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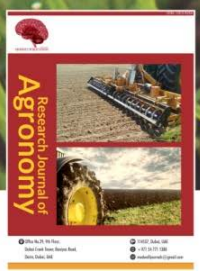

The Change in Environmental Status by Expands the Coverage Area of Tourism Activities

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Abstract: The purpose of this study is to determine energy consumption of output and input and investigated their effects on ecosystem in a tourism zone in North of Iran. We are interest to know how much energy produce and how much of them consumed. The Mazandran province in South part of Caspian Sea has main potential for production with suitable land, enough water and good soil. The first part of our discussion is about agri-food sector that have important part in economic development because of its great role on public health. In this area, the most cultivation product is related to industry products with 38.6%. In fish culture sector Mazandaran has 664 numbers of warm water fish culture with beneficial extent of 2362 ha warm water fish, 26.6 ha cold water fish and 12678 ha natural resource. Recently by increasing the population in this area, the ground which allocated to build houses, increased about 24%. To substitute the land for building, a part of forest and agricultural area were used. By comparing the data during a decade about 360 ha of green land were used for this purpose. The population growth leads to increasing demand for food and shelter. In this respect the area for compensate the increase population just during two recent year is estimated to be 670 ha. On the other hand traveling to Mazandran province to use its favorite weather is increasing, therefore energy consumption is increased. All of these trend results in increase demand for fuel consumption and CO_2 generated.

INTRODUCTION

This study was done to assess the basic information related to status of footprint and energy consumption in Mazandran province in North of Iran. Every person that lives on planet uses some of foods and energies. Earth's ecosystem has related to amount of resources enter for our life as consumption and out of our life as waste. Consumption of water and land resources is increasing as a consequence of population growth. The Ecological Footprint is a well known resource accounting tool that measures how much biologically productive land and

water area an individual, a city, a country, a region or humanity uses to produce the resources it consumes and to absorb the waste it generates, using prevailing technology and resource management. It is necessary to careful calculations of how people dispose of their waste how much is recycled how their waste impact the ecological situation. In ideal form in a certain place the waste of people should not be more than the production. However, because the amount of produced waste is directly affected by the amount of resources every person consumes, therefore investigation of culture and nurture level is important. Two things are essential in calculating; Produce the resources for consumer's demands and amount of recycle that produce. Ecosystems for survey need to instant area that provided products and recycled waste. Functional land and water ecosystem is important because land and water area supports significant photosynthetic activity and also accumulate of biomass used by humans. Large amounts of energy related to non-renewable resources. Fuels such as oil and gas were consumed to drive the whole supply chain and could deteriorate the ecosystems. These resources cause the air and water pollution and again back to functional ecosystem. Ecological footprint by using of existing energy resources analyses food, shelter, mobility, goods and services often with further resolution into sub components consistent categorization across studies allows for comparison of the footprint of individual consumption components across regions and the relative contribution of each category to the region's overall footprint. In the present study, we aim to have a glance the energy consumption trend in recent years in a green-land province in North of Iran. This pre-investigation gives the basic information to have footprint investigation in our next studies.

Geography of the study zone: Mazandaran province located in South of Caspian Sea. Mazandaran is one of the most densely populated provinces in Iran and has diverse natural resources, especially, large reservoirs of oil and natural gas. The province's four largest cities are Babol, Amol, Sari and Qaemshahr. Mazandaran is a major producer of farmed fish and aquaculture provides an important economic addition to traditional dominance of agriculture. Another important contributor to the economy is the tourism industry as people from all of Iran enjoy visiting the area. Mazandaran is also a fast-growing Centre for Biotechnology and Civil Engineering.

MATERIALS AND METHODS

Based on the description of Wiedmann and Barrett, Ecological Footprints (EF) are allocated to detailed household consumption activities following the COICOP classification system and to a detailed breakdown of capital investment. Therefore in the present study to access the basic information for energy consumption, at first the main ecological footprint components is to determine how much of the planet must be dedicated to sustaining our life style and then the amount of capacity for production is calculated. The EFA estimates the area of ecosystems required to support a specified population at a given level of consumption (Rees, 2000). Thus, Rees define the EF of the population, as the area of productive ecosystems that the population requires on a continuous basis to produce the resources it consumes and to assimilate the waste it produces wherever on Earth the relevant terrestrial or aquatic ecosystems may be located. For determining the energy consumption we scored the data based on Barrett (2001). However, some information that was not compatible were modified and presented. The main components that determine energy consumption are. Food (what a person eat), Goods (the goods a person buy). Shelter (the house a person live in it) and mobility (the way a person travel).

