiep's actions related to energy efficiency have proven the interest of the sector that the institution represents, especially when the motivation is to reduce costs and become more independent of the Regulated Market.

Among the ways to reduce energy costs, self-generation showed great potential and adhesion to bioenergy production, since the resources are often quite accessible, as wastes from industrial production that have some energetic value. Yet, difficulties to deploy a system to exploit this potential can arise, such as the initial investment, lack of technical knowledge and low efficiency.

It was also identified the lack of opportunities for small-scale industry, for which self-generation could be financially infeasible. The scenario for them in Free Market is also more inhospitable. Being classified as Special consumers, small-scale industries are restricted to incentivized energy that are cleaner and most decentralized and diverse sources; however, these are more expensive, sometimes even with the reduction of distribution taxes. Thus, there is a need for more specific incentives for small-scale industries by the public policies, as well as starting by Fiep.

As for self-generation through solar and wind power, it also requires a high investment to supply a good part of the industry's demand, in addition to the physical space. Nevertheless, to supply the consumption of headquarters and offices, turbines and panel installations are more accessible, although the return period could still be high.

It was also identified that industries are still quite dependent on natural gas and, if it depended on Fiep, the tendency is that their use only increases. This is a reflection of a disadvantage of renewable energies, which is efficiency to be subject to environmental factors such as rainfall, solar radiation and wind speed.

The industrial process itself is already quite polluting, but the industries must assume also an environmental responsibility with the large amount of electricity that they consume. Environmental impacts are inevitable for all human intervention in the planet, but a more diverse, decentralized and renewable energy matrix is capable of reducing the intensity of these impacts caused by productive sector. Thus, it is possible to provide energy, such fundamental resource, in a more accessible, innovative and cleaner way, valuing the local industries.

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Control Of Freedom: Its Challenges To Wellness

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Abstract

Qualities of life in reality not only include physical worth but self-worth, freedom and dignity. This pertinent quality become constitutionally entrenched doctrine as it symbolizes primacy of freedom over tyrannical power. Safeguarding the freedom from being oppress thus contributes to our wellness as a whole. This paper attempted to discuss the issues and problem confronting freedom in governmental context because government controls over our life are great, from the day we were born till death. It is thus inevitable that encroachments of freedom are proliferating and expose to abuse. How these abuses are controlled will be highlighted to exhibit the extent of freedom practiced. The discussion will focus on freedom in Malaysian context as compared to UK and Australia. The pattern is not always consistent, sometimes corroborating freedom and occasionally, not. This sign will reveal the level of wellness in the given society whether high or low.

Keywords: Freedom, Oppression, Abuse Of Power, Tyranny

1. INTRODUCTION

Qualities of life in reality not only include physical worth but self-worth, freedom and dignity. Dignity is something unseen. That is why it is often trampled. Douzinas thus averred injustices are result of desperation, disasters, large and petty evil. Injustices thus are mostly felt by the oppressed, the excluded, the exploited and the discriminated. In short, injustice is felt by the victim (Coutas Douzinas,2005). Depriving individuals of their basic freedom is unjust hence are unacceptable and wrong.

We have seen how freedom have been impinged by those in power. Freedom from personal liberty to freedom of speech and association have been tampered by the executive government. The law was used sometimes to secure the position of the government to an alarming degree. In the case of Dewan Undangan Negeri Kelantan v Nordin bin Salleh & Anor (1992) I MLJ 697, the state constitution restricted the right for state executive council to change party and this was held by the court as unconstitutional. According to the court, it tantamount to denying the rights of association under art 10(1)(c). Since party hopping occur to the detriment of the ruling party, the court appear to interpret Art 10 to favour the executive, side-lining the Rule of Law.

Court have interpreted Art 10 freedom of association, narrowly. The right given under art 10 seems to be subjected to the mercy of executive. Prof Abdul Aziz Bari added further, the word "personal liberty can be deprived save in accordance with law" seems to be more forceful than fundamental liberties (Abdul Aziz Bari, 2009). This paper thus attempted to examine how freedom is trodden and the justification of such blockade by the authorities to gauge the degree of wellness enjoyed in the society.

Malaysian have embodied fundamental liberties in part II of Malaysian Federal constitution. Since Malaysia exercise constitutional supremacy, the power of Parliament and State legislatures is limited by the Constitution. They cannot override the constitution as they please. Fundamental liberties are one of the germane qualities that is constitutionally entrenched that symbolises the importance of freedom over tyranny.

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Before discussing the fundamental liberties in other common law country as UK and Australia. The first part of the paper will underline how fundamental liberties are implemented in Malaysia. Here Art 5 till 13 of the federal constitution are provided to protect essential liberties of the people.

Fundamental liberties in Malaysia.

Commitment to fundamental liberties in Malaysia have been sporadic. Art 5 personal freedom was limited to freedom from wrongful detention. It was only later that the courts were willing to expand it to include quality of life.

Under Article 5, a person's life or personal liberty cannot be taken away unless it is in accordance with law. Art 5 mainly focus on freedom against wrongful detention. An arrest is deemed wrongful when a person is detained and wrongfully convicted by police without proper legal authority. Wrongful arrest may also include; arrest of the wrong person, arrest of a person without probable or just cause, arrest for personal gain and arrest based on pure malice. How the court determine the extent of freedom may vary. The court will normally deny the freedom if it is harmful to the security of the country. This is quite sensible. Problem arise when the power is being abuse. *Tee Yam v. Timbalan Menteri, Menteri Keselamatan Dalam Negeri, Malaysia [2005] 6 CLJ 550* was a case relating to freedom against wrongful detention. He filed an application for a writ of habeas corpus. Seeking to set at liberty his detention under s. 4(1) of the Emergency (Public Order and Prevention of Crime) Ordinance 1969 (EO 1969). Tee claimed denial of his constitutional right to be represented by counsel was contrary to the constitution. On 26 March under s. 3(1) of the EO 1969 and Tee was detained by the police for sixty days. Thereafter, the Minister directed the applicant to be detained for a period of two years. The applicant thus made representation to the Advisory Board ('AB'). The applicant's claimed that the allegations against him were imprecise and vague and that the Minister had considered erroneous facts and argued that the AB had not apply natural justice rule on him. The Minister argued it had considered the reports and documents on the applicant and was satisfied that the applicant was the leader of Gang 21 and whose detention was necessary for the suppression of violence. The applicant had access to counsel whilst he was under police detention and had the services of the counsel for the length and duration of the hearing before the AB.

The court held that the presence of police officers at meetings between the applicant and counsel had not violated the rights of the applicant because it is sanctioned by law (s. 4 of the EO 1969, security detention). Application for habeas corpus was hence dismissed.

Court continued to be cautious in granting personal freedom on national security ground. This was reflected in the case of *Govt of Malaysia v Loh Wai Kong (1979) 2 MLJ 33*. Here the court limits the scope of personal liberty to wrongful detention only, "personal liberty means a personal right not to be subjected to imprisonment arrest or physical coercion in any manner that does not admit legal justification." In this case application for mandamus to compel the govt to issue him passport was refused on the ground that article 5 does not extend to right to leave the country. Loh contended that he has fundamental right to travel abroad and that the refusal of a passport violated this right. The Federal Court ruled that no such right existed. The judgment penned by Lord President Tun Mohamed Suffian Mohamed Hashim,

"personal liberty" in article 5 means liberty relating to or concerning the person or body of the individual; that article does not confer on the citizen a fundamental right to leave the country. On the contrary, the Government may stop a person from leaving the country if, for instance, there are criminal charges pending against him."

Here the refusal of passport relates with national security purpose. The denial of freedom in this respect is therefore justifiable.

Nevertheless, there are times when national interest is not the issue, the court remains wary in granting the freedom. In Pihak Berkuasa Negeri Sabah v Sugumar Balakrishnan & Another (2002) 4 CLJ 105 the court reinforces its restrictive stand. Sugumar was Negeri Sembilan born Malaysian who went to Sabah. As he was not a person belonging to Sabah he required to obtain a pass to enter and remain in Sabah. He practices law in Sabah since 1985 under a work pas issued to him. About 6 weeks before the expiry he was served with a notice from Director of Immigration Sabah cancelling his entry permit.

Sugumar had applied to the High Court for a writ of certiorari to quash the decision of the Sabah state government which revoked his entry permit on grounds of morality. The High Court held that the ouster clause in section 59a of

the Immigration Act 1959/63 indicated that the courts had no grounds for judicial review of the Sabah government's decision.

Sugumar appealed to the Court of Appeal, which overruled the High Court's decision and granted the writ he sought. The Court of Appeal held that ouster clauses are unconstitutional except in cases overriding national interest. The preclusion of the right to judicial review was a violation of Article 5 of the Constitution, which was to be read in a broad manner. The Court of Appeal further ruled that Parliament had not intended to give the East Malaysian states of Sabah and Sarawak untrammelled discretion to cancel entry permits. The Sabah authorities then appealed to the Federal Court.

The Federal Court however quashed the Court of Appeal decision. With regard to the Immigration Act, Federal Justice Mohamed Dzaiddin held:

By deliberately spelling out that there shall be no judicial review by the court of any act or decision of the Minister or the decision–maker except for non-compliance of any procedural requirement, Parliament must have intended that the section is conclusive on the exclusion of judicial review under the Act.

The Federal Court also overruled the Court of Appeal ruling on the broad interpretation of Article 5 declaring that fundamental liberties should not be generously interpreted and here it is why:

...we therefore disagree with the Court of Appeal that the words "personal liberty" should be generously interpreted to include all those facets that are an integral part of life itself and those matters which go to form the quality of life. ... We agree with the learned State Attorney General that the entry permit only allows the respondent to enter and reside in Sabah, but ipso facto the entry permit does not confer any right to livelihood to the respondent.

As the respondent was not a person belonging to the state of Sabah, he could not have been accorded any right to earn a livelihood in that state. The entry permits only allowed Sugumar to enter and reside in Sabah for 2 years lawfully and did not confer any right to livelihood upon him. Neither the personal affairs relating to his family nor his legal practice were accrued rights conferred by the entry permit.

Previously though, in the case of *Tan Tek Seng v Suruhanjaya Perkhidmatan Pendidikan & Another [1996] 1 MLJ 261* the court ruled that freedom should be read broadly.

Tan Tek Seng v Suruhanjaya Perkhidmatan Pendidikan & Another [1996] 1 MLJ 261 case concerned the allegedly wrongful dismissal of Tan Tek Seng, a headmaster. The Court of Appeal held that Articles 5 of the Constitution, which protect personal liberty, must be read with a liberal and not literal approach. In his judgment, Gopal Sri Ram held:

Judges should, when discharging their duties as interpreters of the supreme law, adopt a liberal approach in order to implement the true intention of the framers of the Federal Constitution. Such an objective may only be achieved if the expression 'life' in art 5(1) is given a broad and liberal meaning. ... [Article 5(1) means] all those facets that are an integral part of life itself and those matters which go to form the quality of life.

Since Tan was deprived of gainful employment without a fair hearing, under this broad interpretation of Article 5, his dismissal was wrongful and unconstitutional.

The strong call of good governance in modern society has somewhat led the court to depart from the restrictive approach in *Pihak Berkuasa Negeri Sabah v Sugumar Balakrishnan* case. The Federal Court later revisited the issue in 2009 and ruled in *Lee Kwan Woh v. Public Prosecutor (2009) 5 CLJ 631* that constitutional rights, including those under Article 5, must be read in a generous and liberal fashion.

The liberal wording of freedom continues to evolve ever since *Tan Tek Seng v Suruhanjaya Perkhidmatan Pendidikan & Another (1996)*. The court in the case of *Kerajaan Negeri Johor v Adong Kuwau (1998) 2 MLJ 158* adopted the same stance as in *Tan Tek Seng v Suruhanjaya Perkhidmatan Pendidikan & Another (1996)*. Here the people live from hunting of animal in the jungle and collecting of jungle produce and these are the only sources of their livelihood and income. The plaintiffs have rights of free access into Linggiu valley and to harvest the fruits of the jungle. This rights were unchallenged and the defendants later entered into an agreement with the government of Singapore and built a dam in the Linggiu valley.

The building of the dam deprived the plaintiffs from freedom of entering Linggui valley and consequently of their right of livelihood. The Court of Appeal held the plaintiffs were entitled to be compensated for the deprivation of their livelihood.

Where state action has the effect of unfairly depriving a citizen of his livelihood, adequate compensation is one method of remedying the harm occasioned. The courts are interpreting the word "life" in Article 5 to include the right to livelihood. Employment is, therefore, fundamental right within the expression of Article 5(1). In *Nor Anak Nyawai v Borneo Pulp [2001] 6 MLJ 241* it was held that native customary rights can be considered as "right to livelihood". "Life" includes reputation and deprivation of reputation would be a violation of Article 5(1). This was depicted in the case of *Lembaga Tatatertib Perkhidmatan v Utra Badi a/l K Perumal [2000] 3 MLJ 281*.

In this case the plaintiff, a hospital attendant, was an employee of the second defendant. A sample of urine taken from him was tested positive for morphine. The first defendant requested the plaintiff to show cause why disciplinary action should not be taken against him on the ground that he was a drug addict. The charge was made under general order 26 of the Public Officers (Conduct and Discipline) (Chapter D) General Order 1980 which contained two alternative punishments against him, namely to dismiss or to reduce in rank. The plaintiff gave his explanation on the charge extended against him. Yet the first defendant dismissed the plaintiff. The plaintiff's appeal to the Appeal Board was rejected. The plaintiff applied for a declaration that his purported dismissal was null and void.

Gopal Sri Ram JCA held, now, it cannot be refuted that any sort of punishment imposed upon a public servant has serious consequences. It carries with it a discredit. It tarnishes reputation. The authorities are now well settled that the punishment of dismissal deprives a person of his livelihood and within the meaning of expression of 'life' in art. 5(1) of the Federal Constitution.

