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Sustainable Agriculture: And Introduction to Extensive and Intensive Agriculture

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Abstract: Agriculture is what led to the rise of civilization. Agriculture encompasses a wide range of skills and techniques, including ways to expand the lands suitable for crops, digging canals and various forms of irrigation. In today's world, due to concerns about lack of resources, it is required to take agriculture towards sustainable agriculture (e.g., organic farming) or intensive farming (e.g., industrial), so that we can meet our needs in the future. In this study, it is tried to review the history of agriculture and explain intensive and extensive agriculture. In general, we can argue that modern agronomy, plant breeding, pesticides, fertilizers and technological advances significantly increase crop yields are great steps have been taken in the last century.

Key words: Agriculture, extensive agriculture, intensive agriculture, skills and techniques, needs

INTRODUCTION

Agriculture is a major sector of the national economy and basic human life and it has had a vital role in different periods in the evolution and development of human society (Aydogdu and Yenigun, 2015). Historically, humankind has used agricultural products, since the creation. Early humans used tree roots and finally, the fruits of wild trees as well as animal's milk that are all related to the agriculture sector. Given the significant population growth and due to the low level of traditional agriculture productivity over time poverty and migration from rural to urban areas have taken place and have created a big problem in the country (Turkey in 2015).

Agriculture is the main source of livelihood of people and most people scratch lives by resources of agriculture, forestry and other natural resources. Moreover, agriculture sector continues to provide basic needs of people and has an important role in providing raw materials for industry and in the creation and expansion of employment opportunities (Karkacier and Goktolga, 2011). Considering the quality of growth of a variety of plants and their medicinal properties and by being in possession of suitable soil and water, humans understood that by planting, cultivation and irrigation of seeds, trees and shrubs can provide their food (Dubey, 2010). In this lifestyle, humans could bring the untouched nature in the service of their own through working. Since, agricultural products need to be taken care of human beings built their houses alongside fields. They were plowing land by animals such as cows and horses and used water descended from rivers and streams, springs and for irrigation of their farms.

Thus by creation of farms and homes together, villages gradually came into existence. Heavy duty of farming for care against risks and threats such as pests, diseases and wild animals was possible only with the assistance and cooperation of all farmers in rural areas. This method of cultivation in farming and gardening was based on initiative tools and objects but one of the main and most important features of this type of agriculture is the use of valuable experience of history of agriculture the farmer inherit from his predecessors and this definition reflects a concept of traditional agriculture in today's scientific community.

Agriculture has long had a great role during the history of human societies in the creation, development and evolution of civilizations. Therefore, the formation of human communities in the urban, rural and even country geographical units in historical developments during the long centuries has depended on prosperity and development of agriculture. Until medieval times farming had a traditional and simplified structure and in the late Qajar traditional agricultural activities were performed in Iran.

Agriculture has been the base of food security and survival of civilizations of human societies to date and lack of serious attention to it can have unpleasant consequences for growth development and prosperity of communities.

Now, agriculture has an important role as sources of food in the consumption basket of world (Kuhpayi, 1990) and the issues of food security and strategic agricultural production have increased its importance. Agriculture science is the science and technology of cultivation and

utilization of water, soil and plants and in Islam it is also taken into consideration. However, specifically, agriculture is the use of water and soil for plants with herbaceous stems and leaves first and second, their life is not more than a couple of years and third, usually grown on a large scale.

Historically, agriculture science took scientific form from the second half of the eighteenth century and then became related to various sciences such as physics, chemistry and natural sciences. Thus, the science of agriculture encompasses such activities of man done to meet the needs of some plants and as a result get their maximum production. Agriculture is cultivating and farm and the job of cultivation has a scientific root through which animal and vegetable products are obtained.

Overall, agriculture is considered as part of a country's economy and if we want it to be done literally, it is a very difficult task and in the words of Professor Lowis Mallassiss, doing this is the development of agriculture. Despite, its being necessary, it is beyond the ability of great owners, educated minority, managers, staff, farmers and less educated or illiterate rural farmers. Agricultural development is discussed within national frameworks and as an important economic sector plays a vital role in national development (Nazari, 2011).

