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Integrated Farming System as an Approach to Sustainable Agriculture

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ABSTRACT

In India's circumstance, more than 60% of people are engaged directly and indirectly in agriculture work. An integrated farming system proved a practical approach with an appropriate combination of farms and enterprises. The integrated farming system will help to increase farm income and employment to the farmers for sustainable agriculture. The present study is focused on understanding the integrated farming system and its significance towards sustainable agriculture, to know the benefits of Integrated Farming System on Indian farmers, to assess the improvement in the standard of living of the farmers after introducing Integrated Farming System. The study is based on primary data. A well-structured interview schedule and also qualitative methods were used as a case study for depth study to understand the integrated farming system from the farmers. Overall, this study found that an integrated farming system has significance towards sustainable agriculture, Integrated Farming System brings more benefits than other agriculture systems on Indian farmers, and brought improvement in the standard of living of the farmer after adopting the Integrated Farming System.

Key words: Sustainable, Fertility, Agriculture, Integrated farming system, Agriculture market

India is a country blessed with lots of natural resources with a good composition of flora and fauna. It has unique biodiversity as compared to the world and geographical structure changes when we travel from one corner to another. India is a land known for its various crops, fruits, and vegetables. Good fertility of the land, enough water resources, and supportive climate conditions made Indians concentrate on the agriculture activities. Our ancestors started agriculture around 9000 BC with their traditional wisdom and techniques. They had their traditional methods of doing agriculture and it was sustainable and never disturbed the natural biological cycle. Initially, they started farming only for their household consumption, and later on, when the population started to grow and the existence of the open market came into the picture, farmers started to grow surplus crops and sold their yields in the market. To satisfy the growing population and demand, farmers increased their agricultural output. Gradually, the expansion of agricultural land has increased and farmers extensively concentrated on those crops which

have demand in the market but still they followed traditional systems and techniques for farming.

The drastic change that took place in the history of the Indian agricultural system was when industrialization stepped in. The advanced technologies and machinery took over the human's position. And later on, globalization stepped into the Indian Territory. Industrialization mainly concentrated on promoting heavy industries and globalization opened the domestic market into the open market and brought science and technology into the country [1].

In the year 1960, Dr. M S Swaminathan had introduced the "Green Revolution" to satisfy the hunger of the increased population in India. Genetic crops, Intensive use of Chemical fertilizer, extensive agriculture output, and mono-crops were some of the objectives of the green revolution. As a result, the government has produced enough output for the existing population. Due to that, we lost the fertility of the land by using various chemical fertilizers. Farmers have exploited the land and continue to increase agricultural production. Changing climatic conditions and also, global warming created havoc in the life of farmers throughout the country. By understanding the problems of water scarcity, land infertility, quality of seeds, insect's problem, reasonable price for the product, and improper transportation facility made the agriculture scientist think about agriculture and it forced them to find a sustainable solution. But the truth is, it was the government that forced farmers to adopt unsustainable agriculture, not the farmers

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themselves. In India, farmers use traditional agriculture system where farming happens with the synchronization of nature and the surrounding environment without harming them [2].

The world came to know the importance of the traditional agriculture system and thereby promoting sustainable agriculture. Our ancestors have been using the sustainable agriculture system for thousands of years and we have spoiled it and let suffer not only ourselves but also for future generations as well. In India, more than 60% of the population depends upon agriculture. Agriculture is the main source for generating income in India. Unfortunately, The Government itself ignored this reality and for the short-term requirement, it destroyed the lives of thousands of farmers and let them suffer for a longer period. The agriculture system which our ancestors followed was sustainable but the interference of the government destroyed it and influenced them to follow the modern agriculture method, which is not at all suitable for the land, climate, and even for the health of the people [3].

Sustainable agriculture

Sustainable agriculture is a type of agriculture that focuses on producing long-term crops and livestock while having minimal effects on the environment. This type of agriculture tries to find a good balance between the need for food production and the preservation of the ecological system within the environment. In short Sustainable Agriculture is:

- Economically viable:* If it is not profitable, it is not sustainable.
- Socially supportive:* The quality of life of farmers, farm families, and farm communities is important.
- Ecologically sound:* We must preserve the resource base that sustains us all.