It is true that without constitutionally entrench freedom, the government has no filter in executing its power. The above cases signify how the court can engage in judicial activism in expanding the meaning of personal liberties. The cases in *Tan Tek Seng v Suruhanjaya Perkhidmatan Pendidikan & Another, Lembaga Tatatertib Perkhidmatan v Utra Badi a/l K Perumal [2000] 3 MLJ 281, Lee Kwan Woh v. Public Prosecutor (2009) 5 CLJ 631* etc. were testaments to these positive trend. However, there are also other instances where the court project its restrictive mind as in *Pihak Berkuasa Negeri Sabah v. Sugumar Balakrishnan & another*. Be that as it may, court needs wisdom and sharpness in balancing the power and freedom so that both dynamics are practice within the allowed limit enough of thwarting anarchy as well as tyranny. With this kind of environment, the wellness of society can thrive.

Fundamental liberties in UK

Malaysia mainly relied on the written constitution unlike UK. UK system of fundamental liberties is embodied in the statutes and conventions as UK has no written constitution. Despite of the absence of written constitution, UK seems to relate closely with the constitutional values that promotes the democratic spirit.

Given the nonexistence of a written constitution, the principal safeguards against the abuse of power by the government in Parliament are therefore not legally enforceable. They are embodied in the constitutional understandings, conventions, or principles of good administration, the observance of which depends upon the sense of fair play of Ministers and their civil servants; the vigilance of the Opposition and individual Members of Parliament; the influence of the press, broadcasting, and public opinion; and the periodic opportunity of changing the government through free and secret election (Anthony Lester, 1976).

The constitutional role of the independent judiciary is likewise important. Should a Minister or a public body exceed the powers conferred by statute, or misinterpret the intention of Parliament as expressed in a statute, or transgress a rule of the common law, it is the vital function of the courts to intervene and to provide redress. Under the leadership of the late Lord Reid and Lord Denning, the House of Lords and the Court of Appeal have been discerning in the past few years in restraining the misuse of the powers of the state. The courts have prevented Ministers from exceeding or misinterpreting their statutory powers (*Padfield v. Minister of Agric*), they have compelled the disclosure of documents for which executive privilege had been claimed unreasonably in the course of legal proceedings (*Conway v. Rimmer*). They have widened the common law rules of natural justice to apply more flexible standards of fairness both to public bodies *(Ridge v. Baldwin*). These decisions represent an extraordinary extension of the judicial review of administrative action in the United Kingdom. They have reduced the one important consequence of the principle of the

omnicompetence and undisputed supremacy of the central government in Parliament from Dicey's idea of constitutional principle: the rule of supremacy of the law (Wade,1959). During the seventeenth century, the judges struggled to adapt to the system. The Scottish judicial view is rather different (MacCormick v. Lord Advocate). They not only persist to be independent from the executive but also for the right to withhold effect from laws that they regarded as unconscionable or contrary to a higher, fundamental, and immutable natural law. The judges won the struggle for independence against the Crown's claim to rule by prerogative, but through revolution Parliament won; and although the Bill of Rights of 1688 and the Act of Settlement of 1700 recognised some important personal rights and liberties, the terms of the constitutional settlement were mainly concerned with the rights and liberties of Parliament itself (Wade, 1959).

Freedom are thus reinforced within the principle of parliamentary sovereignty. In absence of written constitution, human rights may not seem "fundamental", but it is arguable that they are well protected and that the spirit of liberty is as strong in the United Kingdom as in those democratic societies that have written constitutions, Bills of Rights, and comprehensive systems of administrative law (Anthony Lester, 1976). Measured by the volume of legislation, the British legislative process is highly efficient. Recent reforms have increased the legislative scrutiny of executive action. Parliamentary Questions to Ministers also have increased dramatically in number (Honourable Roy Jenkins, Sect of State for the Home Dept, 1976). As Professor Goodhart, who, in the course of his Roberts Lecture, described Question Time as "the most effective machinery that has ever been devised for the control of the executive by the legislature". It is undoubtedly one important extrajudicial safeguard. Other safeguards are also, characteristically, extrajudicial (Goodhart, 1958). The actions of central government departments recently have been opened to scrutiny by the Parliamentary Commissioner for Administration; those of local government are scrutinised by the Local Commissioners for Administration; and complaints about the National Health Service are now investigated by the Health Service Commissioners. In addition, Parliament has passed some legally enforceable measures to protect specific human rights, such as equality of opportunity regardless of race or sex (The Race Relations Act,1965).

Indeed, the British constitutional system at best has worked remarkably well considering the absence of any constitutional framework forming the fundamental and paramount law of the nation.

Christie v Leachinsky [1947] AC 573 though an old case, highlighted how personal liberties were manifested. It also depicts fundamental liberties secure important place in United Kingdom in spite of absence of written constitution. In this case the Police officers appealed against a finding of false imprisonment. The plaintiff had been arrested under the 1921 Act, but the law provided no power of arrest. The officers might lawfully have arrested the plaintiff for the offense of stealing a bundle of cloth, which they had reasonable grounds for suspecting.

Nevertheless, the court held that police officers must at common law give a detained person a reason for his arrest at or within a reasonable time of the arrest.

It is notable to witness UK transform the ideals of fundamental liberties through responsible government and accountability. UK’s approach in acquiring good governance is not merely through judicial review but others forms of scrutiny such as parliamentary control and freedom of media. Australia adopt the same pattern. The differences may therefore appear in forms, not in substance.

Australian Fundamental liberties

Australia was also dedicated in upholding fundamental liberties. In Australia it is presumed that Parliament have not intended to limit fundamental right unless the intentions are indicated in clear terms. In *Coco v The Queen (1994) 179 CLR 427 at 437* the High Court restated this principle as follows:

The courts should not assign to the legislature an intention to interfere with fundamental rights. Such an intention must be clearly manifested by unmistakable and unambiguous language.

This signifies that though parliament may be strong, the court's existence is there to ensure oversight are done on repressive conducts touching individual freedom.

According to Commonwealth Ombudsman Australia the scope of repressive conducts can be widen to also include:

Rudeness, unwillingness to treat the complainant as a person with rights; refusal to answer reasonable question; neglecting to inform complainant on request of her entitlement; knowingly giving misleading or inadequate advice; ignoring valid advice or overruling consideration which would produce an uncomfortable result for the overuler; offering no redress or manifestly disproportionate redress; showing bias on colour or whatever ground; refusing to inform adequately the right of appeal; failure to mitigate the effect of rigid adherence to the which it can produce manifestly inadequate treatment (Mary Seneviratne, 2002).

How the court enforce the system of rights is also commendable. In an old case of *Swan Hill Council v Bradbury Case(1937)56 CLR 746 at 756* it was held that the order of prohibition cannot be exercised freely without control. Such act may amount to abuse of discretionary power.

In this case under the Local Government Act 1915, Swan Hill Council, sec 198(1) stipulated that the council can make by-laws to regulate and restrain the construction of buildings, fences on or within ten feet of any street road. So the Swan Hill Council made by-laws in clause 4 conferring power to restrict the building of shops, houses etc unless with approval of the council. The following provisions also confer powers to consider the situation of the building like the plan, materials and estimated cost and 'any such particulars necessary' to enable the council or its surveyor to determine whether all the provisions in the by-law are complied with. The Supreme Court of Victoria held that clause 4 of the by-laws as invalid. The Council appeal. On appeal the Full Court affirmed the decision of the earlier court and dismissed the appeal.

Dixon J justified that there is no express limitation on the discretion upon the council to approve or disapprove proposal to build. If understood properly the clause intended to give wide discretionary power to the council to the extent that the council can restrict and determined in advance whether the building is fit to be constructed. There is nothing to show that the restriction to build shop buildings was not intentional. Abuse easily occurs where power is wide and undefined. This type of by-law is silent on whether due reason is needed for the council to withhold approval to build. The object of framing such a clause was not to make it an exceptional privilege lying in the special grace of the council. There are reasons why discretionary power is given to the council, maybe legislature distrusts itself to formulate some advance standards that would prove sufficient in all infinite circumstances. Thus when a provision of this kind is made, it is incumbent on public authorities to exercise the discretion with bona fide consideration and without intention to achieve other ends and purpose other than what it is supposed to uphold. The duty may be enforced by mandamus.

The above illustrations are by no means exhaustive, sufficient to state that this is one of the many instances how Australia uphold freedom from bad administration by confining the discretionary power to accede only to prudent and accepted standards. These limitations would certainly resolve the unjustified oppression that have been affecting the wellness of any human soul.

Qualified freedom

Restricting freedom is not by itself bad and wrong because there is always an exception to the general rule. As exemplified in s 18C of the Racial Discrimination Act 1975 (Cth) (RDA). This section prohibits freedom of expression when it has the tendency of insulting and intimidating others.

> Section 18C provides:
>
> (1) It is unlawful for a person to do an act, if:
>
> (a) the act is reasonably likely, in all the circumstances, to offend, insult, humiliate or intimidate another person or a group of people; and
> (b) the act is done because of the race, colour or national or ethnic origin of the other person or of some or all of the people in the group….

Just as free speech is channel to truth and an instrument of our highest intellect it is also an instrument of much mischief. Racial and religious bigotry and promoters of treason and pornography often hide behind constitution to free themselves from culpability (Shad Saleem Faruqi, 2008).

In all societies freedom of speech is subject to limitation in order to secure broader interest of the community. Raja Azlan Shah J in *PP v Ooi Kee Saik (1971) 2 MLJ 108* put it succinctly,

There cannot be any such thing as absolute and uncontrollable liberty wholly free from restraint for that would lead to anarchy and disorder. The possession and enjoyment of all rights …are subject to such reasonable conditions as may be deemed to be…essential to the safety, healthy, peace and general order and morals of the community. What the constitution attempts to do in declaring the rights of the people is to strike a balance between liberty and social control.

In UK, The Race Relation Act 1976 outlaws insulting speech, racial hatred or disharmony. The defence of truth is not allowed by the law because in this situation dissemination of truth is less important than the maintenance of the social fabric of society. The Public Order Act 1986 contains extensive prior restraints on speech assembly and association. Telephone tapping and interception of mail are statutorily permissible by the Interception of Communications Act 1985. Nearly 150 statutes of the UK Parliament, including the Official Secret Act 1911/1989, contain secrecy clauses that prevent release of information (Shad Saleem Faruqi, 2008).

Malaysia also has laws to encounter this particular issues. Freedom needs to be restricted as and when necessary to preserve harmony and order. Art 10 though touches about freedom of speech is still subject to legal restraints. Seditions Act 1948, Police Act 1967 and Printing & Press Act 1984 are laws that parliament made to restrict freedom of speech to maintain public order. Whilst offences like religious incitement, obscenity, causing disharmony and disunity on ground of religion found under Sec 292 to 294 of the Penal Code also restrict freedom of speech and expression.

Singapore too had not given freedom and individual independence a big latitude. Scholar Tan Teng Leng, justified that striking the balance between the poor, hungry, unemployed, uneducated, homeless and the rich, the incongruent demand of competing races, languages and religion are sensitive and tough issues to handle. It merits skilful and appropriate responses. This necessitates pragmatic policies which might compromise freedom and rights deemed pertinent to the west. The end justify the means may be relevant here due to the potentially disruptive impact of differing view (Tan, 1991).

The racial riots in Singapore in 1950 and Kuala Lumpur 1969 are alleged to have been caused partly by irresponsible reporting of racial sensitives issues. This is why the press is kept on a tight leash. From time to time relaxation takes place but things get tightened again if necessities of political, economic and social institution so demand. In Malaysia rights and responsibilities must go hand in hand and that freedom is not an end in itself. Freedom per se is of no value. It is what freedom is for; it is the use to which it is put; it is the sense of responsibility with which it is exercised. We recognise that democracy like any other non-coercive relationship, rests on shared understanding of limits (Shad Saleem Faruqi, 2008).

Democracy does not mean absolute freedom. Issues that inflame religious, racial, and cultural sentiments should not be sensationalised and be avoided at all cost (Mohd Azizuddin, 2008). Restrictions are warranted to avoid any unnecessary turmoil that would indirectly effect the wellness of society.

2. CONCLUSION

A fundamental right is denied when a person is being punished for exercising the right. If the government can punish people arbitrarily, thus, the right not to be deprived of liberty without legal justification and just cause become fundamental. The cases on fundamental liberties projected in Malaysia, UK and Australia showed how the fundamental liberties are enforced and executed on the government's power. To end abuses that threaten the entire civilization, to create happiness for all people and to deter great unjustified suffering, fundamental rights are granted to all people in every civilized society. Nevertheless, liberty is freedom to do whatever one wants but with responsibility. Freedom if not exercised responsibly may lead to subjugation. Just like unemployment increases the freedom of employers to get their pick of job applicants, to pay low wages, and to avoid protests from workers. For the same reasons, unemployment decreases the freedom of workers. Likewise, in a drought in India, thousands of peasants may starve while grain merchants get rich (John S. Atlee, 2014). Therefore, restrictions on individual freedom is pertinent in order to preserve the maximum possible freedom for all.

Thus government needs to interfere in so far as necessity and special circumstances requires in a democratic society. The intrusion must conform to the pressing social demands, appropriate and well-adjusted to the aim being charted. Government restrictions on the right to assembly and association, in order to calm a riot is one example. It shows that power is as much crucial as freedom. The courts role is to balance the two important entities so that both freedom and power do not fall into vices. The touchstone to manage the affairs will be manifested in the constitutional values and paradigm. The constitutional values are there to discipline the states. Failure to honour it will undoubtedly cripple any foundations of a state. The wellness of the society is very dependent on these basic conditions. Abuse and mishandling of them will only kindles injustices of immeasurable magnitude.

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Pesticides: A threat to survivability of earthworms

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Abstract

Earthworms are the efficient biotransformers of soil as they crush, macerate, aerate and convert organic waste into nutrient rich manure. But, pesticides pose a big threat to the worm's survivability and reproduction capability. The present study was carried out to analyze the impact of pesticides exposure on the reproduction and survivability of Eisenia fetida. Exposure to Thiram @1.25 mg/kg, resulted in 08.66 ± 0.33, 01.66 ± 0.66 and 0.32 ± 0.02 reduction in survivability, cocoon production and body weight of worms, respectively. Carbendazim (1.25 mg/kg) exposure resulted in 10.66 ± 0.33, 03.00 ± 0.57 and 0.47.66 ± 0.03 reduction in survivability, cocoon production and body weight respectively. Reduction in survivability, cocoon production and body weight was 16.40 ± 1.407, 36.00 ± 2.12 and 0.54 ± 0.01 respectively in worms exposed to Pinoxaden (3.0 mg/kg soil.) When worms were exposed to Sulfuron (3.0 mg/kg soil), 17.80 ± 0.86, 38.00 ± 2.12 and 0.6189 ± 0.004 reduction in survivability, cocoon production and body weight was noted whereas, 17.66 ± 0.66, 65.66 ± 1.76 and 0.73 ± 0.01 reduction in survivability, cocoon production and body weight was observed when they were exposed to Phorate (2mg/kg).Similarly 17.00 ± 0.00, 56.33 ± 1.8 and 0.59 ± 0.01 decrease in survivability, cocoon production and body weight was recorded in worms exposed to Cartap (2 mg/kg).