Therefore, familiarity with agriculture and farming methods is undeniable for different people and in this study, we try to offer a variety of agricultural practices such as extensive agriculture, semi-intensive and intensive agriculture.

History: Agriculture (Agronomy) has a Greek origin and is composed of two words: AGROS meaning farm and NOMUS as management. Scientifically, Agronomist refers to a person who has higher education and has theoretically done studies to serve as a counselor or farmer guide. From the viewpoint of agriculture to increase agricultural production, three ways have been proposed:

- Increasing areas under cultivation
- Increasing the yield per unit area
- Increasing yields per unit of time

According to historical evidence, >9 thousand years ago in the plains of the Tigris and Euphrates and the Nile, human was busy planting some products. In ancient Egypt and Mesopotamia about 3,500 years ago, irrigation was being done by various methods and the use of herbs and spices was common. At the same time, the ancient Egyptians knew large number of crop plants such as cereals, dates, grapes, olives, pomegranates, bananas, lemons, figs, vegetables and cultivated them.

In excavations of different parts of Iran, it has been found that around 3000 BC, tree planting was common. Babylonians and Assyrians in 700 BC successfully cultivated nearly 900 different vegetable. The old Romans in 500 BC who ruled an important part of the world of that time had great attention to agriculture and formed a significant portion of their economy so that important service of Roman to agriculture in general and horticulture in particular is noteworthy. The evidence suggests that at those days, they had information, crop rotation, manure and greenhouses.

In the medieval times, growth of sciences had retrogression so agriculture went unnoticed. However, in the Renaissance to the late 19th century, Europeans used the discoveries and inventions of scientists and began the revival and expansion of science and technology, agriculture and horticulture benefited from this trend. After the discovery of America, agriculture, especially planting vegetable was considered and research and cultivation of vegetables such as tomatoes, potatoes, beans and marrow were developed. In the last century, the development of science and technology of Agriculture took a strange exponential growth process, so that its progress was equal to a hundred centuries.

Numerous studies are done on plant breeding, plant nutrition, plant protection and new methods of planting and thousands of scientific papers have been published. In recent decades, repeated experiments were done on how plants reproduce, especially as tissue culture, dense cultivation and cultivation without soil and satisfactory results were achieved for example, the performance of tomato in this system was increased to 350 tons per hectare (about 10 fold compared to before) (Ahmadi, 2010).

MATERIALS AND METHODS

Types of agriculture

Extensive agriculture: In the past, due to the increasing global population and food needs in our time, serious attention was not given to agriculture by communities and custodians. Water and water resources along agricultural systems were as the main points of agricultural development so that any point of the earth where there was plenty of water available as rivers, agricultural prosperity was more and this issue has been the fundamental factor in formation of traditional agricultural life during the history of the past. Moreover, the utilization of water resources and irrigation has made agriculture face with limited horticultural crops with lower levels and ultimately reduce agricultural production.

In traditional agriculture, farmers received the past experiences of fathers and their ancestors from generation to generation and used them in the field of agricultural operations (Nelson, 1995). Thus, considering the low literacy rate and the average number of major traditional agriculture, the experiences of farmers are used in our country. In general, farmers in the history of agriculture land in East including Iran until the arrival of new science and technology and agricultural technology used hand tools and the use of this equipment exists to this day in some places and even old ones.

In fact, these not changed tools over the centuries have been a symbol of traditional agriculture. Traditional agriculture unlike modern agriculture, has not had significant transformation over time. In traditional agriculture in a consistent manner, farming operations and farmers are not based on principles of agriculture but based on their experimental reserves of plantation. Extensive agriculture is a form of agriculture where the farmer is subject to weather conditions. Therefore, they do not consume a lot of input and cannot increase the area under cultivation and overall, it refers to a type of farming where in the vast expanse of arable land relatively small amount of capital is enabled. In extensive agriculture, farmers act traditionally. In traditional agriculture due to bad weather that brings water from the aqueduct to agricultural land, considerable amount of water is wasted. Moreover, in autumn and winter when farmlands do not need water it is completely abandoned and subterranean water is left unused. This is while by preserving water during the months when the water is infested, 900 acres of farmland can be watered during the growing season (Porrero *et al*., 2012).

