Research Article

DOI: 10.48165/jes.2022.38.1.2

ACS Publisher
www.acspublisher.com

Journal of Extension Systems

Year 2022, Volume-38, Issue-1 (Jan-Jun)

ISSN 0970-2989 ***(Print)***
ISSN 2582-273X ***(Online)***

Need for Appropriate Extension Strategy for Sustainable Innovative Approaches with Global Health

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ARTICLE INFO

Key words: Ecological agriculture, Human health, Plant nutrition, Sustainable agriculture, Environmental degradation, Extension strategy, Farmers functionary research.

ABSTRACT

As an aftermath of the green revolution supported by advanced agricultural sciences, the increasing gulf between production and an understanding of basic ecological relationships has coincided with the increased use of external inputs, development of crop species with low susceptibility to pests, dependency on large amounts of water and other scarce natural resources which have extremely contributed to the degradation of the environment and sustainable agricultural system, production of unsafe food and ultimately deterioration of human and animal health. Globally, the bigger issues of health challenges are purely linked to the current state of agriculture. To cope with these challenges the ecologically-based agriculture is continuously showing its' potential to many around the world. Ecological agriculture is all about understanding the conditions leading to sustainable, productive agriculture that has a harmonious environmental impact. To build the ecologically sustainable agricultural system the enormous health threats related to the use of inorganic pesticides, fertilizers, and herbicides in agriculture would be taken into considerations. It requires the shift to low input systems and the use of organic manure and ecological pest management which have a considerable positive effect on human health. The present paper is based on the exploratory type of research which appropriately addresses the issues to improve human health through proper natural resource management and maintenance of ecosystem health with the help of advanced extension strategies. It is worthwhile to mention that the farmer functionary research, an innovative methodology of technology transfer can help to manage the crop ecosystem and to promote a sustainable agricultural system without hampering human health.

Introduction

The earth is the foundation of all life. The ways that we grow our food, produce our goods, and power our homes and cities are depleting resources, polluting the planet, and drastically reducing the biodiversity of our planet. By increasing our respect for nature in all its incarnations, we will have taken a big step towards building a sustain-

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Received 12-02-2022; Accepted 12-03-2022

able future. A sustainable living will protect the resources that help us to live and enjoy life for future generations. The major issues that affect our planet today, from climate change to animal rights, and about what we can do now for those to come. Furthermore, the environment goes hand-in-hand with human rights and economic justice: a culture of peace cannot be built without an understanding of how deeply all of these issues are intervened. For reinventing the factors of health hazards in case of applying the inorganic external inputs for agricultural production the revelation of the fact that the technologies like ecological agriculture, organic farming, and resource-conserving agriculture can be the panacea for controlling the health hazards that occurred in modern agriculture and towards the sustainable agriculture. The system of producing more food and procreation of health hazards are not the multidimensional discussion but in such an alarming agricultural condition wherein the production of more food requires judicious application of inorganic pesticides and fertilizers which can create health hazards for human beings too. So in such research climate, the health of the human being (ultimate beneficiary of agriculture) can be highlighted in the light of safe use of pesticides and fertilizers to flourished and cherished human civilization without any risk of health hazards which can be promoted through a safe economy, environment-friendly, ecological and sustainable agriculture.