Keywords: *- Phorate, Pinoxaden, Cartap, Sulfuron, Thiram, carbendazim & Eisenia fetida*

1. INTRODUCTION

Earthworm's plays very important role in fertility and formation of physical & chemical properties of soil like bulk density, infiltrability, porosity, aggregate stability, organic contents and C: N ratio by consuming organic matter, leaf litter and animal excreta *etc*.They also act as vital bioindicators for revealing the soil health and can be used to assess the threshold levels of insecticide usage. Earthworms being widely distributed are adversely affected due to their exposure to Agrochemicals. Lack of hard covering on the body of earthworms, makes them more prone and susceptible to the exposure of agrochemicals (Lanno *et al.*, 2004).

Agrochemicals not only kill the target species, but also prove harmful to non-target organism like earthworm species because of the similarity in their physiology (Wang *et al*., 2012). The use of Pesticides has become an important part of agro ecosystem to enhance yield (Croft, 1990). But their excessive and indiscriminate use is increasing day by day for a big success in the development of agriculture to meet the ever increasing demand of food due to population explosion. The cost of benefits of good yield of various crops is being paid by earthworms due to adverse and lethal effects of these pesticides.

2. MATERIAL AND METHOD

2.1. Collection of test animal: The earthworms were collected from the vermicomposting unit of Department of Zoology, CCS HAU, Hisar. Material used and methodology adopted for different experiments under screen house conditions are as follows.

2.2. Pesticides:

Pesticides Phorate, Cartap, Pinoxaden, Sulfuron, Thiram and carbendazim were obtained from the Department of Plant Pathology, College of Agriculture, CCS HAU, Hisar.

Adult worms with fully developed clitella were washed, weighed and released in each tub of 70 liter capacity. Further; they were checked to ensure that all the worms had burrowed into soil in the tubs. Then these tubs were sprayed

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individually and in combination with different concentration of pesticides. Thereafter, the tubs were covered with gunny bags to prevent water loss, direct exposure of Sun light and predator. Treatments were given in triplicate and the observations were taken up to 60 and 90days. Critical difference (CD) was calculated between the treatments by using Completely Randomized Design (CRD).

3. RESULTS AND DISCUSSION

3.1. Effects of herbicides:

The process of vermicomposting involves several physical, chemical and biological reactions and the organic matter is stabilized by enhanced decomposition due to worms. Vermicomposting results in obtaining organic sources of nutrients which are physically, nutritionally and biochemically improved in a certain period of time. The effect of herbicides on the growth (body length & weight) and reproductive potential was studied during present investigation. Table 1 & 2 explains impact of herbicides on growth parameters and the observations on growth parameters were recorded on 15th days to 60th days. Pinoxaden and sulfuron @ 3.0 ml/kg soil induced reduction in their length and it was recorded 6.41cm and 6.73cm respectively on 60th day of treatment, whereas the total weight gains by the earthworm represents the total biomass. The lowest weight i.e. 0.54g was measured in worms treated with pinoxaden @ 3.0 ml/kg soil and 0.61g in sulfuron @ 3.0 mg/kg soil on 60th day of experiment. Similar negative impact of herbicides on earthworm growth & reproduction has been reported by many researchers. Zhou *et al.,* (2007) have reported that the weight of earthworm was more sensitive index compared to decrease in the body length and mortality indicating toxic effects of Acetachlor and Methamidophos.

Table No. 1: Effect of herbicides on the body length of earthworm, *E. fetida*

Treatments	Body length of earthworms in (cm)			
	15 days	30 days	45 days	60 days
Control	7.338±0.013	7.414±0.009	7.444±0.127	7.550b±0.254
Sulfuron (0.4 mg/kg soil)	6.946±0.010	6.948d±0.017	7.008c±0.044	6.788a±0.295
Sulfuron (0.8 mg/kg soil)	6.898±0.009	6.928d±0.011	7.004c±0.053	6.984b±0.180
Sulfuron (1.5 mg/kg soil)	6.852±0.016	6.848c±0.012	6.820b±0.022	6.810a±0.010
Sulfuron (3.0 mg/kg soil)	**6.812±0.009**	**6.836c±0.012**	**6.846±0.016**	**6.738a±0.041**
Pinoxaden(0.4ml/kg soil)	6.572±0.012	6.618b±0.011	6.688b±0.012	6.430a±0.010
Pinoxaden(0.8ml/kg soil)	6.526±0.012	6.622b±0.014	6.636a±0.016	6.622a±0.033
Pinoxaden(1.5ml/kg soil)	6.508a±0.009	6.558a±0.016	6.630a±0.014	6.550a±0.017
Pinoxaden(3.0ml/kg soil)	**6.488a±0.012**	**6.554a±0.019**	**6.528a±0.011**	**6.410a±0.205**
SE(m) ±	0.011	0.013	0.050	0.160
C.D. (p=0.05)	0.032	0.037	0.143	0.460

Values with the same superscript do not differ significantly

Table No. 2: Effect of herbicides on the body weight of earthworm, *E. fetida*

Treatments	Body weight of earthworms in (g)			
	15 Day	30 Day	45 Day	60 Day
Control	0.830±0.007	0.932±0.014	1.144±0.022	1.224±0.013
Sulfuron (0.4 mg/kg soil)	0.762^{c}±0.023	0.722^{b}±0.009	0.758^{b}±0.012	0.724^{b}±0.016
Sulfuron (0.8 mg/kg soil)	0.750^{c}±0.016	0.740^{b}±0.018	0.720^{a}±0.007	0.666±0.009
Sulfuron (1.5 mg/kg soil)	0.730^{c}±0.007	0.632^{a}±0.016	0.732^{a}±0.017	0.640^{a}±0.010
Sulfuron (3.0 mg/kg soil)	**0.738^{c}±0.019**	**0.644^{a}±0.022**	**0.704^{a}±0.025**	**0.618^{a}±0.004**
Pinoxaden (0.4 ml/kg soil)	0.682^{b}±0.017	0.738^{b}±0.014	0.838^{c}±0.017	0.752^{b}±0.014
Pinoxaden (0.8 ml/kg soil)	0.658^{a}±0.020	0.770±0.014	0.786^{b}±0.024	0.742^{b}±0.015
Pinoxaden (1.5 ml/kg soil)	0.612^{a}±0.016	0.754^{b}±0.010	0.742^{a}±0.018	0.748^{b}±0.012
Pinoxaden (3.0 ml/kg soil)	**0.664^{b}±0.023**	**0.750^{b}±0.019**	**0.836^{c}±0.014**	**0.546±0.011**
SE(m) ±	0.016	0.016	0.018	0.014
C.D. (p=0.05)	0.046	0.046	0.052	0.040

Values with the same superscript do not differ significantly

Table No. 3: Effect of herbicides on the survivability of earthworm, *E. fetida*

Treatments	Number of earthworms

	15 days	30 days	45 days	60 days
Control	49.60±1.327	52.00±1.225	59.80±1.281	64.00±1.000
Sulfuron (0.4 mg/kg soil)	39.00^{b}±1.304	38.40^{c}±1.364	35.40^{c}±1.631	29.80^{c}±1.393
Sulfuron (0.8 mg/kg soil)	38.60^{b}±0.927	30.00^{b}±0.949	28.20^{b}±1.158	27.60^{c}±1.568
Sulfuron (1.5 mg/kg soil)	37.80^{b}±1.655	29.80±0.860	28.40^{b}±1.077	24.20^{b}±1.068
Sulfuron (3.0 mg/kg soil)	**29.80^{a}±1.562**	**25.40^{a}±1.631**	**25.20^{a}±1.562**	**17.80^{a}±0.860**
Pinoxaden (0.4 ml/kg soil)	40.00^{b}±1.140	38.60^{c}±1.208	32.40^{c}±0.927	29.60^{c}±1.030
Pinoxaden (0.8 ml/kg soil)	40.00^{b}±0.707	37.00^{c}±2.550	28.00^{b}±1.140	23.80^{b}±1.158
Pinoxaden (1.5 ml/kg soil)	38.40^{b}±0.927	33.40^{b}±1.030	29.40^{b}±1.208	20.00±1.000
Pinoxaden (3.0 ml/kg soil)	**29.60^{a}±1.327**	**26.80^{a}±2.035**	**22.80^{a}±1.158**	**16.40^{a}±1.077**
SE(m) ±	1.244	1.521	1.256	1.147
C.D. (P=0.05)	3.582	4.380	3.617	3.303

Values with the same superscript do not differ significantly

Number of cocoons produced by earthworm is the most suitable parameter to analyse the effect of pesticides on reproductive potential. Cocoons production reduction on exposure to pollutants is attributed to lesser survivability of earthworms. Live earthworms were counted on the 60th day and Table No. 3 depicts that survivability of earthworms decreased with increase in concentration of herbicides. Live earthworms number was 29.60 & 16.40 in tubs treated with pinoxaden @ 0.4 ml/kg soil and 3.0 ml/kg soil. Similarly less number of survived earthworms with sulfuron was observed and pinoxaden proved more toxic when compared with sulfuron. Similarly weight loss was reported for organochlorine pesticides intoxication (Martikainen, 1996) and for the effects of fungicides and herbicides in *E. fetida* and *L. terrestris* (Helling *et al.*, 2000). Choo and Baker, (1998) found endosulfan did significantly reduce the weight of juvenile *Aporrectodea trapezoides* within 5 weeks when applied to soil at normal application rate in both the field and laboratory.

Sulfuron and Pinoxaden induced significant decline in the total number of cocoons production as shown in Table 4. In the beginning of the experiment, the maximum decline in number of cocoons (36.00±2.121) was observed in the case of pinoxaden @ 3.0 ml/kg soil i.e. and 38.00±2.121in sulfuron @ 3.0 mg/kg soil where as the maximum cocoon production was found in control with nil herbicides. The number of cocoons decreased with increase in concentration of sulfuron and pinoxaden. The minimum cocoons production rate was 23.07% with pinoxaden @ 3.0 ml/kg soil and 22.44% with sulfuron @ 3.0 mg/kg soil.

Gupta and Saxena, (2003) studied the effects of carbaryl, an N-methyl carbamate insecticide, on the reproductive profiles of the earthworm *Metaphire posthuma* and found defective sperm heads. Various other reproductive parameters were studied in earthworms exposed to various xenobiotics like cocoon, hatchling production, viability of the worms produced and sexual maturation (Van Gestel *et al.*,1988; Reinecke and Venter, 1987). Several scientists have reported that pesticides influence the reproduction (cocoon production, a reduced mean and maximum number of hatchlings per cocoon and a longer incubation time) of worms in a dose-dependent manner, with greater impact at higher concentration of chemical (Haque and Ebing, 1983).

Table No. 4: Effect of herbicides on the number of cocoons produced by earthworm, *E. fetida*

Treatments	Number of cocoons produced by earthworms			
	15 days	30 days	45 days	60 days
Control	59.00^{c}±0.707	63.00±0.707	68.00±0.707	71.00±0.707
Sulfuron (0.4 mg/kg soil)	60.00^{c}±1.140	54.00^{c}±1.414	51.00^{c}±0.707	49.00^{d}±0.707
Sulfuron (0.8 mg/kg soil)	56.00^{b}±0.707	52.00^{b}±0.707	49.00^{b}±0.707	45.00^{c}±0.707
Sulfuron (1.5 mg/kg soil)	51.00±0.707	50.00^{b}±0.707	47.00^{b}±0.707	43.00^{b}±0.707
Sulfuron (3.0 mg/kg soil)	**49.00^{a}±0.707**	**45.00^{a}±0.707**	**43.00^{a}±0.707**	**38.00^{a}±2.121**
Pinoxaden (0.4 ml/kg soil)	64.00±0.707	60.00±1.000	55.00±0.707	51.00^{d}±0.707
Pinoxaden (0.8 ml/kg soil)	60.00^{c}±1.414	55.00^{c}±0.707	50.00^{c}±1.140	46.00^{c}±0.707
Pinoxaden (1.5 ml/kg soil)	55.00^{b}±0.707	50.00^{b}±0.707	45.00^{a}±0.707	41.00^{b}±0.707
Pinoxaden (3.0 ml/kg soil)	**46.80^{a}±0.800**	**44.00^{a}±0.707**	**40.00±0.707**	**36.00^{a}±2.121**
SE(m) ±	0.878	0.850	0.767	1.179
C.D. (p=0.05)	2.529	2.447	2.210	3.394

Values with the same superscript do not differ significantly

3.2 Effects of fungicides on:

3.2.1. Survivability of earthworms:

There was significant reduction in the survivability of earthworms was recorded due to fungicide's exposure when compared with control on the final day (90th) of the study. Maximum reduction (74.46%) in survivability was observed in worms exposed to Thiram along with Carbendazim @1.25+1.25mg/kg followed by 71.13% in Thiram @ 1.25mg/kg in comparison to control as presented in table 5 .Whereas 64.46% reduction in survivability of earthworm was observed @ 1.25mg/kg concentration of Carbendazim. Survivability reduced up to 42.23% and 16.66% in Thiram @1.00mg/kg and Carbendazim @ 1.00 mg/kg respectively.

