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RESEARCH ARTICLE

Sustainable Agricultural Development: Concept and Priorities of Farmers and Extension Workers

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ABSTRACT

Sustainable agricultural development refers to the capability of the agricultural system to ensure food security for all at present and in future. The concept of sustainable development as understood by the farmers and extension workers was studied along with their priorities. Biological, Economic, Social and Environmental indicators of Sustainability as mentioned by the respondents matched well with the thinking of experts. Integration of these indicators in decision making would achieve sustainable agricultural development.

Key Words: Sustainable agricultural Development - Biological, Economic, Social and Environmental Indicators - Views and Priorities of Farmers and Extension workers.

INTRODUCTION

Sustainable development was defined as the "development that meets the needs of the present without compromising the ability of future generations to meet their own needs" (United Nations General Assembly, 1987). In course of time, many definitions of the concept of sustainable development were proposed (Emas, 2015). The one that is more relevant to agriculture was given by High Level Panel of Experts on Food Security and Nutrition (HLPE).According to the Panel, Sustainable agricultural development is agricultural development that contributes to improving resource efficiency, strengthening resilience and securing social equity / responsibility of agriculture and food systems to ensure food security and nutrition for all, now and in the future" (HLPE, 2016). It was considered worthy to know the understanding of the concept 'Sustainable Agricultural Development' by farmers and extension workers.

MATERIALS AND METHODS

An ex-post facto study was taken up in Cauvery Delta Zone of Tamil Nadu State during 2016. A sample of 160 farmers was randomly selected from four Villages of Chidambarm and Kattumannarkoil taluks of Cuddalore district. Further, a sample of 120 Extension workers was randomly selected from State Department of Agriculture, M.R.K. Cooperative Sugar Mills, and NGOs operating in the study area. Responses were collected from the respondents utilizing semi-structured interview schedules.

RESULTS AND DISCUSSION

The concept of sustainability as understood by the farmers of the study area was obtained by asking them what is meant by sustainability of agriculture. Their responses were in terms of indicators of sustainability. The results are presented in Table 1. The Table 1 reveals that more cattle in the farm, Crop rotation/Intercropping/Mixed cropping, Quality grains and fodder and No Salinity/Alkalinity were considered the indicators of sustainable agriculture by all the respondents (100.00%). Use of Traditional varieties, more trees in the farm and Use of Farm yard Manure and Green manure were considered indicators of sustainable agriculture (93.75%) followed by fewer incidences of Pests and diseases, Soil conservation and water conservation and use of indigenous knowledge were considered indicators of sustainable agricultural development by most of the respondents (90.62%). Sustainability of agriculture was considered possible only with the holistic perspective of more cattle, more trees, crop rotation, mixed cropping and Intercropping, use of Farm Yard Manure/Green Manure as well as no problem soil due to the tradition. Quality grains and fodder was also an important indicator because of preference for personal consumption and care for animals. Floods and Droughts experienced in the study area prompted them to mention soil and water conservation. Use of traditional varieties and use of indigenous knowledge were also mentioned because of their memories of the past.

The Table 2 reveals a list of twenty-one indicators including Integrated Pest Management (IPM), Food security, Soil Conservation, Water Conservation, Adaptable technologies and Green Manure crops and Nitrogen fixing plants (100.00 %). This may be due to the professional training of the extension workers. Technologies compatible with labour availability (95.83%) was listed an indicator because of field experience. Judicious combination of inorganic and organic fertilizers along with biofertilizers, higher productivity, Crop rotation/Intercropping/Mixed cropping were also listed by most of the respondents (91.67%) due to their understanding of advantages and personal exposure. Conservation of Natural vegetation on-farm and off-farm, scale- neutral technologies, agroforestry and raising more farm animals were also listed by many of the Extension workers due to exposure from media. Use of traditional varieties and indigenous knowledge (33.33 %) were also mentioned by few of the respondents due to their interaction with the farmers.

Priorities of Farmers and Extension Workers for Sustainable Agriculture

Priorities of farmers were obtained and the results are presented in Table 3. The Table 3 reveals that the top priorities of farmers for sustainable agriculture were Focus on Farm Level problems and Intercropping/Mixed cropping/Crop Rotation and use of Green manure (100.00 %). Focus on Farm Level Problems reveals the difficulty encountered in addressing location specific issues as a departure from macro level recommendations. This is followed by use of traditional crop varieties and use of indigenous knowledge for crop protection (90.63%) due to the familiarity of the technologies. Farmer-to-farmer communication was mentioned as a priority by three-fourths of the respondents as it provides a homogenous platform for sharing information and difficulties. This may also facilitate participatory democracy (Mintzer,1992) a vital input for sustainable development.