Intensive farming: It is nearly a century that farming community in Iran has become familiar with modern agriculture or knowledge-based agriculture. This new style has a wide array of features and principles, the most important of which is consistency with the promotion of agriculture and agricultural education, so that farmers with the help of agricultural experts and specialists in the agricultural science, benefit from their experiences. Among its results was the change in this area with increased crop and agricultural production coincided the invention and entry of agricultural machinery into the field of agriculture. On the other hand, in modern agriculture, modernization of machinery and agricultural stuff, the use of new agricultural inputs such as fertilizers and pesticides in addition to increasing agricultural production including farming, horticulture and so on has created agricultural self-sufficiency discussion and development of agricultural economy. In the early 20th century, modern agricultural growing rapidly and attention to agricultural mechanization have brought about consequences such as easier agricultural activities, reduced production costs and partly food security of the international community. Moreover, this new farming due to technology and mechanized agriculture would expand the area under cultivation and empower farmers and development of agriculture. In general, in the history of world agriculture, the agricultural sector by passing from a period of traditional agriculture and embarking on the path to sustainable modern agriculture and services has greatly contributed to the development and prosperity of the international community which is called intensive agriculture. In intensive agriculture, many inputs such as improved seeds, fertilizers, machinery and so on are used to obtain the maximum performance level. Development of agriculture in temperate regions has been through continuous cropping replacement grasses instead of traditional methods to alternate crop. In the traditional agriculture, culture of cereals (wheat corn) has been due to food needs and plow alternating with a summer crop such as root forage plants, soy or beans alternatively with a mixture of 3-6 years grasses and legumes forage. The main advantage of grasses crop rotations with cultivated plant is preventing the proliferation of weeds, pests and diseases and maintaining soil fertility. Grasses receive manure, are finally plowed under the soil and increase organic matter in the soil. From the 1950s due to increased use of mineral fertilizers and the development of high yielding crops that require more nutrients, crop rotation systems gradually changed or abolished that includes replacing labor and animals with bigger machines of which combine can be named as an important one. The use of herbicides growth regulating herbicides increased. Maintaining soil fertility does not depend on special rop rotation use of organic manure is not dependent and increasing in the speed of operation because of mechanization makes agriculture crop selection and systems very flexible. In those areas where the climate is suitable for agriculture, continuous agriculture more or less has replaced crop rotation of plant are grasses. Simplicity of combining crops has coincided with crop plants specialization. In general, it can be said that in intensive or deep agriculture, involvement of farmers to increase performance is so high and the land is a limiting factor in production. In other words, scarcity of land makes the farmers do many operations on the land and take the maximum benefit. In this way of agriculture, land preparation, fertilizer increase, irrigation and all preserving practices are done well to make product increase possible. Investment to eliminate undesirable elements of nature

such as soil improvement, drainage, pest and diseases and weeds are high and naturally, the income from unit area increases accordingly. This type of cultivation is common in densely populated areas (around the cities) where the farm level or amount of water in the region is low compared to the number of population. Planting rice and legumes in most parts of Iran is completely intensive agriculture systems cultivation of cereal crops and forage plants reduce compared to weed plants (Paterson *et al*., 2012).

RESULTS AND DISCUSSION

The causes of advent of intensive agriculture: Modern intensive agriculture has emerged over 30-40 years because of scientific and technical advances that occurred during World War II and immediately after it and in this case relevant factors include. Increase of agricultural mechanization and consequently the alternative of energy that was previously supplied by animals and humans and was replaced by tractor energy and increase in the number of tools for different stages in the process of agriculture and animal husbandry. Now, a few non-mechanized commercial crops are grown.