The quality of food is a matter of concern as the modern technology in crop production with the use of pesticides and mineral fertilizers in agriculture has resulted in residues. The standard analytical techniques are being developed rapidly so that more and more residues are detected. Thus, modern agriculture is posing a global challenge for achieving sustainable development and a clean environment. Consumers are increasingly demanding environment-friendly and healthy foods. India is developing organic farming as well as conservation agriculture, approaches for sustainable agriculture, taking into consideration both environmental concerns and the growing global organic good market. Sustainable agriculture including organic farming is yet to take center stage in agriculture production in India despite agricultural policies waxing eloquent on promoting sustainable farming practices. Thus, it is high time for agricultural extension to play its significant role in; creating awareness on various alternatives in farming for sustainable development, also in building motivated human resources to promote organic farming and to have strong institutional arrangements. For the long past, researchers and policymakers have been aware of the link between the food we eat and the effect it can have on our health. The situation is that our health is influenced by the water we drink, the air we breathe, many physical and non-physical factors in our environment, and the quantity and quality of food we eat every day. The quality of our food is largely determined by the way it is grown or produced. Here lies the link between health and agriculture. As an aftermath of the green revolution supported by advanced agricultural sciences, the increasing gulf between production and an understanding of basic ecological relationships has coincided with the increased use of external inputs, development of crop species with low susceptibility to pests, dependency on large amounts of water and other scarce natural resources which have extremely contributed to the degradation of the environment and sustainable agricultural system, production of unsafe food and ultimately deterioration of human and animal health. Pesticides used in agriculture are usually referred to as plant protection products. They protect plants or plant products against pests. They are widely used in farming for their economic benefits — to fight crop pests and reduce competition from weeds, thus improving yields and protecting the quality, reliability, and price of produce. However, their use does involve risk because most have inherent properties that can make them dangerous to health and the environment if not used properly. Human and animal health can be negatively affected through direct exposure (e.g. industrial workers producing plant protection products and operators applying them) and indirect exposure (e.g. via their residues in agricultural produce and drinking water, or by exposure of bystanders or animals to spray drift). Soil and water may be polluted via spray drift, dispersal of pesticides into the soil, and run-off during or after cleaning of equipment, or uncontrolled disposal.

Developments in the agriculture sector have significantly influenced the choice of crops, the way they are grown, and the resource use patterns. The water-intensive cash crops, resulting in lower access to nutritious food requiring higher use of inorganic pesticides and fertilizers have led to the depletion of groundwater levels and contaminated food and drinking water. Indiscriminate use of inorganic external inputs and unsafe practices while using has hazardous to human health. All these together have contributed to the degradation of the environment, production of unsafe food, and ultimately deterioration of human and animal health. These are the result of the green revolution technology supported by advanced sciences. However, the science that has supported such a revolution in agricultural production has only focused on some parts of the production process and has neglected the basic understanding of agriculture as an ecosystem service and part of the global ecology. It emphasizes the role of ecological agriculture which is all about understanding the conditions leading to sustainable, productive agriculture that has harmonious impacts on the environment.

This paper re-emphasizes the need for ecological agriculture by adopting some extension strategies for sustainable agriculture without hampering human health.

The desk research study was carried out to prepare the entire content. The major emphasis was given to the discovery of ideas, insights, and theoretical constructs. The researchers reviewed and built upon the work already done by the previous scientists. The incorporation of researchers' ideas, knowledge, opinion, and discussion with the experts, related to the field helped to envisage the conceptual framework as well as to derive a conclusion of the entire paper. The in-depth knowledge of the different experts of multidimensional facets in agriculture has been consulted through interview methods for collecting and gathering the information to construct the theoretical background in a nutshell.

Framework and Discussion

The judicious application of inorganic pesticides use in most of the developing countries is reported to be unscientific and unregulated causing serious damages to the ecosystem and human health. The immediate health effects of exposure among the pesticides applicators are skin problems, itching, eye irritation, and vision problems. The frequency of symptoms like nausea, giddiness, breathing problems dehydration, vomiting, cramps, convulsions, diarrhea is comparatively less. These are some of the direct health hazards of pesticides application. Other indirect health hazards can be occurred by the residual toxicity of the pesticides within the food we eat. Finally, we must consider the enormous health threats related to the use of pesticides, fertilizers, herbicides in agriculture. In such an alarming situation, the need of the hour is to properly address the need for ecological agriculture, which is all about safe, healthy, sustainable, productive agriculture. The existing agricultural system can be modified through the adoption of an ecological approach emphasizing the maintenance of environmental services within the agricultural system. Some strategies of ecological agriculture may be the reduction of energy and resource-conserving external inputs, increase of low external inputs and mobilization of locally available natural resources by the local people, green manuring, intercropping, composting, biological pest management, adoption of the systems of rice intensification, promotion of home vegetable gardens, conservation agriculture, cultivation of traditional crops, organic farming, etc. Above all these strategies for food secure, healthy, safe, and sustainable agriculture requires some extension interventions to popularize and adopt the same. These extension interventions may include participatory appraisal and management of locally available natural resources and farmer functionary research.