In addition to producing food, there are several overall goals associated with sustainable agriculture, including conserving water, reducing the use of fertilizers and pesticides, and promoting biodiversity in crops grown and the ecosystem. Sustainable agriculture also focuses on maintaining the economic stability of farms and helping farmers improve their techniques and quality of life.

Integrated farming system

The integrated farming system is a whole organic farm management system that aims to deliver more sustainable agriculture. It combines the best of modern tools and technologies with traditional practices according to a given site and situation. In simple words, it means using many ways of cultivation in a small space or land. It involves attention to detail and continuous improvement in all areas of a farming business through informed management processes. It is a dynamic approach that can be applied to any farming system around the world. According to the "European Institute for Sustainable Development in Agriculture (EISA)", the Integrated farming system includes the following points (Fig 1). (EISA - European Initiative for Sustainable Development in Agriculture, 2011).

Importance of the study

It has to be understood by each individual about the importance of a mixed crop system in the present agricultural scenario. Mixed crop or integrated farming system is one part of the natural farming system which promotes mixed crop instead of a single crop, organic farming, use of local resources, encourage for using organic manure, water management, soil fertility and protection, future prediction with the help of changing environment and climate and with lots of values and respect towards the work. The growing population has raised the demand for food and grains but not encouraged sustainable agriculture practices and forgot the traditional farming system.

It is our responsibility to promote and encourage the farmers, government, and local people to understand the significance of an integrated farming system and bring back those methods and systems into the mainstream. Chemically grown food grains and crops and unethical agricultural practices pushing human lives in danger. It has disturbed human health, biotic and abiotic factors. The time has come, to realize the importance of the traditional farming system and make it a part of our daily life and thereby live a healthy and happy life in society.

MATERIALS AND METHODS

The researcher used observation methodology to capture certain important aspects in the study areas. The primary data collected such as farmers opinion, experiences, and feelings, researcher has used interaction method with farmers and also in-depth interview schedule was developed which included socio-demographic, farming experience, fertility of the land and demand of agriculture market in the product, etc. and also qualitative methods used as a case study for depth study to understand the integrated farming system from the farmers. The data was compiled in an MS Excel tabulated and presented in percentages. The secondary data collected through various books, articles, and websites.

RESULTS AND DISCUSSION

Experience in farming

This above chart shows the total years of farming. Out of 100 integrated farmers, 38 farmers are having experience from more than 8 years and 27 farmers are having experience in farming between 3-6 years [4]. The researcher observed here is, farmers who have been following mixed agriculture systems for many years are very



Fig 1 SEQ * ARABIC 1: Integrated Farming (EISA)

happy and satisfied in their profession and they are well settled and have good demand for their product in the market. This above statement indicates that the effect of an

integrated farming system or natural farming system can be seen in long duration and once it catches hold of you then never leaves your hands.