Increase in energy consumption is reflected in increased productivity. Agriculture, including water consumption, is also analyzed along these same lines. Study of energy consumption is important to evolution a situation of an area we are living and give the basic data for government for their management. Data of present work came from a number of sources including international sources, national sources and local sources (Publication related to Governor organization). Reading and suggestion from other related studies from around the world helped to complete the database are mainly from Barrett and Scott (2003). By assembling these sources it was possible to estimate the energy consumption of green-land of North of Iran.

RESULTS AND DISCUSSION

The aim of the present work was to have a preliminary quick look in an area of south Caspian Sea where an agricultural zone but recently their population is increased noticeably and to have basic information for future study in concern of footprint analysis. We want to describe energy cycle and suitable correlation between production and consumption of energy in distinct area. This area has varied resources and potential for rapid economic development. By interpretation of data of different food spent, we may point on the amount of material which people would like to consume in this area. This specific study confirms that not only how much is being consumed and what is being consumed in this area of country but also production processes and methods could influence ecological impacts, accounting to consumer trends and the increase in production.

How much food do people eat?: Global agriculture is the major worldwide system of food production. It includes agricultural lands, agricultural inputs, agricultural production and consists of two main parts: plant cultivation and cattle breeding (Ton, 1997). Agri-food sector is important part in economic development because it has great role on public health directly and indirectly made a valid environment to production of nutritionally better food. Most of Mazandaran total surface area is suitable for agricultural activities. This area has worthy soil and adequate water, thus, most of land is under cultivation. The government encourages farmers in agriculture sector especially to produce wheat by suitable assistant such as increasing the insurances of agriculture products. Before reviewing the statistical product I should emphasis that many of rural community will prepare their necessary demand in yard and small garden in their home (e.g., chicken, duck, ship, milk, bread, etc.) that its data is not considered in our present study. The study area is important part in agriculture activity with 402000 ha of land and 11945 ha of water surface for production aquatic animals. In the year of 2011, the total population was 783734 families or 3073943 people with growth coefficient 1.16%, thus, this topic show growth population is raising. The statistical data about agricultural inputs and agricultural production in study area are as follow:

The first part of discussion is about food such as bread, chicken, milk, etc. and amount of material consumption. Food is any substance consumed to provide nutritional support for the body. It is usually of plant or animal origin and contains essential nutrients such as carbohydrates, fats, proteins, vitamins and minerals.

In fact we want to show the kinds of food that people prefer to use. Quality and quantity of this material has influenced on consumers because food has important role and big part of life cycle. These food estimates are based on the high ecological cost of modern food production method. The model allows further structure of food production and the patterns of food consumption were firmed. Table 1 give us some initial information for demonstrated our results.

Statistics show what kind of food material has more customers. Base on the existence data the most important food for consumer is bread and rice with 57.6% (Table 1). The next is milk and dairy product (19%). These materials are staple food. Rice, dairy products and bread are the most important daily food product. Although, milk is daily drink and is necessary for everybody but our findings show milk consumption are decreasing recently while other product of milk is increasing. Population of Mazandaran in 2011 was 3073943 person, based on estimation, the average person consumed roughly 8.7 kg of bread per month and 104 kg per year,

Table 1: Kinds of main material that people like to consume in 2011 (for each person, per year)

Kind of food	Consumption (%)	Coefficient	Total amount of consumption (ton)
Rice	11.07	2.8	116810
Bread and wheat	46.6	3.5	491830
Meat	4.9	-	33810
Chicken	3.20	2.1	52260
Fish and shell fish	3.50	-	36890
Cereals	2.91	1.3	30740
Vegetable and fruit	8.75	0.6	92220
Milk and their products	19	0.2	1998060