Participatory appraisal and Management

The fast depletion of natural resources and production of health hazards is best understood at the local level where the significance of such resources is user-context-specific. The proximate relationship between the local people and nature harbors the powerful information banks at the local level (Edward, 1987a). The natural resources in the local situation can be appraised with the help of different participatory tools like space analysis, b time analysis, c flow analysis, and d decision analysis. Different participatory tools under space analysis are i) transect walk ii) social map iii) hydrological map iv) natural resource map etc under time analysis participatory tools are i) timeline ii) time frame iii) seasonal diagram etc underflow analysis the PRA tools are i) Venn diagram ii) information flow analysis etc under decision analysis participatory tools are i) matrix ranking ii) wealth being ranking etc. The knowledge and experience of a local user of such resources can help to understand the phenomena of natural resource depletion (Mukherjee, 1997). In this context, there is a foremost need to appreciate local level realities and create enabling conditions for community participation towards conserving and preserving natural resources, and hence the only way of the local community is through a participatory approach to eco-development (Chambers, 1989). So, participatory appraisal and management of locally available natural resources is an approach and methodology to harvest the local community's knowledge. The principles of the same can be delineated as Listening and learning, offsetting biases, seeking diversity, utilization of community time, and cross-checking. And ultimately the information regarding the management of natural resources can be done with the help of space analysis, time analysis, flow analysis, and decision analysis. All this information can be collated and an amalgamation of modern and traditional technology would be done with the help of the methodology participatory technology development and the generated technology would be the environmentally safe, sustainable, and productive agricultural technology.

Farmer Functionary Research

Another extension strategy in this regard may be farmer functionary research. It is an innovative extension methodology for the transfer of technology. The farmer func-

tionary research is a participatory approach to build capacities of farmer groups in managing crop ecosystems and making them better decision-makers in promoting sustainable use of resources at the farming levels. Besides, the approach aims at identifying and training master farmers who would help in further scaling up. This approach enabled farmers to become informed decision-makers, making crop management decisions based on learning in their fields along with training received. As a result, farmers moved away from excessive use of agrochemicals towards more environment-friendly and sustainable crop management practices. Farmers were involved in all stages of the process from setting the research agenda and the experimental treatments, conducting observations, and discussing and interpreting results. With renewed confidence, farmers had become useful research partners with research institutes and extension staff, in field-based research (Aravind *et al*, 2006).

Conclusion

To conclude the health hazards produced by the indiscriminate use of inorganic pesticides, fertilizers and herbicides is an alarming challenge to our society. It needs immediate intervention to cope with the challenge. In this perspective, ecological agriculture is the panacea for a sustainable, eco-friendly, and productive agricultural environment. For harnessing all these strategies of ecological agriculture participatory appraisal and management of locally available natural resources and farmer functionary research are the two pillars of extension intervention in the changing global scenario. We live in a world that is changing very rapidly. The pollution of our land, air, and water has caused changes that we are only beginning to understand. In developed countries, a large amount of excess food and goods go to waste, while half of the world's population lives on less than $2 a day. The Internet can connect people across the world in ways our ancestors could never imagine, but natural resources are diminishing rapidly as the process of urbanization moves across country-sides. As individuals, we did not create these problems, but as individuals, we can solve them. Every single one of us depends on the planet, and every single one of us is responsible for its survival. Changing how we live can be very difficult, but it is possible.

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