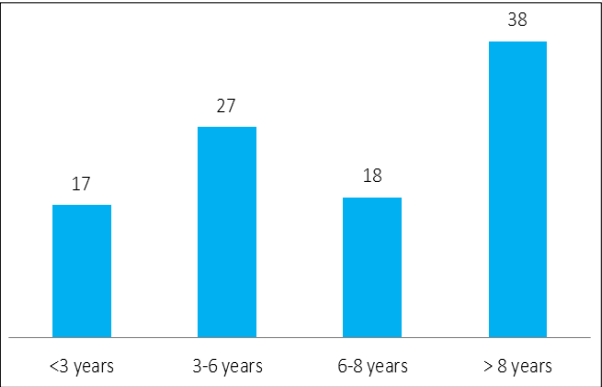


Fig 2 Farming experience

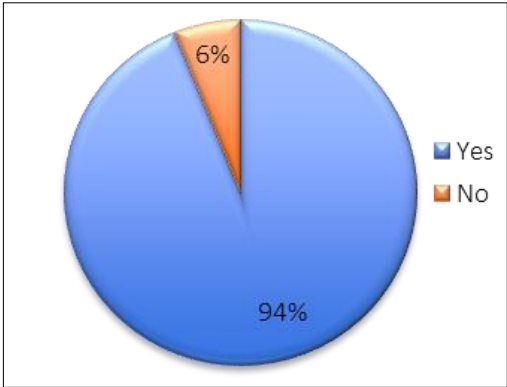


Fig 3 Fertility of the land

Increased fertility of the land

The above figure shows the increased fertility of the land and it shows the effect of integrated farming systems on the land. Out of 100 integrated farmers, 94 farmers are the fertility of the land drastically increased after started to follow the integrated farming system because of they have been using Jeevamrita, Bijamrita, compost prepared from the cow dung and other agriculture waste and weed compost from the beginning and now they are getting the benefits, which is visible in increased land fertility of the farmers [5]. They expressed their joy by sharing that the crop yield has been increasing every year and humus in the land has increased an earthworm can be seen all over the land, but the remaining 6 farmers' land not increased fertility of the land.

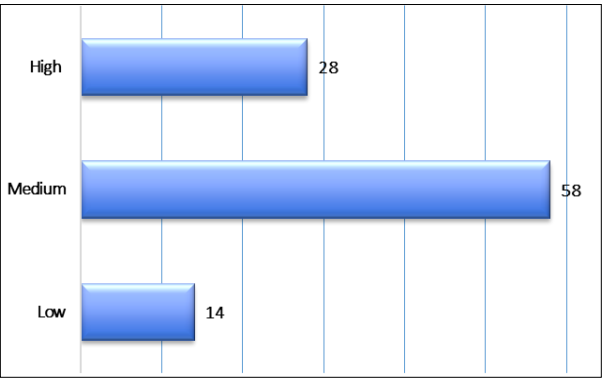


Fig 4 Demand in market

The demand for agricultural product in market

The above figure shows the demand for an agricultural product in the market. 58 percent of the farmers are mentioned that there is a medium demand for their crop in the market and 28 percent of the farmers are getting huge demand in the market for their agricultural output. Because farmers who are doing farming for many years mentioned that they get huge demand in the market and other farmers like doing farming last 7-8 years back, who are in the initial stage of farming they are getting medium demand for their crops [6]. This statement depicts that there is a demand in the market for naturally produced or organic products; only fluctuations of price in the market are troubling the farmer. Further, farmers who will continue this Integrated farming system for many years will get a huge demand in the future, and fluctuation in the market will not affect their earnings.

Case study

The researcher is very glad to express his experience with the farmers in the field visit. The researcher has used two methods to collect the data from the farmers, through direct interviews and phone interviews. Many of the farmers were very enthusiastic to share their knowledge, wisdom, and experience with the researcher. The tribes which the researcher has met in the H D Kote were very humble and along with data they also expressed their problems which they are facing every day. They have an intimate relationship with the trees, birds, animals, and the surrounding environment. One of the tribal farmers said that he wants to rebuild the forest through horticulture in his 1.5 acres of land. It's motivated me because instead of thinking about himself he thought of doing something to his tribal colony and definitely for the environment [7-9].

The remaining farmers which researchers have met in other places also showed interest and expressed their opinion and viewpoint regarding mixed and natural farming. Some of them suggested better data collection and shared their immense knowledge with the researcher. One of the farmers also asked the researcher to share the report with them. Most of the farmers are well educated and have knowledge regarding natural farming and they do have awareness about the importance of it at the same time.

One thing which the researcher felt similar in the entire interview is, they want to bring back the traditional farming system which they have lost in the name of industrialization and globalization. They say if one wants continuous earnings throughout the year, he/she should follow the traditional farming system [10-11]. Many of the farmers want to encourage the use of local resources and domestic production instead of depending upon the foreign exchange.

The data are analyzed below

They collect data for the study “Integrated farming System”, the researcher has gone for the field visit to the Jaaganakote Haadi, Kenchanahalli Mysore District. There he has met a tribal farmer, who is following IFS for the last 6 years in his agriculture. By taking the help of Mr. Sundara Nayaka and Mr. Venkataswamy, the researcher has visited the Haadi (Tribal Village) and had 3 long hours of discussion in his field and collected precious information for the study.