3.2.2 Number of cocoons:

Cocoon production in earthworms decreased significantly on their exposure to fungicides in comparison to control and the observations recorded from day one of exposure up to 90th day of study are presented in Table 5. Maximum (0.66 ± 0.33) reduction of was observed on exposure to Thiram + Carbendazim @1.25+1.25mg/kg followed by (01.66±0.66) in Thiram @1.25mg/kg. Thiram (1.00mg/kg) and Carbendazim (1.00mg/kg) alone induced (08.00±1.15) and (10.33±1.76) reduction in cocoons production respectively. Carbendazim also had adverse impact on reproduction potential of worms as (03.00±0.57) decrease in cocoon production was recorded on exposure @1.25mg/kg.

3.2.3. Body weight of earthworm:

The observations revealed the fact that reduction in body weight is due to prolonged exposure of earthworms to fungicides and body weight of worms reduced significantly on 90th day of exposure. Maximum reduction (0.28±0.01) was observed on exposure to Thiram + Carbendazim @1.25+1.25mg/kg followed by (0.32 ± 0.02) in Thiram @1.25mg/kg. Thiram (1.00mg/kg) and Carbendazim alone (1.00mg/kg) were responsible for (0.46 ± 0.03) and (0.49 ± 0.06) reduction in body weight respectively. Adverse effect of Carbendazim on the body weight was (0.47 ± 0.03) @1.25mg/kg when compared with control.

3.2.4. Length of earthworm:

Deleterious effect of fungicides exposure on the length of earthworms was alsorecorded during the present investigation and it was observed that significant changes took place in the length of earthworms as are shown in table 5. Thiram + Carbendazim @1.25+1.25mg/kg reduced the length up to 4.88 ± 0.13followed by 5.35 ± 0.23 reduction on exposure to Thiram @1.25mg/kg. Carbendazim and Thiram @ 1.00mg/kg induced 6.28 ± 0.20 and 6.06 ± 0.36 reductions in the length respectively. Carbendazim alone @ 1.25mg/kg also exhibited adverse effect (6.16 ± 0.03 reduction) on the length of worms.

Table: 5 Effects of fungicides on different growth parameters of *E. fetida* on 90th day

Treatment (mg/kg)	Adult earthworms	Number of cocoons	Body weight (in grams)	Length (in cm)
Control	61.00 ± 0.57	136.66 ± 3.28	0.92 ± 0.02	8.83 ± 0.15
Thiram (0.75)	26.66 ± 0.33	48.00 ± 3.21^{d}	0.52 ± 0.04^{b}	7.69 ± 0.11^{d,e}
Thiram (1.00)	17.33 ± 0.33^{b}	08.00 ± 1.15^{b}	0.46 ± 0.03^{b}	6.06 ± 0.36^{b}
Thiram (1.25)	**08.66 ± 0.33^{a}**	**01.66 ± 0.66^{a}**	**0.32 ± 0.02^{a}**	**5.35 ± 0.23^{a}**
Carbendazim (0.75)	26.66 ± 0.33	58.00 ± 1.52	0.61 ± 0.02^{c}	7.92 ± 0.05^{e}
Carbendazim (1.00)	25.00 ± 0.57	10.33 ± 1.76^{b}	0.49 ± 0.06^{b}	6.28 ± 0.20^{b}
Carbendazim (1.25)	**10.66 ± 0.33**	**03.00 ± 0.57^{a}**	**0.47 ± 0.03^{b}**	**6.16 ± 0.03^{b}**
Thiram+ Carbendazim (0.375 + 0.375)	25.00 ± 0.57	48.33 ± 3.18^{d}	0.57 ± 0.10^{c}	7.61 ± 0.32^{d}
Thiram+ Carbendazim (0.50 + 0.50)	20.33 ± 0.33	27.33 ± 2.40	0.53 ± 0.01^{b,c}	6.17 ± 0.24^{b}
Thiram+ Carbendazim (0.625 + 0.625)	17.33 ± 0.33^{b}	10.00 ± 1.15^{b}	0.47 ± 0.07^{b}	5.11 ± 0.06^{a}
Thiram+ Carbendazim (0.75 + 0.75)	16.66 ± 0.88^{b}	10.00 ± 2.00^{b}	0.40 ± 0.03^{a,b}	6.80 ± 0.24^{c}
Thiram+ Carbendazim (1.00 + 1.00)	13.00 ± 0.57	04.66 ± 2.02^{a,b}	0.46 ± 0.01^{b}	6.00 ± 0.06^{b}
Thiram+ Carbendazim (1.25 + 1.25)	**07.66 ± 0.33^{a}**	**0.66 ± 0.33^{a}**	**0.28 ± 0.01^{a}**	**4.88 ± 0.13^{a}**
SE(m) ±	0.48	2.04	0.048	0.201
C.D. at 5 %	1.404	5.964	0.14	0.588

Values with the same superscript in same column do not differ significantly

3.3. Effects of insecticides on:

3.3.1. Survivability of earthworms

The effects of insecticides on survivability of earthworms are shown in Table 6. It was observed that Cartap (2.0 mg/kg) was most toxic followed by combination of Cartap + Phorate (1.0 +1.0 mg/kg). Maximum decrease in survival of adult earthworm was recorded in Cartap (@2.0 mg/kg) *i.e.*, 16.66 and 16.00 on 30th day and 60th day, respectively. As the concentration and duration of exposure to insecticides increased, population of adult earthworms decreased and maximum number of adult earthworms were recorded in control. Dose and time dependent reduction in earthworms' population exposed to pesticides was observed which is supported by the observations by Jovana *et al.* (2014). However, significant reduction in number of adult worms as compared to control stamps the lethal effects of pesticides on earthworms. Mortality induced due to stress caused by pesticide exposure contributes to reduced survivability.

Table No. 6: Effect of different concentration of insecticides on survivability of earthworms, *E. foetida*

Treatments	Survivability of earthworms (Adults)	
	30th day	60th day
Control	20.333±0.333	22.000±0.577
Phorate (1.0 mg/kg)	19.667±0.333	17.333±0.333
Phorate (1.5 mg/kg)	19.333±0.333	18.000±1.000
Phorate (2.0 mg/kg)	**18.667±0.333**	**17.667±0.667**
Cartap (1.0 mg/kg)	17.667±0.577	17.333±0.882
Cartap (1.5 mg/kg)	18.000±0.000	17.000±0.000
Cartap (2.0 mg/kg)	**16.667±0.333**	**16.000±0.577**
P + C (0.5 + 0.5 mg/kg)	18.667±0.333	18.000±0.577
P + C (0.75 + 0.75 mg/kg)	18.333±0.667	17.667±0.333
P + C (1.0 + 1.0 mg/kg)	**17.333±0.667**	**16.333±0.333**
SE(m)±	0.408	0.596
C.D. at 5%	1.213	1.771

3.3.2. Number of cocoons

The effect of different concentration of insecticides on cocoon production of *E. foetida* is shown in Table 7. Cocoons production after exposure to insecticides was recorded on 30th and 60th day and it was observed that maximum number of cocoons 71.333 and 76.667 were in control on 30th and 60th day, respectively whereas minimum number of cocoons 57.66 and 56.33 were observed on 30th and 60th day, respectively after exposure to Cartap (2.0 mg/kg) followed by 62.000 and 61.000 on 30th and 60th day, respectively after exposure to Phorate + Cartap (1.0 + 1.0 mg/kg). As the concentration and duration of exposure to insecticides increased, cocoons production decreased. The decreased number of juvenile number is supported by the observations made by Jovana *et al*. (2014). Less viable cocoon production and decreased viability may act as the contributing factor for decline in number of juveniles as reported by Navarro and Obregon (2005).

Table No. 7: Effect of different concentration of insecticides on the cocoons production of earthworm, *E. foetida*

Treatments	No. of cocoons	
	30th day	60th day
Control	71.333±2.028	76.667±1.764
Phorate (1.0 mg/kg)	71.000±1.528	69.333±1.453
Phorate (1.5 mg/kg)	69.000±0.577	68.000±1.528
Phorate (2.0 mg/kg)	**66.667±0.667**	**65.667±1.764**
Cartap (1.0 mg/kg)	64.333±0.667	64.000±2.309
Cartap (1.5 mg/kg)	62.667±2.028	62.333±0.667
Cartap (2.0 mg/kg)	**57.667±2.028**	**56.333±1.856**
P + C (0.5 + 0.5 mg/kg)	69.667±1.202	69.000±1.528
P + C (0.75 + 0.75 mg/kg)	66.667±1.333	65.667±0.882

P + C (1.0 + 1.0 mg/kg)	**62.000±1.155**	**61.000±1.155**
SE(m)±	1.430	1.560
C.D. at 5%	4.248	4.634

3.3.3. Number of juveniles earthworms

Effect of different concentrations of insecticides on juveniles of *E. foetida*, is summarized in Table 8. Maximum numbers of juveniles were observed in control and their number was (16.000 and 22.333) on 30th and 60th day, respectively. Minimum number of juveniles (10.333 and 7.000) on 30th and 60th day were found in case of Cartap (2.0 mg/kg) followed by 11.000 and 8.333 on 30th and 60th day respectively, after exposure to Phorate + Cartap (1.0 + 1.0 mg/kg) , number of juveniles decreased with increased concentration of insecticides,.

Table No. 8: Effect of different concentration of insecticides on juveniles of earthworms, *E.foetida*

Treatments	No. of juveniles	
	30 Days	**60 Days**
Control	16.000±0.577	22.333±0.882
Phorate (1.0 mg/kg)	14.333±0.882	13.333±0.333
Phorate (1.5 mg/kg)	13.667±0.882	12.000±0.577
Phorate (2.0 mg/kg)	**13.000±0.577**	**11.333±1.333**
Cartap (1.0 mg/kg)	12.333±0.667	11.000±1.528
Cartap (1.5 mg/kg)	11.667±0.882	10.333±0.882
Cartap (2.0 mg/kg)	**10.333±0.882**	**7.000±0.577**
P + C (0.5 + 0.5 mg/kg)	13.333±0.667	12.000±0.577
P + C (0.75 + 0.75 mg/kg)	12.333±0.333	10.667±0.882
P + C (1.0 + 1.0 mg/kg)	**11.000±0.577**	**8.333±0.882**
SE(m) ±	0.715	0.913
C.D. at 5%	2.124	2.712

3.3.4. Body weight of earthworm

Maximum gain in body weight was 0.955 g, 0.985 g and 1.320 g on 0, 30th and 60th day, respectively in control. With increase in concentration and duration of exposure to insecticides, body weight decreased. A decreasing trend in the weight (0.921 g, 0.687 g and 0.590 g) of earthworms was recorded on 0, 30th and 60th day, respectively, when treated with Cartap (2.0 mg/kg). Similar was the trend in Phorate + Cartap (1.0 + 1.0 mg/kg) treated worms and the weight was 0.927 g, 0.697 g and 0.620 g on 0, 30th and 60th day, respectively. Reduced body weight may be attributed to the reduced feeding due to stress and avoidance behavior of earthworms towards pesticide contaminated substrate.

Table No. 9: Effect of different concentration of insecticides on body weight of earthworms, *E. foetida*

Treatments	Body weight of earthworms (g)		
	0th day	**30th day**	**60th day**

Control	0.955±0.004	0.985±0.003	1.320±0.147
Phorate (1.0 mg/kg)	0.949±0.005	0.807±0.003	0.804±0.044
Phorate (1.5 mg/kg)	0.946±0.004	0.767±0.003	0.753±0.003
Phorate (2.0 mg/kg)	0.942±0.002	0.737±0.012	0.733±0.018
Cartap (1.0 mg/kg)	0.939±0.000	0.717±0.012	0.697±0.012
Cartap (1.5 mg/kg)	0.928±0.002	0.707±0.012	0.673±0.02
Cartap (2.0 mg/kg)	0.921±0.012	0.687±0.003	0.590±0.015
P + C (0.5 + 0.5 mg/kg)	0.938±0.002	0.737±0.007	0.683±0.023
P + C (0.75 + 0.75 mg/kg)	0.931±0.001	0.733±0.012	0.693±0.009
P + C (1.0 + 1.0 mg/kg)	0.927±0.001	0.697±0.007	0.620±0.017
SE(m) ±	0.003	0.008	0.051
C.D. at 5%	0.007	0.025	0.15

4. CONCLUSIONS:

The impact of herbicides, fungicides and insecticides contamination on the growth and reproduction of earthworm, *Eisenia fetida* was evaluated during this investigation. It was concluded that all six pesticides had detrimental effect on the survivability, body weight, length and reproductive potential of earthworms. The toxicity increased with time and doses, the order of lethal effect is as follows Pinoxaden > Sulfuron >Thiram >Carbendazim and Cartap> Phorate .

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Inconsistencies And Deficiencies In The Waste Management Practices In Athens. An Intersectional Approach.

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Abstract

The city of Athens faces significant issues regarding waste management. Every day approximately 850t of recyclable and household waste have to be collected from 11500 collection points using 180 collection programs of which 31 are recycling programs and 4 are weekly recycling programs with press containers. The collection programs are developed with the support of Geographic Information Systems (G.I.S.) and are displayed on maps. Each map consists of data regarding the number, the time and the district of the collection program, therefore the driver along with the two workers of each waste collection vehicle have direct access to directions for their course of operation. The scope of the current research is to examine waste management in the municipality of Athens and to identify the issues arising. For this purpose, non-standardized interviews were conducted to eight members of the municipality of Athens between December 2017 and January 2018. Following classification of issues, results indicated shortage of personnel and equipment and also lack of co-operation by local inhabitants. It is of our belief that the municipal authorities must comply with the relative European waste management regulations by mitigating waste over-production, increasing resource efficiency and promoting recycling (Reduce, Reuse, Recycle) while applying a pay-as-you-throw (PAYT) program and a polluter-pays principle. Therefore we consider official inspection, recruitment of specialized personnel, purchase of modern necessary but mainly public information campaigns on waste management absolutely crucial.

Keywords: Recycle, Reuse, Regional Waste Management.