Table 2: Status of wheat farming and production (2001-2011)

Years	Extent of farming (ha)	Production (ton)
2001	93985	34873
2002	130934	38391
2003	201361	55169
2004	183272	58577
2005	143234	52000
2006	140665	42000
2007	120000	52000
2008	128730	52000
2009	186586	55000
2010	199672	57000
2011	196025	59000

Statistical of Mazandaran in 2011

thus, annually bread consumption is estimated 320000 ton for person. Overall, wheat productions and their products with rice are very essential in comparison to other food. After meat with 4.9 % and chicken 3.20%, vegetable by 8.75% and fish with 3.50% have another essential food in people, food chain. Cereals with 2.91% have less consumption in distinct area. Fruit and vegetable are daily food demand but some person doesn't like them to eat however it consists of 8.75% of total amount of consumption (Table 1). In general 64849 m^2 is extent of ground to produce fruits. Based on interest of government, wheat production is very important for Iran economy, therefore, it is encourage specifying more ground for these valuable products. Such as bread, in this area rice is important foods and has especial niche in daily food cycle.

In recent years, the production has been increased steadily and the production of agriculture ground accounted for existence population is approximately 2929432 persons. In spite of increasing in production (Table 2), meanwhile food demands such as wheat, rice is more than the production and land allocated for production for this material. Meat such as wheat have especial niche in food cycle, number of husbandry is increasing at present time. Their capacity are 69749 and chicken is 3165774.5.

Table 3 shows the use of bread and their products have increased about 100% during the last 5 years. In general there is a significant increase in all material consumed from 2006-2010, however, the type and amount of consumption is different year by year.

Table 3: The comparison of 5 years material consumption per family

	Values				
Parameters	1	2	3	4	5
Kind of food (kg)	2010	2009	2008	2007	2006
Bread and their products	22331	20970	11387	12682.9	10888
Meat and chicken	31711	33947	43526	48435	22528
Fish and shell fish	2043	2328	3582	4299	936
Fruits and dried fruits	4423	6375	9385	10534	3006
Vegetable and cereals	8472	8348	9530	1058	579

Statistical of Mazandaran in 2011

Table 4: Statistics production and land used for rice cultivation (2001-2011)

Years	Extent of ground (ha)	Production (ton)
2001	237000	1330000
2002	237000	1420000
2003	237000	1420100
2004	215000	1244850
2005	215000	1244850
2006	239000	1393753
2007	239000	1419874
2008	235351	1354112
2009	239000	1381296
2010	239000	1332089
2011	236406	1439425

Statistics of Mazandaran Agri-Jahad Ministry in 2011

Rice is one of the oldest plants after the wheat that has the highest under cultivation of world's agricultural land but in terms of energy production is the first in world ranking and it's cultivation in many regions relatively high water is extended in recent years (Ittersum and Rabbinge, 1997). According to statistical Center of Iran, cultivation of rice in Iran was 615 thousand hectares in 2010 with average production of 4764 kg ha^{-1}. The study area have the most rice cultivation land in Iran with 33.4% of the total area under cultivated (Karbasi *et al*., 2012).

Ten years statistical show, rice consumption has more increased and therefore amount of production and extent of land that under exploitation have increased too (Table 4). Consumption of rice in 2011 was 35-38 kg per person.

Extent of agriculture land in 2011 at distinct area is 360657 ha, garden is 64849 ha, forest land is 1107255 ha and desert 1086 ha.

According to food demand of societies recently the agriculture lands are increased while the grassland has decreased from 1036658 ha in 2007-584711 ha in 2011. In this area, 15066.6 ha are used for fish culture (Table 5 and 6), 584711 ha for grazing and small productions. The grassland mainly is located in mountain area.

The harvesting of wood from forest shows a negative activity during last decade. In 2011 the destruction of forest was 3300 ha while in 2004 it was 6482 ha (Table 5). More protection of the forest and less harvesting is essential for saving this environment that is unique in the country.

The ground for fish culture is 2362 ha for warm water fish production and 26.6 ha for cold water fish.