The Table 4 reveals that Technologies and Improved varieties from the Scientists and Biodiversity are the top priorities of all the Extension Workers for sustainable agriculture. This may be the due to professional education and training of the extension workers. Majority of the Extension Workers (83.33 %) felt that agricultural enterprises need to be diversified and organic and inorganic inputs need to be judiciously combined. It may be due to their field experience combined with professional training. Adequate, quality seed production to meet the demands of farmers was the priority for three-fourths of the Extension Workers as it has been the real field problem faced by them. Some of the Extension Workers expressed the need to limit the use of inorganic chemicals and pesticides and to increase the use of biofertilizers and biopesticides (62.50%).This may be due to media exposure and training undergone. Use of proven indigenous technologies could be promoted for sustainable agriculture argued some of the Extension Workers (58.33%) as they are convinced that some of the indigenous technologies have been scientifically established.

CONCLUSION

It could be concluded that the Biological, Economic, Social and Environmental indicators of sustainable agriculture mentioned by the respondents of the study match with the thinking of international experts. There was some additional input like farmer-to-farmer communication from farmers for social networking. Integration of biological, economic, social and environmental concerns to decision making of farmers and Extension Workers (Kanayo *et. al.*, 2015) would achieve the goal of Sustainable Agricultural Development through participatory democracy.

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Table 1. Meaning of Sustainability as Understood by Farmers (n=160)

S.No.	Indicators of Sustainability	Number of Respondents	Percentage
1	Use of Traditional Varieties	150	93.75
2	Use of indigenous Knowledge	145	90.62
3	More Cattle	160	100.00
4	More Trees	150	93.75
5	Use of Farm Yard Manure and Green Manure	150	93.75
6	Quality grains and fodder	160	100.00
7	Crop Rotation/Inter cropping/Mixed cropping	160	100.00

8	Soil Conservation	145	90.62
9	Water Conservation	145	90.62
10	Minimum use of Chemicals	160	100.00
11	Fewer incidences of Pests and Diseases	145	90.62
12	No Salinity/Alkalinity	160	100.00

Table 2. Extension Workers' view on Indicators of Sustainability (n=120)

S.No	Indicators of Sustainability	Number of Respondents	Percentage
1	Food security	120	100.00
2	Diversity of Species and varieties	112	93.33
3	Conservation of natural vegetation on-farm and off-farm	100	83.33
4	Soil Conservation	120	100.00
5	Water Conservation	120	100.00
6	Increased Soil Organic Matter	120	100.00
7	Judicious combination of inorganic and organic fertilizers along with biofertilizers	110	91.67
8	Integrated Pest management with a combination of Cultural methods, Chemicals, bio-pesticides and natural enemies	120	100.00
9	Higher Productivity	110	91.67
10	Crop Rotation/Inter cropping/Mixed cropping	110	91.67
11	Use of Traditional Varieties	40	33.33
12	Agroforestry	90	75.00
13	Green manure crops and Nitrogen fixing plants	120	100.00
14	Recycling of farm waste	60	50.00
15	Raising more Farm Animals	90	75.00
16	Use of indigenous Knowledge	40	33.33
17	Scale neutral technologies	95	79.17
18	Technologies compatible with labour availability	115	95.83
19	Low cost external inputs	80	66.67
20	Adaptable technologies	120	100.00
21	Inclusion of cash crops	90	75.00

Table 3. Farmers' Priorities for Sustainable Agriculture

S.No	Priorities	Number n=160)	Percentage
1	Focus on Farm Level Problems	160	100.00
2	Use of traditional crop varieties	145	90.63
3	Use of Indigenous knowledge for crop protection	145	90.63
4	Use of Green Manure	160	100.00
5	Intercropping, Mixed cropping and Crop rotation	160	100.00
6	Farmer-to-farmer communication on technologies	120	75.00

Table 4. Extension Workers' Priorities for Sustainable Agriculture

S.No	Priorities	Number (n=120)	Percentage
1	Technologies and improved varieties from Scientists	120	100.00
2	Diversify agricultural enterprises	100	83.33
3	Combination of organic and inorganic inputs	100	83.33
4	Biodiversity	120	100.00
5	Use Proven Indigenous Technical Knowledge	70	58.33
6	Limit the use of inorganic chemicals and pesticides and increase biofertilisers & biopesticides	75	62.50
7	Adequate, Quality seed production	90	75.00