1. INTRODUCTION

Waste management in the city of Athens is a fairly complex and difficult procedure. Every day 850t of recyclable and household waste have to be collected from 11500 collection points using 180 collection programs of which 31 are recycling programs and 4 are weekly recycling programs with press containers. The collection programs are developed with the support of G.I.S [1]–[4]. The municipal authorities face certain issues in the course of the collection, transport and waste disposal proceeding. Waste collection fully operates on 14/7 basis and the working shifts are clockwise scheduled, namely; morning shift, afternoon shift and evening shift. Evidently difficulties arise due to the traffic jam all day long and the quite hours during the night. Regarding the landfill site, the gate fee is up to 45€/t of waste. Huge issues

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arise also when the landfill site is not receiving waste for various reasons, resulting in waste accumulation at the collection points driving to significant public health risk [5], [6]. Also the landfill site does not operate under fixed working hours making waste disposal much harder. Regarding recycling, the problem encountered by the municipal authorities is the public's reduced purchasing power, as a result of the economic crisis [7], [8], which in turn produces reduced, recycles for the municipal authorities to sell, thus reducing the total municipal profit. Another issue is the stealing of the recyclable separated items for black-market sales. However, most significant is considered the lack of public's intention to properly recycle [9], [10] resulting in approximately up to 40% of non-recyclable items being placed in the recyclables collection points [11], [12]. As a result, the containers are quickly filled while the recyclable items separation by the Recycling Materials Collection Centers is becoming a major challenge [13]–[16].

Within the scope of the current research, a waste management research was carried out in two European Countries, namely; Denmark and Estonia, allowing comparison among waste management programs.

The case of Denmark [17], [18]. Denmark was favored given it operates a highly sophisticated waste management system by the competent bodies; the municipalities, thus sharing certain common characteristics with Greece. In particular, a waste analysis and evaluation system operates under scenarios. These scenarios outline the environmental and economic effects while making use of a solid structured waste data collection system. The accurate data are collected from the waste operators, thus the statistical outcomes are totally reliable. It is worth mentioning that the waste management system currently operating in Demark emphasizes in the sorting at source while the landfill site taxation reaches up to 110€/t of waste. In the case of Danish, waste management objectives are incineration of waste mitigation and energy recovery through waste incineration, intensive monitoring of the household waste trends, increasing recycling (currently recycling is up to 42%) through public awareness campaigns.

The case of Estonia [19]**,** [20]. Estonia has being selected given the recent past poor operation of the waste management procedures. Of course, currently huge progress towards efficiency and sustainability has been made by the competent bodies; the municipalities. In Estonia a national waste plan was developed aiming at ending the old landfill site operation, creating a recycling network and recovering energy through waste. Waste disposal points are located at a distance of about 500m away from the cities, while waste stations and recycling stations at a distance of about 1-4km away from the cities. Nowadays, a waste collection system based on tenders provides input to the only 5 landfill sites remain operational. Finally, the landfill site taxation reaches up to 50-55€/t of waste. The objectives set are the reduction of the landfill site taxation to 20€/t of waste, focusing to the PAYT principle and increase of recycling up to 50% (currently recycling is up to 20%).

2. METHODOLOGY

A qualitative analysis was used for the scope of the current research. Interviews were conducted using non-standardized questionnaires during December 2017 and January 2018, addressed to the persons responsible of the Cleaning and Recycling Department of the Quality of Life Directorate-General of the Municipality of Athens, directly with a view to the substance of the issue along with the future objectives set by the Department. The questionnaire was design to highlight any potential strengths, weaknesses, opportunities and threats (SWOT) of the municipal operational systems,

the recycling targets and the relative cleaning regulations. Furthermore, waste collection process is presented through GIS, an innovative effort of the municipal authorities in collaboration with DAEM [5].

Collection program using GIS; an example. The city of Athens is divided into seven municipal districts. Separate waste collection programs are implemented in each of these seven municipal districts. The municipal authorities have designed the waste collection programs using G.I.S aiming to provide precise information to the persons responsible of the Department dealing with the waste collection points, in order to ensure that they in turn be able to indicate these areas to the drivers and the workers. In figure 1, the program "411 Π4" is presented. Each program consists of the waste collection vehicle route with a view to collecting all waste from the containers available around the collection area. Thus, red line defines the boundaries of the collection area where the waste collection vehicle will operate. The program code name is "11" and it will be held in the 4th municipal district. The letter of the Greek alphabet Π (Pe) aside to the number 4 indicates the time the program is supposed to run (04:00am). Waste collection programs are subject of re-design in complete dependence of the waste quantities trends [21].

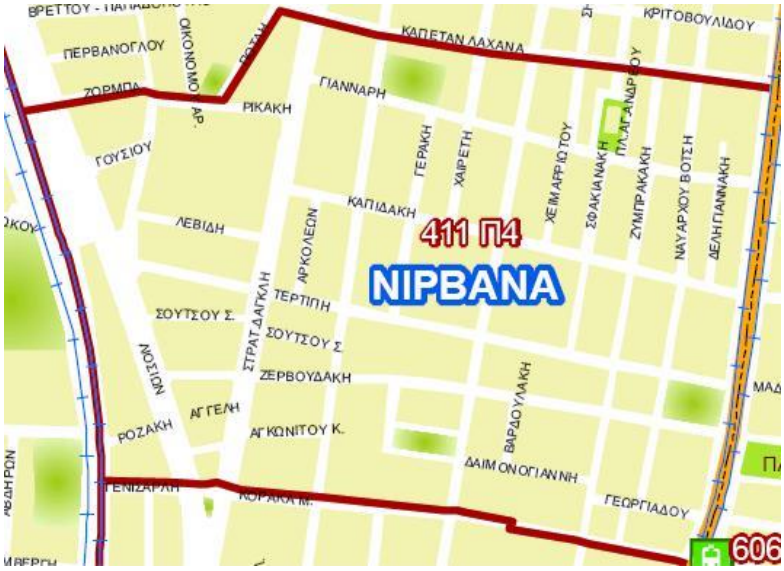

Figure 1. Waste collection program using GIS

[5] DAEM SA is the IT Company of City of ATHENS. It has been operating since 1983 providing high quality ICT solutions for the Municipality of Athens as well as other Municipalities, Institutions and Public Organizations in Greece. Within these 34 years of continuous presence, DAEM SA has successfully implemented a wide range of various projects in the fields of ICT, enhancing its technical know-how by actively participating in National and European research programs. Nowadays, DAEM SA through its experience, responsibility and credibility, is setting a new trajectory that guarantees its successful intervention in transforming Public Administration into a Smart Entities.

3. RESULTS

Results indicate that the strengths at the city of Athens are the multiannual experience of most employees and their exemplary devotion to duty. Weak points are the shortages of personnel, mechanical and other equipment. Major issues regarding waste management are, the working hours of the landfill site, the stealing of the recyclable materials, the lack of co-operation by the inhabitants, the economic crisis and the lack of political will. More particularly, during the waste collection procedure the Cleaning and Recycling Department personnel faces certain difficulties due to the traffic jam all day long and the quite hours during the night. The objectives of the municipal authorities are to achieve one container of recyclables to one container of non-recyclables, to replace using simple paper for the program design and distribution with other means combating counterfeiting, to reduce waste quantities through recycling, to step up the public information and awareness campaigns particularly on younger generations, to align with the Community legislation, regulation and incentives regarding waste management sustainability.

4. CONCLUSIONS

The effort at the city of Athens towards waste management is noteworthy but certainly not enough. The issues arising regarding waste collection such as traffic jam all day long and the quite hours during the night remain unresolved. At the same time the unfixed working hours of the landfill site makes the municipal authorities effort much harder. A temporary to this issue solution adopted by the Waste Transshipment Station and in operation since last year. The municipality lacks of public landfill site, thus a gate fee of 45€/t of waste to private undertakings is paid, thus the municipal authorities should seek to purchase site and increase recycling along with composting and recovering energy through waste in order to restore sustainability. Regarding the recycling issues (currently recycling is up to 18%), the economic crisis should not be considered disadvantage, because if the recycling increases up to 50% according to the requirements of the European Union then the municipality authorities will profit enough selling recyclable items, despite the crisis. The municipal police could help to the issue of stealing the recyclable items along with the submersible containers program.

Concluding, the issue is mainly social, thereby public information and awareness campaigns should be launched, recycling should be considered a rewarding process, the principle PAYT should be implemented and the polluter-pays principle should be enacted; Practices that have come to a standstill due to lack of political will. Moreover private undertakings should be further involved in the waste management improvement and sustainability effort sharing the needed know-how, expertise and technological solutions developed. The advantage of the multiannual experience of the Cleaning and Recycling Department personnel is of particular importance, however further support by all means is needed.

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Tourism and Marine Protected Areas

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Abstract

In the last decades, there has been deterioration in the main purpose of tourism, giving way to financial gain. However, in recent years, there has been a change in contrast to mass tourism. There has been a development in certain alternative forms of tourism. From all the forms of tourism, marine tourism perhaps is the most important. The need for protection and conservation of the natural environment is something that has been acknowledged by the international community. Taking this into account, marine reserves and marine protected areas (MPA) are frequently been suggested as important tools in fighting against the threat to the marine ecosystem. Largest steps should be done, since the percentage of the Mediterranean area which is under protection is only 3,8% (95.660 km2), whereas the percentage of coastal regions being under protection is just 0,4% (9.910 km2) of the total Mediterranean surface (2.510.000 km2). This is considered as a very small percentage, because the coastal zone and the Mediterranean in general, are very important in the conservation and reproduction of fish population. These protected areas have become very popular tourists' destinations in the last years. Tourism activity in protected areas may improve their financial abilities, contribute in protecting natural and cultural resources as well as improve the quality of life of the local inhabitants. Such a region may also increase the chances of sustainable economic activity.

Keywords*: Ecotourism, Marine tourism, Marine Protected Areas, Natural resources, Socio-economic impacts, Sustainable tourism*

1. INTRODUCTION

Since the creation of the world and the organization of the first cities and societies, and over the years became systematically increasingly strong the human need for entertainment and acquaintance with new places, new traditions and cultures. That was the beginning of tourism as we know it today.

Over the last 20 years however, the climate has been reconverted, and as opposed to mass tourism have been developed some alternative forms of tourism, characterized by sensitivity to the protection of nature and culture of a region. These include ecotourism, a new form of tourism, which primary objective is to protect the environment and natural resources, but also the preservation and promotion of cultural characteristics of a place.

Ecotourism is tourism that is developed in ecologically valuable areas and, does not exceed the carrying capacity of the region, promotes the protection and management of the natural and cultural environment, in accordance with legal or other effective measures, whilst maintaining the cohesion of the social fabric [1].

The growing environmental awareness of the population in general, or of tourist market in particular, and the objectives for a viable and sustainable tourism development that is pursued by several fields (international, government, business) are considered to be key drivers of ecotourism. Being one low environmental impact activity, ecotourism besides offering pleasure, enjoyment, knowledge and experiences to visitors, it also maintains and enhances the welfare of local communities that is an integral part of such activity and development process.

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The IUCN in an attempt to define the concept of ecotourism, defines it as:´´The environmentally responsible travel and visit in relatively undisturbed natural areas which aim to delight and appreciation of nature (and cultural assets of the present and the past)[3] and promote conservation, have low visitor's impact, and provide useful active socio-economic involvement of local populations´´.

Greece is a country blessed by nature and known for its rich history. It offers plenty of light, warm and friendly sea and unique monuments. It has not ceased to attract millions of tourists for decades. On the positive side of this development, the "sale" of the "product" -Sun and Sea- by the tourism industry, has brought huge economic benefits to the country, and has managed to retain people in the province.

The need for delimitation of tourism development and protection of our natural and cultural wealth, come to cover some "categories" of tourism, such as sustainable (or viable) tourism, ecotourism, rural tourism, nature tourism, etc. Sustainable tourism is a model promoted by the European Union, and refers to a more general rules' framework. These rules are structured around the triptych economy, ecology and society and promote competitiveness [12].

1.1 Relevance of tourism and environment

A few years ago the researchers of the tourism phenomenon was obliged to demonstrate that there are links between tourism and the environment. Today, after the Declaration of Manilas for World Tourism (1980), the Rio Summit on Environment (1992), the Agenda 21, which was incorporated in the Treaty of Maastricht and recently the Global Code of Ethics for Tourism (1999), wherein all these texts, which are binding Greece also, adopted the principles of 'sustainable development' and also the obligation of the international community involved with tourism development to protect the environment.

Those politicians and business leaders involved in tourism, recognize that a healthy tourism industry depends on a healthy environment and talk about tourism development that promotes forms of "environmentally prudent tourism."

Thus, governments and entrepreneurs, promote the development of new and alternative forms of tourism that are compatible with the environment, such as conference, cultural, sports, ecological, religious and other, in an attempt to mitigate the effects of mass tourism, broaden the tourist season and create new "tourism products" that respond to the tourist demand and are less influenced by international conditions [3].

Nowadays, the need for protection and conservation of the natural environment has been recognized by the international community. The institution of protected areas is a basic tool for protecting the environment. Within the limits of protected areas is not simply seeking for protection and conservation of biotic and a-biotic elements, but also the parallel service of all functions, values and activities that take place into them, to the extent of course that not neglecting their primary role in maintaining the natural environment.
Protected areas have been a very popular tourist destination in recent years. Tourism in them, can be considered compatible with the principles of protecting the natural environment only in accordance with a new model, that of sustainable tourism development. Currently in Greece, have begun initiatives in order to develop tourism activities in protected areas and generally in areas with valuable biodiversity elements.

2. ALTERNATIVE FORMS of TOURISM

Tourism in protected areas can improve the economic capacity of a region, contribute to the protection of natural and cultural reserves, and improve the quality of life. But it poses risks, such as a possible reduction of populations of endangered / protected species of flora and fauna, water pollution, soil pollution and possibly groundwater tables, degradation of coastal and forest ecosystems, etc.

As tourism in protected areas is a relatively modern trend, there is no legislation defining its legal scope, but only some texts of international organizations and bodies, that specify the principles of tourism development with emphasis on its relationship with the environment, some European initiatives and some associated Greek ones.

Some of the most prevalent types of ecotourism/alternative tourism are the following: Marine tourism, Religious tourism, Fishing, Diving, Therapeutic, Conference, Nautical, Student, Environmental, Athletic, Agricultural, Mountain and Family.[3]

Any type of tourism includes its own particularities and peculiarities that make it unique. Alternative tourism can serve as a basis for independent touring packages, but also can enrich other packages of the tourism classical model. The protection of the environment is a prerequisite for alternative tourism development.