Table 5: The amount of forest and grassland destroyed and trees cut down between 2004-2011

Years	Forest (ha)	Grassland (ha)	Trees (m^3)	Extent of forestry (ha)
2004	135.9	-	141032.33	6481.5
2005	123.58	5.7	970118.81	3099
2006	194.23	79.5	803700.32	4711
2007	75.57	35	688513.00	8469
2008	21.7	6.13	720527.00	4528
2009	119.49	17.92	664585.50	3117
2010	59.59	1.5	542992.00	2601
2011	499.06	142.32	546259.50	3303

Statistical of Natural Resource Ministry in 2011

Comparing the fish product between 2007 and 2011, illustrate 24% increase in warm water fish culture and 26% in cold water fish culture (Table 6).

Lakes and reservoirs with an area totaling 12678 ha provide a huge capacity for fresh water fish production (Table 6). In 2011 fish production reach almost 50987 ton produced from 15067 ha of semi natural land and fish ponds. As it is illustrated in Table 6, there is a sharp increasing in production of aquiculture in recent years that is mainly due to export of common carp and rainbow trout fish in neighborhood countries and therefore increase in price of fish. The warm water fish culture of carp and cold water culture of rainbow trout are the main types of aquiculture activity in Mazandran province.

Annually consumption of meat in Mazandaran is increasing; consequently the use of land for animal husbandry is increasing. The amount of husbandry production is 102633 ton per year. The amount of milk production in this region is 429983 ton. The production of chicken also has paid attention therefore the production has progressed rapidly in this area. The capacity of production in 2007 was 4142992 but in 2011 it is 4829424 number of chicken. Totally annual productions of chicken meat are 157000 ton, sea production is 562594 ton and meat is 50 ton.

The significant changes event in past few years shows significant alternation in land that was used for agricultural purposes. Many agricultural land are used for factories, housing and private public service. Several factors are influence on its changes. The increase of population is one of them.

At present 49% of the province consist of forest (1107255 ha), 26% is consist grassland (584711 ha) and 6% are extent of garden lands (134300 ha), the remain consist of building ground, fish culture land and desert from 2375640 km^2 of total area of Mazandaran.

Generally by increasing the demand for agricultural food, the increasing waste generation should be expected. Actually the waste has several reasons. The most important of them is agriculture and household waste that influenced on aquatic ecosystem. Based on the analysis of data of some recent years, there was significant correlation between increasing of the industry activities and growth of the population with the waste generated.

Table 6: The fish production from the year 2005-2011

	Warm water fish		Cold water fish		Natural and semi natural resources	
Years	(ton)	(ha)	(ton)	(ha)	(ton)	(ha)
2005	1905	809	206	3.6	7440	4509
2006	2766	858	1190	14.6	13688	13215
2007	5700	1571.5	6863	20.8	17316	12895
2008	6169	1897	8097	26	24459	12493
2009	6841	2047	9169	27	22344	12463
2010	8648	2320	10515	25.68	27604.5	12539
2011	8961	2362	12456	26.6	29570	12678

Fishery Management of Mazandaran in 2011

Table 7: Number of persons is living in their houses in 2011

Number of person that live in house	Number of family	Coefficient	Entirety
1	36798	2.5	91995
2	119621	1.3	155507
3	197886	0.8	158308
4	224601	0.5	112300
5	122073	0.4	48829
6	74654	0.3	22396

Statistical of Mazandaran in 2011

Table 8: Number of families and the size of houses

Size of house (m^2)	Number of family	Coefficient	Entirety (m^2)
50	740100	0.1	740089.1
50-100	142900	0.2	142905.2
100-150	196000	0.3	196034.4
150-200	35420	0.4	35416.4
200-250	15170	0.7	15172.7
>250	-	1.1	-

Amount of daily waste generation in a year of 2011 was 2061.3 ton that was being 1746.6 tons in 2010. Production and waste of daily activities lead to environmental change and could be most important factor for control of pollution.

How many people lived in houses?: Given the significant energy consumption imputable to buildings, the development of accurate models to predict building energy performance to understand their environmental impact has become a fundamental research issue (Pisello *et al*., 2012).