Mr. Somu (Farmer) was so enthusiastic to share his experience, knowledge with the researcher and as a result, he has collected a bunch full of information from him. An interesting fact about him is, no one has suggested him to do Integrated Farming System (IFS). Once he had visited Kerala and there he had seen farmers who are following this system for many years. That motivated him to do IFS in his land.

Basically, they were called Kaadukuruba's. Because of the Forest Protection Act 1927, the Forest Department and Government had forced them to come out of the forest, as a result, they had to leave the forest. Some of the Kaadukuruba tribes were refused to come from the forest and they stayed back. Forest department used all the immoral tactics to kick them out of the forest, they shot the dogs, hens and even they let the trained Elephant attack the tribes present there. As a result, two tribes have died on the spot itself. He said they were all very attached to the forest and they had a good connection with the surrounding environment, animals, birds, etc. When they were in the forest, they had good unity and cooperation among their tribal community but now everything has been lost. The farmer said, his parents planted trees in the middle of the forest and now it became huge trees. His father had given 3 acres of land in jaaganakote Haadi, Mysore District, he wanted to use that land for agriculture as well as for growing trees. He says plants which he has planted in his field will help his families and he doesn't have any expectations for his present. He just wants to grow different trees and make a forest. He has 3 acres of land, which came from his father. In his 1.5 acres of land, he is doing IFS and remaining 1.5 acres of land he is growing chilly, Ragi, and also banana trees. The most attracted thing is his IFS in 1.5 acres of land, where he has planted many varieties of plants such as a Silver tree, in one row Coffee, Areca nut plants, Jackfruit plants, Drumstick plants, Teak plants, black pepper, Lemon, sapota, date plants, Amla plants, sweetsop plants, etc. We can say he is a sustainable agriculturalist who not only grows trees in his field but also in his home as well. He has small places around his home and there he has planted trees like pomegranate, Areca nut plants, coconut trees, flowers, Jackfruit trees, etc. He also grows grass around the fences in his land. He said, he wants to grow all the things which are required for domestic purposes and he wants to be a self-reliant and self-sufficient person [12].

He is unhappy because no one is planting trees at least in their front yard. All his neighbors are making fun of him and criticizing his work. They say Integrated Farming System is a foolish thing, instead of that he can grow other crops which give him output quickly. But he is a very brave person, who never cared about criticisms and just did what he wanted. He says it may be summer, winter, or rainy season, the farmer should get a crop that is the main reason he has chosen IFS. Along with these multiple crops, he also has a small percolation pit at the corner of his land. Now he is planning to fill water and do fisheries in it. He also prepares compost manures in his land and used it for the land to have fertilizer. Apart from that he also uses Urea and DAP chemical fertilizer when it is required. But he is trying to use organic manure completely for his crops without using chemicals. He has 3 cows and one calf; he also has 3 goats and hens in his house. He uses cow's manure in compost preparation. He has bore well (220 feet) on his land. He is also using sprinklers for water irrigation. He expresses his feelings, that he is humiliated by the forest

department and he is still not happy because he is not in the forest. He wanted to create a forest and provide tree shadow for everyone. Another interesting fact is, he put a wire fence around the land, and the strategy behind this is to stop the wild pigs. He says, you don't need to pass the current in that fence, because pigs already know that fence means current shock, even though there is no pass current, pigs never try to touch it. The researcher says most of the time he has used his commonsense to solve the problems.

Benefits from IFS

Farmers said some of the benefits a farmer will get from IFS, they are:

- Get crop or agriculture output throughout the year.
- If one crop or plant doesn't give you the intended result, like in terms of money or agricultural output, then other crops or plants will help you to earn money.
- Land fertility increases
- Interdependent plants like, black paper and leaves of some of the trees act as manure for the plants.
- Raising cattle will help in terms of money as well as manure for the land.
- He says income generation also increased after following this system.

The researcher has absorbed lots of things, such as his will power, strong determination, and enthusiasm towards agriculture. He respects nature and wants to live a sustainable life which not only helps his family but also to the surrounding nature as well. The researcher feels he is the best example of a mixed agriculture system because he follows every aspect relating to natural farming and the only thing which bothers him was fluctuating market price. But still, he never lost his faith, he says that he may suffer some difficulties because of some fluctuation in the current price, but he is damn sure that he will get a good price for his yield in the recent future [13-16].