This is the solution for broadening of the tourist season, improvement of the quality of tourism demand, protection of the environment, sustainable tourism development and promotion of culture and environment

In the present study we will deal with marine tourism, which holds a prominent place in coastal areas.

2.1 Marine Tourism

Marine tourism is a form of alternative tourism that aims to highlight the marine wealth of the country, attract the interest of tourists to come into contact with sea and ensure the sustainability of the marine wealth of the country. Marine tourism, in the broadest sense, could be described as any tourist or recreational activity related to the sea and the coast, i.e. almost the entire range of tourist activities. Usually though, as marine tourism we mean sea walking-tours, cruises with cruise ships or yachts and water sports activities such as sailing. The marine tourism is therefore an alternative form of tourism that seeks to bring together the tourist with several activities and promotes information on the marine environment.

2.1.1 Importance of marine tourism to Greece

The value and importance of these forms of ecotourism are especially important when referring to Greece. Greece is a Mediterranean country with a long coastline that covers an area of 15,000 km, with many islands, good weather conditions, especially during the summer months with key point the sun, clean waters that are ideal for many sports and diving activities, but also for scientific study. This advantage is strengthened both by the naval tradition of millenniums and the favorable specific conditions for maritime voyages: Greek seas are considered safe in terms of maritime risks, distances between islands are relatively small and access is easy, while equally favorable are the conditions related to the volume of the wind and the temperatures of the ambient and sea.

Marine tourism is a large section of the tourism industry and interacts as a feeder to other categories. From national aspect, marine tourism helps in maintaining of cohesion of the Greek islands and conveys the Greek flag to the last island. Its importance is reflected by the fact that the industry of sea tourism covers 3.8% of the 18% of the total contribution of all sectors of tourism to GDP of Greece.

The marine tourism associated with the activities sailing, cruise, waterskiing and Surfing, windsurfing, fishing, diving, rowing and tours with tourist boats.

Thereby, in all islands' major beaches there are platforms in the sea, where professional trainers will initiate visitors to the magic of the ride across the wave: ski, jet-ski, parachute, surfing and traditional (but slower) pedal boats and canoes, are available for tourists for exploration or isolation in less accessible beaches. The 90% of Greek tourism investments are concentrated in the coastal zone. A large number of hotels, rooms, restaurants, nightclubs and stores have been developed over the past decades in Greek coastal zone. The development of tourism has favored greatly the Greek

economy, strengthened the creation of local development projects, increased employment opportunities and reduced significantly the movement of population from the countryside to urban centers (urbanization).

3. MARINE PROTECTED AREAS

Nowadays, it is generally admitted that oceans and their livelihood are under threat. The increasing use of the coastal zone by humans causes significant damage to marine ecosystems with visible results now, such as the depletion of many marine fish stocks. The threat of a further damage to the habitats and the potential loss of species and genetic diversity are highlighting the severity of the situation. In this context, more and more often are proposed marine reserves and Marine Protected Areas (MPAs) as important tools [5] to deal with these threats on marine resources and ecosystems.

Our country is one of the richest countries in biodiversity, as well as 447 out of the 579 species of fish living in the Mediterranean can be found in the Greek seas. Finally, more than 400 bird species have been recorded in Greece, with the country being home to a significant number of endangered species at a European and global level. It is therefore obvious that marine, coastal and island habitats are areas of priority for Greece, as our country has the longest coastline in the Mediterranean (about 15,000 km) and the coastal areas are of major economic, cultural and ecological interest.

By the term Marine Protected Area, we mean an area whose boundaries include part of marine or ocean waters. The term is used to describe marine areas under protection from human activity, and typically include live, abiotic or historical and cultural resources. The marine protected areas, depending on their importance, include either limits on growth, fishing and access, either totalitarian prohibition of exploitation of the region.

3.1 Characteristics of Marine Protected Areas

The main characteristics of Marine Protected Areas MPAs often include areas of high ecological value whose marine biodiversity is protected and preserved for the benefit of present and future generations. Marine protected areas are regarded as instruments to improve both fishery management and protection of the marine environment.

Besides protecting the marine environment, the coastal zone and in total the Mediterranean are very important for the maintenance and reproduction of fish stocks.

Target which provide that 10% of Mediterranean's surface should be under protection by the end of 2013 (Convention on Biological Diversity-Convention of Barcelona-CBD), which has been ratified by our country.

The global situation is particularly worrying as, only 0.65% of the oceans and 1.6% of the coastal zone worldwide is being protected in the structure, function and integrity of the marine ecosystem so the MPAs can support more sustainable fisheries management [2].

In 2010, it was estimated that marine protected areas which have been established and are still in force, covering 8% of the world's water. The value of MPAs to the sustainable environmental management and development is internationally recognized. But in many cases, and especially in Greece, where financial planning is deficient in conjunction with the high costs of establishing and running a MPA, further strengthen the need for finding managerial and financial tools [5] for their constant and sustainable operation.

3.2 Contemporary Objectives of establishing Protected Areas

The modern purpose of establishing protected areas is the protection of natural and cultural features with a parallel direct or indirect support of the society of the area concerned. This includes:

1) Habitat protection
2) Conservation of genetic biodiversity (genetic stocks)
3) Promotion of scientific research
4) Conservation of natural, traditional and cultural characteristics
5) Promotion of education at local and wider levels
6) Leisure and development of 'sustainable' tourism and other compatible activities for region's development.
7) Sustainable management of natural resources
8) Contributing to the maintenance of a range of services and goods required to maintain life on earth, for the benefit of present and future generations.

It is not only fishermen's belief but also finding of important research during the last years: the wealth of the sea decreases rapidly worldwide and some species at serious risk. This finding also applies to the seas in our region. Already a significant proportion of seafood species we consume comes from fish farms. Species that were in abundance before, now rarely found in fishermen nets.

In order to halt the decline of marine biodiversity, to retrieve marine species and properly manage marine resources must both reduce catastrophic interference (pollution, overfishing, destructive fishing instruments) and establish networks of Marine Protected Areas that will cover perhaps the 20-30% of the seas and oceans.
In these areas are allowed different uses and levels of protection, like shelters of marine species, areas with certain limitations or areas fully protected that concern different categories of marine and coastal ecosystems, habitats and species. The percentage of fully protected areas compared to less strictly protected areas, within a marine refuge or marine protected area, depends on the degree of protection and restoration that is sought and the level of marine resources' reduction of a region through a dialogue between local bodies based on the collected scientific data [13].
The marine protected areas can bring in medium term significant economic benefits only after retrieving marine ecosystems their productivity and dynamism while helping to reduce the degradation of coastal and marine habitats, to slow the loss of endangered marine species and restore fisheries [2]. A Marine Protected Area creates conditions for new, sustainable economic activities and green jobs that have not been developed yet.

3.3 Benefits of marine protected areas

Scientific studies prove that marine protected areas entail many benefits for humans and nature. The main advantages can be summarized in the following four categories:

1) Protection of the marine ecosystem's structure, function and integrity
2) Fisheries management / sustainable management of natural resources
3) Education and research
4) Leisure / Tourism

Moreover, they allow within MPA, the restoration of exhausted populations, the protection of breeding population and the safeguarding of genetic resources and biodiversity. Besides that it has several positive impacts on nature, it can also be immediately profitable to humans. Furthermore, through marine protected areas is promoting the sustainable management of fish stocks and the reduction of overfishing. Consequently, long-term, the yields may increase, leading to higher incomes for local fishermen. Additionally, MPA can be an ideal location for scientific research that results in improved understanding of marine ecosystems.
Due to lack of proper managerial and financial planning, proposals for marine parks and MPAs were not implemented as the funding was insufficient, but also in cases where there was funding, was not made proper management of public resources in general. Environmental protection is necessary to be part of all priorities of the state, but also to be based on local operators who can express and negotiate for the economic interests of local communities.

3.4 Protection of sea and prosperity of local communities

Can in some areas to be prohibited to fish and fishermen to be happy? Yes, because if this will be done in collaboration with fishermen, it will be accompanied by complementary measures aiming to natural restocking of the sea and this will create additional incomes.

In Italy, they realized it and in recent years they give great emphasis on the creation of marine protected areas with the following views: the restoration of marine biodiversity, the wealth of the sea and the ensuring of local welfare, and especially of the profession of coastal fishermen. The creation of marine protected areas may contribute to conservation of marine biodiversity and the long-term prosperity of local areas. The management of these regions requires, however, administrative shapes and policies that will take into account all the human activities which affect marine life.

Despite the large coastline and the endless distances of the oceans, marine ecosystems are often closely associated one with each other as the activities which take place ashore. The seawater is about 800 times denser than air, and thus, has a much greater ability to suspend, support and carry particles, pollutants, small or large organisms.

For this reason, there is an even greater need, compared to the mainland, to create Marine Protected Areas which are an integral part of the wider management, protection and sustainable use of the natural resources in each country.

4. GLOBAL SITUATION

The networks of Marine Protected Areas are part of the solution but not a solution themselves. It needs to exist also policies for the broader management of the seas.

Today, only the 1% of the oceans is being protected. Part of the measures needed, is an increasingly urgent international action in order to establish a global system of representative networks of marine protected areas by 2012 [4]. This goal was set by the international community in 2002 in Johannesburg at the World Summit on Sustainable Development of the United Nations (WSSD). The World Commission on Marine Protected Areas (WCMPA), although it needs considerable strengthening and participation of more areas, it promotes this goal. At the moment, 4 of the 18 peripheral regions in which the planet divided (see the relevant map), participate with one peripheral coordinator.

In particular, the percentage of the Mediterranean area (2.510.000 km²), which is under protection (95.660 km²) is only 3.8%, while the rate of the protected coastal areas (9.910 km²) is only 0.4% of Mediterranean's surface. This percentage deemed very small since the coastal zone and the Mediterranean region in total are very important for the maintenance and reproduction of fish stocks.

4.1 Marine Protected Areas in Europe

In Europe, as well as in other parts of the world, concerns about the continuing degradation of marine biodiversity have been increased. Losses of marine species, exploitation of commercial fish stocks' populations and increase of human intervention in marine ecosystems require an immediate management response [11].

Nevertheless, for the time being, oceans around the world are still largely unprotected. It is estimated that less than 1% of the Earth's oceans are under protection regime. Since, it is generally accepted that marine biodiversity [7] plays a fundamental role in supporting a wide range of ecosystem goods and services, there have been made efforts to preserve ecologically valuable marine species.

Nowadays, the establishment of Marine Protected Areas (MPAs) is recognized by most countries and regions of the world as an important tool for the conservation of marine ecosystems. In Europe, the implementation of MPAs is accompanied by several international, EU and regional initiatives and commitments.

CONCLUSIONS

By the elements set forth above, it is concluded that Marine Protected Areas (MPAs)[4] act only for the benefit of the respective regions and local communities. They offer a double benefit both on the conservation and protection of the marine environment and also, at local level, by offering benefits in all areas of human activity with most notably field the tourism [9].

But unfortunately, in Greece there is not any developed network of marine protected areas like the ones existing in other European countries (France, Italy, Croatia), America and Australia.

It is therefore imperative that local authorities in cooperation with local politicians and residents of marine areas with significant environmental and biological interest, to exert pressure to all directions and particularly to the relevant state institutions, in order to be implemented the marine protected areas.

Greece is a country endowed with the longest coastline in the Mediterranean, with many islands habitable throughout the year, with the cleanest and award-winning waters in the Mediterranean and has to create as soon as possible MPAs, the benefits of which will appear in a very short period after their creation [6].

In defiance therefore, of the difficult times Greece is going through, can make the big step towards the protection of the marine environment consciously, while enjoying immediately the huge benefits, economically and not, arising in all sectors of human activity [8]. Doing so, will enhance its international position and combined with the already increased tourism will become a global point of interest.

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Risk Quotient Based Analysis on the River Health: Case Study of Kelang River, Malaysia

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Abstract

The health of a river is paramount of importance, mostly as the source for water treatment plant, irrigation and local community livelihood. The rapid development in Malaysia not only changes the neighbouring land use but also put a strain on the waterway's ecological state. The River Kelang flows right down in the middle of Kuala Lumpur, whereby its health is frequently monitored. This study attempts to investigate the feasibility of a temporal risk quotient (RQ) based analysis on establishing an accurate assessment of the water health. We focus on the evaluation of water quality using existing datasets of Biochemical Oxygen Demand (BOD), Chemical Oxygen Demand (COD), Total Suspended Solids (TSS) and ammonia. The temporal risk quotient is calculated for each parameter based on the Malaysian National Water Quality Standard (NWQS). The analysis of ammonia pollution is not only based on design limit for the river but also was extended to three other standards including for raw water for the treatment plant, human health and fish population. The temporal health of River Kelang was evaluated using the Risk Matrix Approach (RMA) based on the frequency of RQ > 1 and associated impacts. Using the developed RMA, the risk hazard for each water quality parameter was assessed and mapped using the Geographic Information System (GIS). The risk hazard mapping can be used as a preliminary basis for cost-effective countermeasures and future development.

Keywords: Risk-Quotient Analysis, River Health, Kelang River.

1. INTRODUCTION

In many developing countries including Malaysia, rapid development poses a negative impact on the health of the river due to uncontrolled point and non-point source pollutions. It is important to evaluate the health of a river to ensure ecological balance for aquatic habitats, good water quality and continuous supply of water to meet the domestic demand. The Department of Environment [1] reported that in Peninsular Malaysia, there are 275 clean rivers, followed by 150 slightly polluted rivers and 39 polluted rivers. This finding shows that the number of polluted rivers is still high. River water quality is evaluated using several physical, chemical and biological parameters. Sawyer et al. [2] mentioned that physical parameters may include total suspended solids (TSS), total dissolved solids (TDS), turbidity and pH. Chemical parameters considered in water quality are dissolved oxygen (DO), biological oxygen demand (BOD), chemical oxygen demand (COD), total organic carbon (TOC), ammonical nitrogen (AN), nitrite (NO_2-N) and nitrate (NO_3-N) nitrogen, phosphorous, heavy metals and minerals and pesticides. Biological parameters include total coliform, faecal coliform, Escherichia Coli, enterococci, phytoplankton, algae and macroinvertabrates.

