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Department of Botany,
Arvindbabu Deshmukh
Mahavidyalaya, Bharsingi
Email: smitagudadhe@gmail.com

Address for correspondence:

S. P. Gudadhe

Department of Botany,
Arvindbabu Deshmukh
Mahavidyalaya, Bharsingi
Email: smitagudadhe@gmail.com

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Equity in Food and Agricultural Systems and Their Impact on the Environment-A Review

S. P. Gudadhe

Abstract

Globally, the agricultural sector ranks first. The sustainable farming is the need of society and also the main source of equity in food and agricultural system and justice for the healthy environment. The sustainable farming can meet the needs of individuals, society, country and future generations along with that it can also maintain the ecosystem's equilibrium. The inclusion of healthy agricultural practices will play a vital role in the retention of sustainable environment. The impact of farming sector on soil, water resources, climate, environment and human health is the major factor to maintain the economy or sustainability of the particular nation. The increasing demand for food of growing population, increasing amount of poverty and malnutrition, the loss of biodiversity and its negative consequences led to climate change are all imposing new obstacles to global food and agriculture production systems. The conventional methods of the farming can fulfil the demand of food of increasing population but there is no assurance about the safety, not any guarantees concerning good health due to the tremendous use of chemical fertilizers. It is not only harmful to the consumers but also have worst effect on the environment. Chemical fertilizers have a negative impact on the soil, its microflora, water supplies, underground water, climate, and eventually, the sector's biodiversity. Therefore, surveillance techniques are required for sustainability, fulfilment, and food security. The environment's adverse impact can be reduced by using chemical fertilizers minimally and increasing awareness regarding biodiversity and environmental conservation. Building up the nation's economy requires the adoption of healthy farming methods, which can only be achieved when the entire agricultural system makes use of the right quantity of fertilizers, manages waste properly, and has a thorough understanding of marketing and product output. Therefore, to keep in mind the seeking resources of the community and the role of agricultural sector this paper focuses on such issues which are beneficial for the sustainable farming methods.

Key Words: Conventional agriculture system, improvement in Food system, Principles of sustainable agriculture, Healthy practices, Methods of agriculture, Effect on Environment

Introduction:

Equity is a key element of social justice, one that includes the concept of equality and also encompasses fairness and inclusiveness. The concept of equity also takes into account resource distribution and access to opportunities and decision-making (FAO 2014a). Sustainable resource management is becoming more and more important. As the world's population increases, there is a sharp increase in demand for agricultural products. One of the most crucial areas for conservation worldwide is agriculture because of its close relationships to human communities, the global economy, and biodiversity. The healthy practices needed for the ecosystem equilibrium along with the fulfilment of the community demands.

Sustainable food systems deliver food security and nutrition for all in such a way that the economic, social and environmental bases to generate food security and nutrition for future generations are not compromised (HLPE, 2014). A sustainable system would feed and nourish the world using the fewest resources possible, while improving the availability, access and utilization of food resources over time. Even more, sustainability in food systems would especially ensure that communities in rural areas of the world will have food security and that they would also control their lands to be used in an efficient way (Tirado von der Pahlen et al, 2018).

key principles of sustainability for food and agriculture

There are some key principals of sustainable agriculture mentioned below on which the healthy strategies are depends

1. Increase productivity, employment and value addition in food system

Since almost every country has some kind of malnutrition and food production is the primary driver of climate change and environmental damage, the world must figure out how to feed its growing population a sustainable, healthful diet. First, it is crucial to increase the diversity, nutritional value, and sustainability of food supply in order to improve nutrition and reduce the food system's environmental impact. In order to address the increasing prevalence of obesity, it is imperative that the environment become less conducive to obesity and that everyone have access to reasonably priced and healthful food. Third, funding is required to support innovations and the creation of interventions that can enhance nutrition in a sustainable and economical manner. Lastly, there must be genuine engagement from the private sector. (<https://www.weforum.org/stories/2015/05/4-ways-to-improve-food-productivity/>)

Food processing and value addition are essential to meet the growing demand for safe, nutritious and convenient food products. They help in reducing food losses, extending shelf life, enhancing nutritional value and creating value-added products, thereby increasing farm incomes and contributing to food security (Kshirsagar and Wandhekar, 2024). It is generally acknowledged that the food processing industry is most suited to employing the impoverished in rural areas and easing the strain on the agricultural sector to provide for their livelihoods. This is because they are accustomed to the agriculture industry, which would facilitate their training and placement in food processing businesses. Compared to other sectors, the food processing industry has the highest multiplier effect on job creation. Therefore, for the overall progress of economy it is important that the farmers and backward communities working in rural food processing units are treated at the top of the growth process (Rais, *et al* 2013). As a result, this principle emphasizes the significance of raising the production of raw materials from the agricultural sector and improving the value-added products through appropriate processing, both of which can improve health and create jobs.