Observations and reflections

Complex lifestyles and changing food patterns created problems in the life of the people. But unfortunately, this effect is also faced by the surrounding environment along with other livings. Every day we are consuming food which is one or the other way soaked out from the chemical contents. The present food system is like a slow poison that will go to kill you and your family unknowingly.

Integrated farming system or mixed farming or organic farming is an essential part of the natural farming system, these are the best sustainable solution towards healthy food and diet. To make it happen, it's our responsibility that we should promote and start or at least motivate those farmers who are already following it [17-18]. Most of the farmers whom the researcher has met in the field are well educated and have in-depth knowledge about natural farming. Farmers are satisfied in their profession and their financial condition is gradually improving every year. There is a saying that, if you nurture nature with lots of care and love, it will definitely nurture you back. Modern agriculture made farmers and people go away from nature and increased the gap between community & nature. Natural farming is acting as a bridge between men and nature so that balance can be brought in the world [19-21].

From the above, all analyses, researchers concluded that the fertility of the land has gone up after introducing the mixed and natural farming system in their agriculture. All the farmers said that the land humus has increased and they

can see the earthworm in their soil. Earthworm in soil indicates that the land is free from chemical contaminations. All the framers agreed that their agriculture yield has increased as compared to the last 2 to 3 years of their output. They are very happy that they are getting good demand for their output in the market. Consumers are very fascinated with the organic output and they also anticipated that they will get a good price in the future. If we see the standard of living of the farmers, there is a drastic increase in the earnings of the farmers every year. All the farmers whom the researcher has interviewed are very satisfied with their present financial condition. They also assured that anyone who starts natural or mixed farming he/she never suffers losses. They said that every farmer should think the soil has goddesses and care for them like their own child, the land never leaves their hand [22].

The study which conducted in Bihar shows that integrated farming system approach consists of the crop, dairy, horticulture, agroforestry, fishery, biogas, etc. components were one of such new development strategies for the small farmer concerning their sustainable livelihood development and [23] which conducted in Tamil Nadu shows that higher farm income was possible by adopting the new Integrated Farming System (IFS) and also achieves sustainable production by effective recycling of natural resources in addition to meet the family needs and integrated Farming system approach has profitable and more sustainable than the conventional sole cropping system and sustain soil productive through recycling of organic sources of nutrients from the enterprises involved [24]. This study result shows that even the Mysore District distraction of the Karnataka state is quite similar, this is how Integrated Farming System (IFS) as an approach to sustainable agriculture [25].

Policy implication

These research study findings show that similar kinds of studies can be undertaken in Indian rural communities to know the issues, needs of integrated farmers, and the scientific report could be submitted to the respective Krishi Vigyan Kendra to understand those needs and issues. And draw local plans to handle those issues. This study suggests that Indian policymakers should focus on integrated farmer's needs and issues, based on farmer's needs, policies and programs shall be framed. This approach will help in the effective implementation of the Integrated Farming System at Karnataka state and gradually at the National level.

CONCLUSION

It is our choice which makes us different in each life. Likewise, either we can choose and promote natural farming so that each individual can get healthy food and good health or consuming junk food and become part of the world's diseases. Natural farming is the easiest way of doing agriculture without using chemical fertilizer and no need of becoming a victim of the so-called systematic agriculture system. The modern agriculture system never had a long-term vision; it just solved the temporary problem. The Green Revolution which was introduced in the early sixties created havoc in the life of the farmer. The effect of a single crop system and intense use of chemical fertilizer destroyed land fertility and many farmers lost their lives because of their inability to repay the loan. Now we have to promote and bring natural farming into the mainstream and make people know the significance of natural farming in the present scenario. Overall, this study found that an integrated farming system has a significance towards sustainable agriculture, Integrated Farming System brings more benefits than other agriculture systems on Indian farmers, and brought improvement in the standard of living of the farmer after adopting Integrated Farming System.

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