The physical, chemical and biological parameters listed above are extensive and the measurements can be very expensive. Therefore, the most commonly used method to evaluate the health of a river is water quality indices (WQI). WQI is a favourable technique because it gives a single numerical value to indicate the condition of the river. In

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Malaysia, the estimation of WQI is based on several selected physical, chemical and biological parameters, i.e. TSS, BOD, AN, COD, DO and pH. Examples of the latest studies in WQI include Bertam River [3], Semenyih River [4], Sri Melaka River [5], Langat River [6] and Klang River [7].

The work of Othman et al. [7] gathered 11 years of monthly WQI data, i.e. 1997 to 2007 from Klang River. Trend analyses of the time series were done using first-order autocorrelation model. The initial and final values of either the moving average or the trend model were used as the estimates of the initial and final WQI at the stations. They found that the WQI for the upstream part of Klang River is good. Additionally, the water quality at Klang River has improved between 1997 and 2007.

Nayan et al. [8] did an extensive study on the trend of water quality and pollution in the coastal zone in Perak. Nurul-Ruhayu et al. [9] and Kozaki et al. [10] concentrates on the pollution of the river in Pulau Pinang and Kuantan, respectively. An extensive study was done in Pulau Pinang by Nurul-Ruhayu et al. [9] on WQI. A total of 11 rivers was selected, i.e. Teluk Bahang River, Batu Feringgi River, Pinang River (Balik Pulau), Pinang River (Georgetown), Kongsi River, Burung River, Dua Besar River, Betong River, Teluk Kumbar River, Bayan Lepas River and Keluang River. Water quality monitoring was done from October 2012 to January 2013. Only three rivers, i.e. Pinang River (Balik Pulau), Kongsi River and Betong River were found to be slightly polluted, with an estimated WQI value between 63 and 72. The WQIs for the other eight study areas were below 60 and therefore categorised as polluted rivers.

The classification of WQI is highly related to the land use of the catchment. For example, Kannel et al. [11] used four WQIs to classify the Bagmati River and its tributaries in Nepal in order to evaluate the impact of urbanization in the study area. The four WQIs are WQI (18 parameters), WQI_{min} and WQI_{m} (temperature, pH, dissolved oxygen, electrical conductivity and total suspended solids) and WQI_{DO} (dissolved oxygen only). They found that the concentration of nitrate is increasing in rural areas which indicate that the main sources of pollution are sewage and fertilizers. Urban areas are highly affected by untreated municipal sewage. Similar studies were conducted by Suthar et al. [12], Alobaidy et al. [13], Al-Badaii et al. [4] and Lim et al. [14].

Lim et al. [14] examined the relationship between land-use and the water quality of rivers in Pulau Pinang. They found that Pinang River, Keluang River and Burung River were slightly polluted or polluted. Additionally, the level of pollution is highly related to the land-use surrounding the rivers. For example, the concentration of TOC is high in Pinang River, which indicates municipal wastes from the housing areas within the catchment, while Keluang River and Burung River showed high TOC concentrations in locations where discharge from a sewage treatment plant was found and river flows through the paddy fields, respectively.

In order to improve the river water quality in Malaysia, strict policy and regulations should be implemented. Mamun and Zainudin [15] reviewed the existing procedures and guidelines related to the protection of the river water quality in Malaysia. This study concluded that the Environmental Quality Act (EQA) may not be adequate to achieve good river water quality as required by the National Water Quality Standards (NWQS) mainly because AN was not considered in the EQA as a monitoring parameter until the new regulations were published in 2009. They also recommended that monitoring requirements and water quality standards should be reviewed periodically to ensure sustainable and good quality water resources. Another study conducted by Afroz and Rahman [16] reviewed the environmental policy related to water pollution and studies related to water pollution and health impacts.

As discussed in previous paragraphs, extensive studies in water quality monitoring, the relationship between land-use and the water quality of rivers, reviews on the existing procedures and guidelines related to protection of the river water quality, water pollution and health impact in Malaysia have been reported in the literature. However, the analysis of a temporal risk quotient (RQ) based analysis to assess the water health received less attention by Malaysian researchers. Therefore, this study attempts to investigate the feasibility of a temporal risk quotient (RQ) based analysis on establishing an accurate assessment of the water health. The focus of this study is the evaluation of water quality using existing datasets of BOD, COD, TSS and ammonia. The temporal risk quotient is calculated for each parameter based on the NWQS. The analysis of ammonia pollution is not only based on design limit for the river but also was extended

to three other standards including for raw water for the treatment plant, human health and fish population. The temporal health of Kelang River was evaluated using the Risk Matrix Approach (RMA) based on the frequency of RQ > 1 and associated impacts. Using the developed RMA, the risk hazard for each water quality parameter was assessed and mapped using the Geographic Information System (GIS).

2. METHODOLOGY

The water quality data is obtained from the quarterly routine environmental monitoring of Kelang River from the year 2005 until 2014. The water parameters used include Biochemical Oxygen Demand (BOD), Chemical Oxygen Demand (COD), Total Suspended Solid (TSS) and Ammonia-Nitrogen (NH_3-N). Water Quality Index (WQI) lies within the range 39 - 72 and varied between polluted to clean. The low WQI values at certain tributaries are expected considering the Kelang River flows along the densely populated and highly developed capital Kuala Lumpur. All water quality analysis was done in an accredited laboratory, following the standard protocol and procedures.

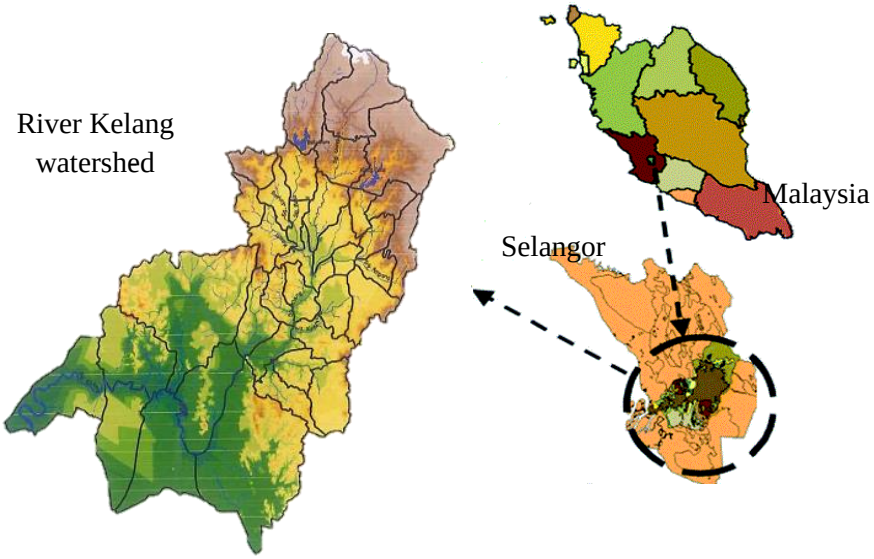

Figure 1 The River Kelang watershed

Six sampling points from the upstream tributaries of Ampang, Semeluh, Gombak, Batu, Jinjang and Keroh Rivers were selected to assess the environmental risk posed on the Kelang River. Table 1 shows the details of sampling stations, equipped with their coordinate, name of the river and the states.

Table 1 The associated details for water sampling stations

Station No.	Latitude	Longtitude	Name of river	State
1K10	03 12 466	101 45 381	Semeluh	Selangor
1K19	03.10.199	101.41.499	Batu	KL
1K20	03 14 153	101 40 790	Jinjang	Selangor
1K22	0312 089	101 40 471	Keroh	KL
1K23	03.09.826	101.45.137	Ampang	Selangor
1K24	03 17 038	101 43 802	Gombak	Selangor

2.1. Study area

Kelang River basin started from the upstream of Gombak District, in the Titiwangsa ranges with the highest elevation 1,330 from mean sea level. The main river flows through Selangor state and Kuala Lumpur into the Malacca Straits. The total length of Kelang River is 120 km with approximately 80 km in the Selangor state and 40 km stretch in the Kuala Lumpur. The catchment size of Kelang river basin is 1,288 km^2. Kelang River is basin recognised as the highly developing and densely populated area in Malaysia. The upper catchment of Kelang River is still mountainous and covered by some tropical forest, meanwhile, middle and lower catchment of Kelang River are urbanized area of Kuala Lumpur and Petaling Jaya.

2.2. Risk quotient based analysis

The focus of risk assessment conducted here is on the health of Kelang River as it posed impacts on human health and water resources. RQ method is useful for screening purposes and provides one point evaluation of environmental risk. Identified possible polluters are due to anthropogenic activities such as wastewater discharges from both industrial and domestic and improper solid waste management. Despite given infrastructure and numerous campaigns from the Government, the waste management remains a battle due to lack of cooperation from local communities [18].

The deterministic risk quotient approach was chosen to provide a comparison of the environmental exposure. The approach is based on the measured or predicted environmental concentrations (MECs or PECs) to the predicted no-effect concentrations (PNECs) as

$$\mathrm{RQ} = \frac{\mathrm{MEC\ (or\ PEC)}}{\mathrm{PNEC}}. \qquad (1)$$

Given the temporal data with varying ranges, a worst case scenario is obtained by employing the highest MEC, whereas the low risk is assessed based on the lowest MEC. The averaged MEC value provides the baseline risk characteristics of the specified area.

In this study, the MECs values obtained are used as the environmental parameters. The most important aspect is the adaptation of PNECs. As the government is striving hard towards improving the health of Kelang River by implementing a strict protocol where the discharged effluent must meet the modified Standard B, this study adopted PNEC values under the Class IIA in the Standard National Water Quality. The analysis was extended to pay more attention to the ammonia toxicity by systematically increased the PNEC values based on the guideline set for water intake, human health and ecosystem (by taking fish as general species). The associated PNEC values used are as tabulated in Table 2.

Table 2 The standard value used to calculate the risk quotient. Parameters of BOD, COD and TSS were evaluated using the values from Class IIA, Standard National Water Quality.

Parameter	PNECs (mg/L)
BOD (Class IIA) (DOE)	3
COD (Class IIA) (DOE)	25
TSS (Class IIA) (DOE)	50
NH_3 (Class IIA) (DOE)	0.3
Water Intake (MOH)	0.5
Effect on health (WHO, 2003)	1.5
Fish (EPA, 2013)	2.39

The statistical RQ values for each sampling point and temporal was calculated including min, maximum, mean and standard deviation. The magnitude of RQ determines the quantisation of the risk agent on effect based on the Risk Matrix developed in Table 3. When RQ value < 1, no adverse effect is presumed, whilst the impact becomes more significant as RQ value becomes $\gg 1$. The impact for COD, BOD and TSS are categorised into three, i.e. low, moderate and high, where the hazard for each point is identified based on the frequency of occurrence. In this study, RQ < 2 and < 3 are considered as low and moderate, respectively whilst the unacceptable high impact is when the RQ values are ≥ 3.

Table 3 The Risk Matrix Approach Table for parameter COD, BOD and TSS

Impact/Frequency	Low (1< RQ < 2)	Moderate (2 ≤ RQ < 3)	High (RQ ≥ 3)
freq≥ 0.7	Y	R	R
0.3 ≤freq< 0.7	G	Y	R
freq< 0.3	G	G	Y

*G, Y, R indicate green, yellow and red, respectively.

Table 4 The Risk Matrix Approach for parameter ammonia NH_3-N.

Impact/Frequency	Low (River Health)	Moderate (Water Intake)	High (Human Health)	Very High (Fish Ecosystem)
Freq ≥ 0.7	Y	R	R	R
0.3 ≤ freq < 0.7	G	Y	Y	R
Freq < 0.3	G	G	Y	Y

*G,Y, R indicate green, yellow and red, respectively.

The categorisation of the hazard on ammonia-based pollution was assessed based on Table 4. The categorical hazard was done using the increment values of ammonia pollution on the river, possibility as water intake, the effect on human health and ammonia toxicity on the fish ecosystem. Each river is assessed on its level of impact and been given associated hazard colour based on three colours i.e. green, yellow or red, where red indicates contaminated belt.

To provide a visualisation of the health of upstream tributaries of Kelang River, hazard GIS-based maps were constructed. Major issues highlighted here are organic pollution (from both measured COD and BOD values), sediment pollution (based on TSS values) and effect from high ammonia concentration. Assessing the river health using hazard maps provide a holistic overview of the status of historical-based water quality.

3. RESULTS AND DISCUSSION

This section describes the assessment of upstream tributaries of Kelang River on the organic, sediment and ammonia pollutions.

3.1. Organic Pollution

The results for organic pollution within the six tributaries of Kelang River will be first discussed. Table 5 shows the statistical RQ values based on BOD and COD.

Table 5 The risk quotient analysis for BOD and COD

Station No. (River)	1K10 (Semeluh)	1K19 (Batu)	1K20 (Jinjang)	1K22 (Keroh)	1K23 (Ampang)	1K24 (Gombak)
BOD						
RQ min	0.333	0.667	0.667	0.333	0.667	0.333
RQ max	2.667	11.667	8.667	6	6.667	1
mean	0.928	3.524	2.333	3.127	2.99	0.508
std	0.434	2.314	1.387	1.311	1.703	0.198
COD						
RQ min	0.2	0.6	0.4	0.6	0.56	0.16
RQ max	1.76	7.12	3.32	3.04	3.52	1.52
mean	0.764	1.827	1.464	1.622	1.705	0.593
std	0.468	1.174	0.69	0.592	0.695	0.349

The maximum RQ is within the range from 1 to 11.67, with the highest organic pollution is from Batu River, followed by Jinjang River. In general, it is expected that organic pollution into the River Kelang comes from Batu, Jinjang, Keroh

and Ampang Rivers based on the mean RQ values. It is interesting to note that the organic pollution has the highest RQ max, indicating that potential polluter is from domestic wastewater or animal husbandry farms.

Tributaries of Semeluh and Gombak Rivers have RQ mean < 1, indicating the water can be said free from organic pollution. Furthermore, the RQ max only reached a high value of 2.7 and 1 for BOD and 1.8 and 1.5 for COD recorded at sampling locations of Semeluh and Gombak Rivers, respectively.