2. Protect and Enhance Natural Resources

The natural resources are important for man kind for the food, clothing and shelter and support for survival in nature with welfare of livelihoods. They are responsible for the maintenance of the biodiversity, ecosystem balance, economic development and cultural importance. Food and agricultural production depend on natural resources and therefore the sustainability of production depends on the sustainability of the resources themselves. Much can be done to reduce negative impacts and enhance the status of natural resources. While intensification has positive effects on the environment through reduced agricultural expansion and subsequent limitation in encroachment on natural ecosystems, it also has potentially negative impact on the environment. The most widespread model of agriculture intensification involves intensive use of farm inputs, including water, fertilizers and pesticides. The same applies to animal production and aquaculture, with subsequent pollution of water, destruction of freshwater habitats, and destruction of soil properties. Intensification has also led to the drastic reduction of crop and animal biodiversity. Such trends in agricultural intensification are not compatible with sustainable agriculture and are a threat to future production (<https://www.fao.org/sustainability/background/en/?key=1>) Aside from reducing the environmental impact of using inputs more efficiently, agricultural systems can also use natural resources more sustainably and efficiently. Maximizing output, minimizing pollution, avoiding uniform pesticide and fertilizer applications, promoting site-specific methods, improving nutrient use efficiency, lowering nitrogen application, and safeguarding agriculture based on natural resources are all essential. Therefore, It is essential to create management plans and methods that integrate natural resource protection with development initiatives.

3. Improve livelihoods and foster inclusive economic growth

Economic growth has to be inclusive to ensure the wellbeing of the entire population. Inclusive growth requires full respect for human rights. Inclusive growth generates decent jobs, gives opportunities for all segments of society, especially the most disadvantaged, and distributes the gains from prosperity more equally. The first priority is to **create opportunities for good and decent jobs and secure livelihoods for all**. This will make growth inclusive and ensure that it reduces poverty and inequality (<https://www.sdgfund.org/thematic-area/inclusive-economic-growth-poverty-eradication>). Sustainable economic development brings social progress through the creation of jobs and income, as well as the integration of poverty groups, young people and the unemployed. Markets require public support and regulation. The economy is organized along value chains, because the point of reference for all economic activity is the products and the markets on which they are sold. (<https://www.giz.de/expertise/html/60139.html#:~:text=A%20strong%20agricultural%20economy%20brings,is%20growing%20in%20developing%20countries>)

4. Enhance the resilience of people, communities and ecosystem

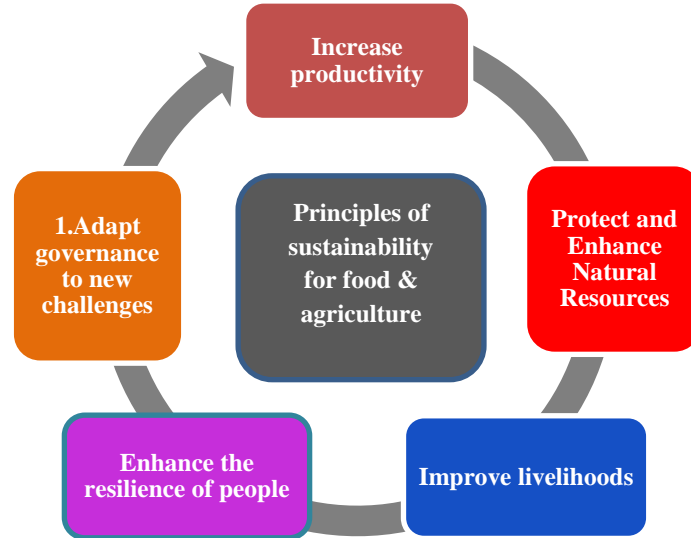
Agriculture is a high-risk business due to its inherent dependence on unpredictable natural factors such as weather, climate change, and pests and diseases. These challenges can make it difficult for farmers to produce food consistently, leading to higher food prices for consumers. As such, this fourth principle argues that we must help farmers build resilience to inherent challenges– to ensure sustainable food production and supply. Environmental and social sustainability are intimately related to ecological resilience. Maintaining agricultural productivity while preserving the environment, human health, and animal welfare is the goal of sustainable agricultural methods.