The information demonstrate that buildings have effective impact on energy cycle and it has different effect by home size and number of buildings that people prefer to live in. The big home compared to small one need more energy. Most of younger people would like to live with their own parents or people in a parent role. According to Table 7, only 36798 people live their house alone. These people mostly are old man or woman or emigrate for work and etc. According to Table 7, the family of 3 person are 197886 that means they are living with one children and the family of 4 person are 224601 with 2 children. The most family lives with four persons. Some family also may live with their grandfather or/and grandmothers.

Distinct area ordinance limit single family dwellings to residents that are family members, either by blood, marriage or adoption, most of their families would prefer to live together. The number of family that lives 3 people in a house is 197886 (Table 7). They could be help to ensure their health and safety of residents and to help protect the life quality and character.

Actually, lower population in a district may help to life security and quality by waste decreasing and efforts to reduce air and water pollution, to undermine protections for public lands and coastal areas and to weaken the protection of the environment in other ways. In most case, the number of people we may have in our house is 4. If you have more than 4 person family, you could face serious problems. These families need to more equipment and energy in their house.

How big are people home?: Buildings significantly have often negatively impact in environment and destroy of natural resources. People build a home for several reasons, including renovation, addition and leasing an apartment. These reasons help us to estimate the accurate investigation about our demands and have important view to equipment in energy cycle.

The range of house size in this area is 50-250 m^2. The demand for bigger houses drives the demolition of still serviceable older dwellings while requiring more materials and energy to build. Average size of house is important. One factor in the nation's mounting demand for energy is a steady increase in the average size of the homes we live in. The average size of a house in Mazandran province based on floor area is 150 m^2. This varies between restricts, cities and towns and varies even more between suburbs. The top of the list is house with an average house size of just <50 m^2 and 740100 families lived there. The most number of family as show at the table is located in this size. The least number of families live in big house with size of 250 m^2 (Table 8). Larger house require more money and material to build and more energy to heat and cool. A small house with just average energy performance will require significantly less energy to heat and cool than a large house that is designed for superior energy performance. Saving energy is easy to achieve in smaller house than big house. Distinct area have more program to new housing development size

Table 9: Comparison extent of land for structure (2004-2011)-(1000 m^2)

Years	Values
2004	6800
2005	5127
2006	5995
2007	2276
2008	1870
2009	1423
2010	2195
2011	2850

Statistical of Mazandaran in 2011

Table 10: Percent of passengers that travel by using of different resources during 1 year

Kind of resource	Percent of total passengers	Number of passengers
Car	68	3890000
Train	28	1622000
Airplane	3	172847

Transport and terminal management of Mazandaran in 2011

have not more client that is because nowadays, people due to their living situation such as energy consumption and equipment, prefer to buy small house. The data illustrate, recently the people prefer to have smaller house than big one. This is may be due to increase the price of house or new couple prefers to live separately from their parents. The numbers of families are living in smallest size of house in distinct area with 50 m^2 is 740100 while the number of family living in 100-150 m^2 is approximately 196000 families (Table 8).

Table 9 shows that with increasing the population in this province, more land is necessary for people to build their houses. Extent of land that allocated to build houses in 2011 was about 6800000 and 6000000 m^2 was in 2009. These data show 24% increase in land used for building in the last two years (Table 9). Although, extent of land for structure have decreased but number of houses have more increased that shows people prefer to live in a small house.

What kind of resource people would like to expedition?: The aim of travel is mostly business, spend weekend, visit family, friend, beautiful places or site. Travel distances could be varying between cities and countries. There are three ways to travel near or more distance. Table 10 shows, 68% of people in study area would prefer to travel by cars and 28% prefer train for traveling and only 3% travel by airplane.

The new statistic indicated the number of passengers using airplane increased from 24940 in 2007-172847 in 2011. The change mostly is related to passenger known tourist will travel at weekend. The number of people traveled by train also had a significant increased. In 2007 only 1312000 persons traveled by train while in 2011 it was 1622000 people that means, 6% increasing within 5 years.

The most change in tremendous traveling is due to change in life styles. Traveling for holiday and journey has increased in last decade and most of family tries to spend their weekend in trip.