Increased use of chemicals as fertilizer, pesticides, weed killer, animal drugs, etc. The rapid development of livestock and plant breeding by producing varieties with high yield that get their full potential only with a higher intake of nutrients and the characteristics of their growth is coordinated with mechanized agriculture. Modified animals are also dependent on high consumption of food. In addition, intensified agriculture has been along with a separate specialization of agriculture and agricultural production supplies regarding place, focused agricultural crop production in areas that are at greater talent and highest income-based investments. In this case, the size of production units in response to the rising cost of inputs has grown faster than the prices achieved by greater efficiency (Paterson *et al*., 2012). However, intensive farming is not limited to a unique particular biophysics environment. This type of farming has developed in wet temperate regions of the world, especially in developed countries in North America and Western Europe and in modern irrigation and agricultural projects of continental areas. Among cereals, wheat and corn are grown widely. Root crops and tubers of temperate regions include white potatoes and some types of Brassica such as cabbage and sugar beets. In temperate regions like tropical areas, legume grains after grain are in the second row concerning yield and acreage. Among them, soy, beans and peas are at the highest point. They are especially valuable multi-purpose agricultural crops that produce food and fodder and simultaneously increase the nitrogen and organic matter in the soil.

The position of crop rotation in intensive agriculture systems: Since the 1950s, increased use of mineral fertilizers that depend on development of external high yielding crops changed or cancelled crop rotation systems that had a special place in traditional agricultural systems. Crop rotation is of great importance due to its role in maintaining soil fertility, preventing the spread of certain diseases of a plant in continuous cultivation, reducing the allopathic effects, controlling weeds and improving water supply and the possibility of reclamation of the cases. Current systems of agricultural with monoculture commercial crop plants with uniform root development needs have led to use a certain depth of soil in terms of water and food resources. If rotation principles that indeed cause a kind of diversity in the consumption of resources and provided restoration of supplies of food and water in some times of the year are not used soil suffers fatigue or gradual poor soil fertility and consequently fertility of soil is affected. Such effects in long-term, endanger ensuring the survival of future generations and are inconsistent with the principles of sustainable development.

Intensive agriculture and mechanization: In fact, it was after the advent of the agricultural mechanization systems that agriculture coordinated industry of production systems. At a closer look, socially, the emergence of mechanization reduced role of human resources and capture some of the job opportunities of farmers and dependent individuals. In a more vivid image, it caused problems such as migration from villages to cities, weaker role of animals in agricultural ecosystems, the wider use of available energy resources, the need to develop industries related to increased environmental pollution and a series of related factors.

The role of human and natural ecosystems in the sequence of natural ecosystems: Sequencing is changes that occur over time in ecosystems, practice and built. These changes lead to the emergence of communities that are quite different in terms of socio-practical issues from each other and other communities. Intensive cropping systems by applying monoculture system, heavy dependence on mechanization and special care repeatedly disrupt the region and in fact, they insert plant as an alternative crop for pioneering ecological societies and allow other steps to continue. In fact, human activities in

intensive farming frameworks create a reverse sequence that will stop the process. In fact, sequence in natural ecosystems is of autotrophic sequences. During the sequence, the amount of energy remains constant or increases while intensive farming systems are highly dependent on external inputs. In climax communities, much of the primary production is consumed to keep building systems, so that much change does not happen in the biomass of the whole system failed. As we see in these societies in the final stages, special photosynthesis is zero which suggests that the system of production is used for maintenance and virtually no dependence to any external source is felt and this process continues as long as no sophisticated operator interferes. However, man as one of the most significant and confounding factors prevents the occurrence of this natural phenomenon. However, natural events such as earthquakes, volcanoes, etc. are also involved. In the current agriculture systems, the goal is to increase the proportion of primary production to all biomass production in the society. This means that a small section of the production is used for revival and maintenance of the systems to exploit resources.

CONCLUSION

Man needs food to meet his dietary needs and for producing food needs the exploitation of natural resources and when he is busy doing this, he is farming. Throughout the history due to lack of resources and tools, traditional agriculture was used and it is not fully abolished and it is still used in some underdeveloped and developing parts. In general, it can be said that farming or agriculture is divided into intensive and extensive farming. In extensive agriculture, farming is done regardless of knowledge using natural resources and sources of irrigation and soil resources may waste due to lack of expertise. However, in intensive agriculture scientifically, it is tried to maximize efficiency and minimize effort and using scientific principles and mechanized practices, it is tried to have more efficiency of land to produce more products. Thus, due to the current conditions, intensive agriculture can meet the needs of human today.

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