The hazard maps in terms of organic pollution were plotted in Figure 2 for both BOD (Figure 2a) and COD (Figure 2b). Both maps showed that middle tributaries are green and the source of organic pollution came from the North-West (catchment of Batu River) and North-East sides of the Kelang River which is the catchment of Ampang River (marked as red).

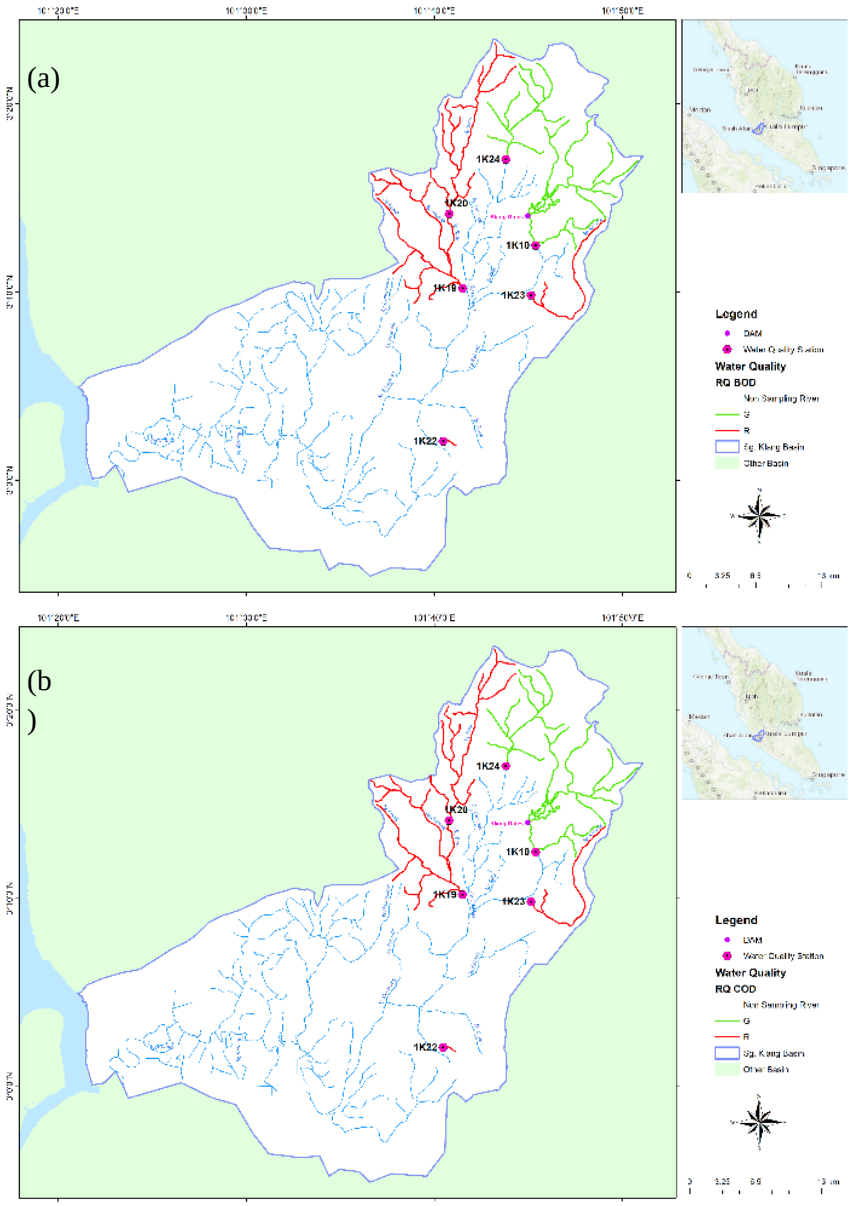

Figure 2 Classification of upstream tributaries of Kelang River on organic pollution. Figures show (a) BOD and (b) COD.

3.2. Sediment Pollution

High concentration of suspended sediment into a water stream or river creates unwanted downstream sedimentation, which does not only affect the local ecosystem but also reducing the effective discharge capacity for the river. Table 6 lists the statistical RQ values using the data of TSS. Data shows that despite the highest RQ max obtained for suspended solid pollution is 31 (at Jinjang River), the sediment pollution is not as significant, as mean RQ lies within 0.2 to 3.

Table 6 The risk quotient analysis for TSS

Station No. (River)	1K10 (Semeluh)	1K19 (Batu)	1K20 (Jinjang)	1K22 (Keroh)	1K23 (Ampang)	1K24 (Gombak)
RQ min	0.04	0.26	0.16	0.26	0.08	0.018
RQ max	8.2	11.74	31	3	4.56	0.86
mean	0.587	1.902	2.976	0.783	0.929	0.187
std	1.203	2.419	6.332	0.61	1.008	0.196

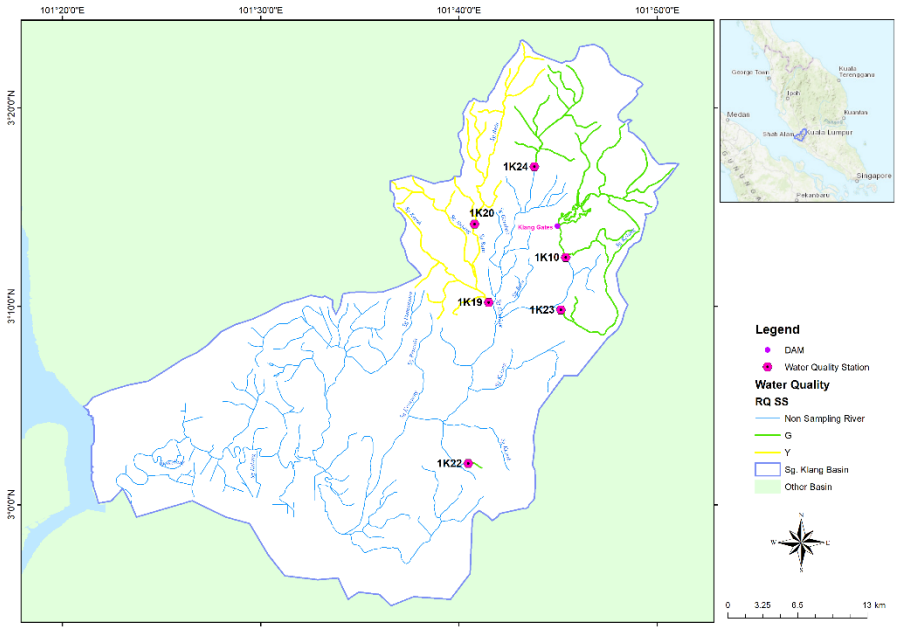

Figure 3 Classification of upstream tributaries of Kelang River on Total Suspended Sediment

The hazard map to show the tributaries status on whether the water stretch is prone to sediment pollution is depicted in Figure 3. It is interesting to note that the influence of sediment pollution on this river is rather insignificant. All tributaries assessed were either green or yellow. The sub-catchment of Jinjang River houses industrial and commercialisation buildings.

3.3. Effects of Ammonia

Recall that the effect of ammonia on the Kelang River is based on the previously described Risk Matrix with four variations of PNECs. The results of statistical RQ values for ammonia pollution are tabulated in Table 7. Based on the analysis conducted for river health (with PNEC NH_3 is 0.3 mg/L), the maximum RQ values can spike up to 94 and the mean RQ values for Batu, Jinjang, Keroh and Ampang Rivers are > 9, the analysis is extended to evaluate the ammonia pollution in water intake, human health and fishes.

Table 7 The risk quotient analysis for NH_3 based on river health, water intake requirement, the effect on human health and fish.

Station No.	1K10	1K19	1K20	1K22	1K23	1K24
(River)	(Semeluh)	(Batu)	(Jinjang)	(Keroh)	(Ampang)	(Gombak)
River health						
RQ min	0.033	0.267	0.033	3.4	4.3	0.033
RQ max	4.867	28.567	16.567	33.667	94	2.333
mean	1.686	15.798	9.237	21.609	17.605	0.262
std	1.057	6.482	5.357	7.236	16.757	0.374
Water intake						
RQ min	0.02	0.16	0.02	2.04	2.58	0.02
RQ max	2.92	17.14	9.94	20.2	56.4	1.4
mean	1.011	9.478	5.542	12.965	10.563	0.157
std	0.634	3.889	3.214	4.342	10.054	0.225
Human health						
RQ min	0.007	0.053	0.007	0.68	0.86	0.007
RQ max	0.973	5.713	3.313	6.733	18.8	0.467
mean	0.337	3.16	1.847	4.322	3.521	0.052
std	0.211	1.30	1.071	1.447	3.351	0.075

Fish						
RQ min	0.004	0.033	0.004	0.427	0.54	0.004
RQ max	0.611	3.586	2.079	4.226	11.8	0.293
mean	0.212	1.983	1.16	2.712	2.21	0.033
std	0.133	0.814	0.672	0.908	2.103	0.047

In general, only water from Gombak River is clean and obeys the standard. The tributaries of Kelang River are obviously not fit as water resources as the mean RQ values can go as high as 13 (at Keroh River). The treatment process required to treat the water to meet the drinking standard guideline is not cost-effective and high frequency of plant shutdown is anticipated should Kelang River is used as water intake point.

Contact with the human is also not advisable for the tributaries of Batu, Jinjang, Keroh and as the mean RQ values are more than 1.5, suggesting that the waters are not suitable for recreational activities. This is quite alarming as there are few illegal settlements in these areas and the possibility of contact is high.

Unionised ammonia NH_3-N is more toxic than NH_4^+-N to aquatic species particularly for benthic invertebrates (Li, 2017). Two common fish species in the downstream are Poecilia Reticulata (known as Gupi) and Plecostomos Punktatus (is Bandaraya), with the Genus Mean Acute Value (GMAV) of NH_3-N are 0.12 and 0.7 mg/L, respectively. Thus, if the GMAVs are taken as the PNECs, the RQ values should approximately be within the RQs for water intake and human health. Based on this, those species do not survive in rivers of Batu, Jinjang and Ampang.

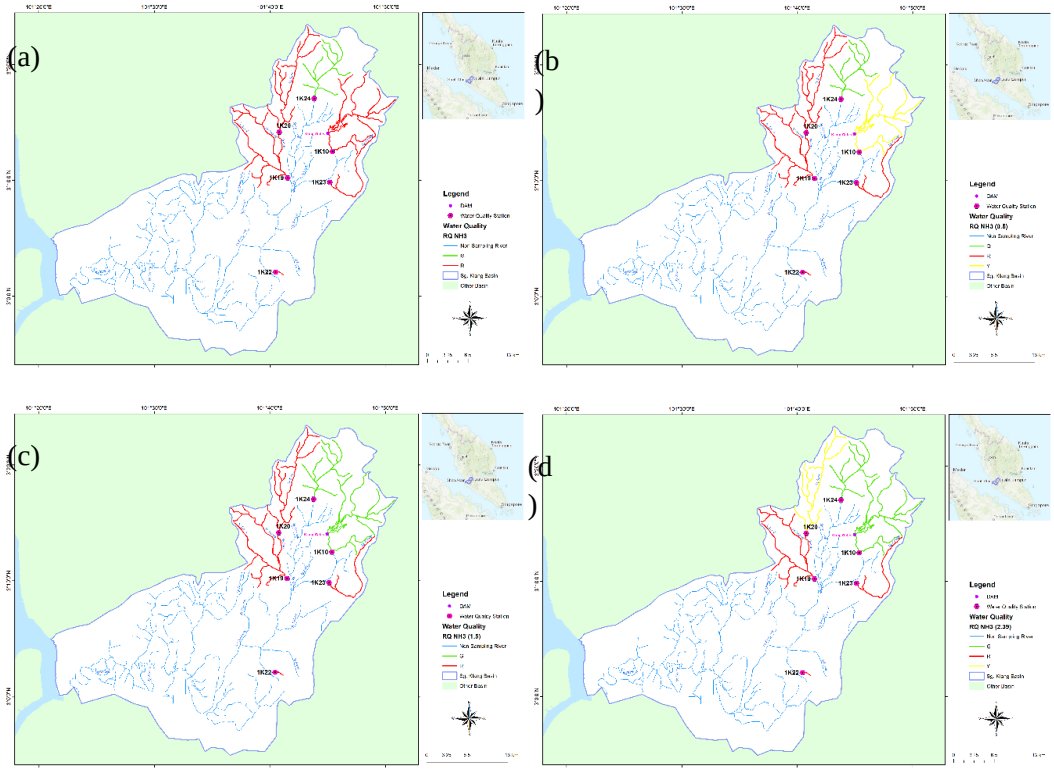

Figure 4 Classification of upstream tributaries of Kelang River on ammonia pollution based on (a) river health (b) water supply requirement (c) human contact and (c) toxicity on fish.

The ammonia hazard maps in Figure 4 showed that the upstream tributaries of Kelang River are not healthy except the upstream of Gombak River (where the sample 1K24 was taken). The incoming waters from the left sub-catchment of Batu and Ampang Rivers from the right side are severely and consistently polluted with ammonia.

Based on Figure 4(b), Kelang River is not suitable as water intake where only the upstream of Gombak River is green. As here is upstream and located further away from the capital, abstraction of water for drinking water treatment is not cost-effective, unless for localised uses only.

Human contact is acceptable for Gombak and Semeluh Rivers. Based on Figure 4(b), the transition of green for the upstream of Ampang River indicates that the level of ammonia pollution is lower than the sub-catchment of Batu River. This is supported by Figure 4(b), where higher PNEC value set for toxicity on fish ecosystem on managed to give the yellow code for River whereas Ampang River and Batu River remained red and not habitable for fish, at least for the common freshwater fishes.

4. CONCLUSION

Tributaries from Kelang River have highest ammonia pollution followed by organic/inorganic and sediment. It can be said that Ampang and Batu Rivers are significantly polluted compared to other rivers discussed in this study. The visualisation of the river status using GIS-based maps and colour coded based on risk-quotient analysis provides better insight into the revival and remedial plan of Kelang River. Exhaustive and costly work in cleaning both Ampang and Batu are foreseen, whilst Jinjang River falls below those two rivers. Semeluh River has a slightly better river status and the cleanest river discussed here is River Gombak.

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Biography: Brief curriculum vitae should also be provided for the presenting author at the end of the paper.

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