5. Adapt governance to new challenges

This principle states that "sustainable production" can only be achieved through a collaborative effort between the public and private sectors in an atmosphere of "accountability, equity, transparency and the rule of law". While the

two sectors often have different priorities and motivations, there should be a "public good dimension" to support stakeholders in the agricultural value chain with the resources needed to thrive. In short, there should be an increase in public-private partnerships to develop and implement sustainable farming practices. (<https://www.jiva.ag/blog/sustainable-agriculture-practices-for-a-greener-future>)

Figure:-1 key principles of sustainability for food and agriculture



Agricultural Systems and Their Impact on the Environment

Agriculture has both beneficial and detrimental effects on the environment. The increased use of fertilizers in conventional farming lowers the productivity of soil and reduced the quality of underground water. Biofertilizers are the alternative source to minimize the harmful effects of chemical agents. Sustaining the ecosystem's equilibrium, managing human health, and providing food safety while having a beneficial environmental impact are the primary goals of sustainable agriculture. The necessity of boosting the positive and minimizing the negative environmental consequences in agriculture is widely acknowledged in order to maintain the sustainability of resource usage (Sala, *et al*, 2017). It is difficult to identify the exact environmental effects of agriculture due to the complex relationships it has with the environment and natural resources. Although agriculture is a significant user of land and water resources, it is nonetheless dependent on both quantity and quality to survive. Although agriculture produces waste and pollution, it also recycles and conserves natural resources, alters the environment, and creates new wildlife habitats (Dhakal, 2019).

Agriculture can either sustain or degrade the environment (Millennium Ecosystem Assessment, 2005). Many agricultural activities can have environmental impacts on land, water, and air. These environmental impacts will differ based on the farm location, farm type, and the specific farming and land management practices used as well as the timing of these practices (i.e., season of fertilizer application). For instance, nutrients and pesticides can run off agricultural fields into surface water bodies or leach into groundwater. The healthier environment is the result of healthier practices which are needed for the future generations. The future of the earth, climate, environment, biodiversity and ecosystem is depend on the change and contribution of the behavioural patterns of the society.

The proper use of the fertilizers and reduction in the detrimental actions in the farming sector will improve the fertility of the soil, underground water quality, air quality, climate and ultimately the environmental safety. Assimilative capacity of ecosystems, farm design and farming practices, and the diversity of the natural resource base differ from place to place. Due to the prevalence of scattered, non-point source pollution in agriculture and the usually lengthy delays in the manifestation of environmental effects, such as groundwater pollution, it is challenging to distinguish the effects these various factors have on environmental outcomes (Cantonati, 2020). In places of heavy agricultural production, air pollution issues brought on by ammonia (acid rain), methyl bromide (ozone depletion), pesticide drift, crop burning, and disagreeable odors also tend to be more severe (Hsu, 2019).

Overgrazing, improper irrigation techniques, excessive row cropping that causes erosion, excessive or inappropriate use of agricultural chemicals, and bringing land into production that is too fragile to support crops are among the agricultural activities linked to environmental degradation. Corrective actions leading to a sustainable agriculture are necessary soon before the growing and more demanding world population requires food and fibre at levels that cannot be supplied with current agricultural systems. This will require major changes in the world's food growing patterns and approaches. Needed changes include research to find more appropriate crops and practices and using holistic principles in the development of agricultural systems (Keeney, 1998). (Pretty *et al*, 1996) suggest a more sustainable agriculture that pursues a more thorough incorporation of natural processes, minimal use of external

and non-renewable inputs that harm the environment or health of farmers and consumers, more participation of farmers, environmentalists, industrialists and consumers in problem analysis and development of solutions, equity in access of productive resources and opportunities, use of local knowledge, resources and opportunities, and greater self-reliance among farmers and rural communities.

Conclusion

Equity in food and agricultural systems ensuring that food is accessible to all in a sustainable and equitable manner requires. The environment, human health, and economic prosperity are all impacted by the intricate food networks. Resolving the disparities that affect regional and ethnic minorities, women, and people of Indigenous descent. The environment, including people, must be taken into consideration when designing new and enhanced technologies. In order to achieve sustainable agriculture, people—especially those who own and manage the land—must be involved in the development of sustainable systems. Consequently, government agencies, business, and research institutions must transform into learning organizations in order to succeed. Ecosystem or landscape-scale environmental protection must be a priority for technologies. Needs for research are multidisciplinary. End users, politicians, and a broad range of both the technical and social sciences will all need to support team approaches. The majority of the study will be high-risk, long-term research and development, which traditional organizations find difficult to sustain.

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Conflicts of Interest

There are no conflicts of interest.

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