How much fuel people use for their transportation?: One of the aims of this study is to estimate the total fuel consumption, the amount of energy and CO_2 emission and its effects on environment in study area. Actually, CO_2 emission is strongly linked with energy consumption. Overall CO_2 emission is reduced by changes in resources and consumption. When used in ecological footprint studies, this term is synonymous with demand on CO_2 area. In Iran, liquid fuels including gasoline and gasoil are dominant sources of energy in the transportation sector. Energy consumption in the transportation sector in Iran is significantly higher than global norm and standard which result in wasting national resources, deteriorating air quality, GHG emissions, etc. Therefore, energy consumption in road transport has to be decreased in order to reduce dependency on fossil fuels as well as negative environmental consequences. The ecological resources require to be protected. The solutions are to adopt demand-side strategies. This is that the government is insisting to replace safe energy such as electricity and nuclear energy instead of fossil fuels.

In the other hand, consumption of all kind of material lead to waste generated specially, CO_2 production. There is relationship between energy consumption, Carbon Dioxide (CO_2) emissions and transportation systems. The study area is necessary for supporting the actual harvest of primary products (cropland, pasture, land, forest land and fishing grounds) to absorb all fossil fuel carbon emissions generated within the area that is built-up constructions such as roads, factories, cities. In the other hand, economic growth and energy used are mainly related. Therefore, we need a solution for supporting and developing of the area. In other words, the forest footprint represents the area necessary to regenerate all the timber harvested. The forest can increase rainfall and humidity. The lands in distinct area include 1107255 ha of forest, 584711 ha of pastures and 1086 ha of desert. Economic important of forest is in agriculture sector with humidity and rainfall and production lead to decreasing of soil erosion. The study area has the first grade in production of forest products in Iran. Another property of forests is in attracting tourists and spending weekend there in hot summer with families. Every year millions of people travel from different parts of country to this green and dense forested province to enjoy the suitable conditions and environment. Apart from economic values of these sources and its importance for environment, preserving soil and store ground is very important too. The forest is

Table 11: Amount of fuel consumption in Mazandaran between 2007-2011

Years	Gas (ton)	Airplane fuel (m^3)	Benzene (1000 m^3)	Fuel (1000 m^3)
2007	82188	7493	988/1391	403/481
2008	83226	6008	872/1206	419/786
2009	91033	5265	1253	407
2010	103546	8319	4/1230	345/6
2011	94832	8680	3/1170	390/4

Table 12: The capacity and number of fuel station from 2007-2011

Years	Number	Values
2007	928	254092
2008	923	253955
2009	1153	259646
2010	1159	260972
2011	1179	220972

Table 13: Comparison of benzene consumption in kind of resources

Resource	Numbers-fuel consumption%
Motorcycle	148742-(36)
Automobile	251440-(60)
Public vehicle	15360-(4)

Statistical of Mazandaran in 2011

the most powerful and safest support for agricultures sector and constant development. Therefore, it is very important to consider a way to decrease fuel consumption in the road transport and using fuel in industry in the study area. To study the trend of fuel consumption and CO_2 emission of the last 5 years (Table 11), we collect the data of passenger that used cars, busses and air plane for their traveling (Table 10). By increasing the passengers and therefore increasing the numbers of vehicle in distinct area, fuel consumption has increased (Table 12). The data shows 60% of consumption is by automobile and the 4% by public vehicles. It is surprising the motorcycles consume 36% of total fuel (Table 13). One of the principal ways to reduce transport-related energy is to reduce fuel-consumption rates of motor vehicles (Huo and Wang, 2012). The first point in this respect is the government policy and technology uses for industry and transport systems. The capacity and number of fuel station provided fuel for cars are presented in Table 12.

CONCLUSION

This study was the pre-study to illustrate the statute of the green land province in North of Iran and to predict the status of this are near in the future. We collected the four important data which is important to estimate of ecological footprint of this area. The data showed in all items regarding as consumption (food, goods, shelter and mobility), there is a high demand that will pressure in land product and ecology of the area. On the other hand traveling to Mazandran province to use its favorite weather is increasing, therefore energy consumption is increased. All of these trend results in increase demand for fuel consumption and CO_2 generated.

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