

Research Article

Impact and constraints of farm pond based watershed development in the Hassan district of Karnataka

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Abstract

The impact of extension intervention as “consequences of innovations” and defined as “the changes that occur to an individual or to a social system as a result of adoption or rejection of an innovation,” (Rogers, 1983⁷). Impact assessment that involves the analysis of changes which has occurred due to program intervention and understanding of causal relationships of underlying such changes by Mustafa et al. (1996⁵). With respect to agricultural sector, the farm pond based watershed management improves the sustainable agriculture and conserve the natural resources such as soil, water and biodiversity, etc. Farm pond is used for storing the monsoon rainwater, which is used for irrigation and Farm ponds are useful to improve the cropping pattern, productivity, employment, and income of the farmers (Kakade, et.al.,2001²). Under this context, this study has set research focus on to study the Impact and constraints of farm pond based watershed development in the Hassan district of Karnataka sample size of 100 farmers from the farm pond based watershed area was selected purposively to assess the impact and constraints of the farm pond based watershed development area.

The sustainability and success of the activity helps the farmers through the active participation of the farmers, improved water availability, ground water recharge, increased crop productivity, livelihood diversification, conservation of agro- horti and forestry. The situation is getting further supported with the recent climate change adaptation and mitigation process.

Keywords: Farm pond based water shed, Sustainable management, Agro forestry practices, Standard of living

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Introduction

Farm ponds, even though limited in terms of size and water capacity, perform very significant roles in various aspects according to their proper placement in the watershed context. The farm pond impacts indicate not only increasing crop yields in both the rainy and the dry seasons, but also reduction of downstream sediment load (WangkahartT, 2007⁸).The improved crop management practices compared with change in cropping pattern have contributed for providing additional employment among farmers. In addition to this, during off-season, construction of farm-ponds, was also contributed to increasing employment among the farmer who have farm ponds. (Rajeshwari Desai, et al, 2007⁶). The basic objectives of watershed development programme are improving the productivity of the soil under rain fed condition through improved soil and water management practices, impart stability to crop yields through proper run-off management, restructuring of cropping pattern and land use, restore the ecological balance through resource conservation,Afforestation and pasture development and improve the socio-economic conditions of the inhabitants. Watershed development and management is a multi-disciplinary holistic approach aimed at optimizing the use of land, water, vegetation and all associated components in an area which could alleviate drought, moderate floods, prevent soil erosion, and improve water availability, increase fuel, fodder and agricultural production on a sustainable basis, (Dhruvanarayana, et.al, 1987¹).

Research Methodology

In the present study, *Expost-facto research design*,Kerlinger, F.N. (1983⁴). was employed. The Hassan district of Karnataka was purposively selected due to the implementation of the farm pond based Indo Canadian Environmental

Facility-water shed project under the management guidance of BAIF Development research foundation. A sample size of 100 farmers from the farm pond based watershed area was selected through simple random sampling technique and Semi structured interview schedule was prepared for this study.

Location of the study

The Adihalli- Myllanhalli project was designed and executed by BAIF development research foundation. The chief attributes of the net worked farm ponds systems were that, it involves relatively low investment and does not require advanced technologies. The total area of the water shed development is 1100 ha. It is a community based bottom up watershed development work. In that watershed development work, the trench cum bund was a compulsory activity (100 percent) and Farm ponds were constructed based on the importance only. Farm ponds were not compulsory for all the farms. The ponds are connected where ever possibilities were there and all farm ponds are not connected in the watershed area.

Adihalli-Myllanhalli village area of Hassan district in Karnataka is a drought prone, rain fed agriculture area. Due to erratic rainfall, poor soils, high water runoff and scarcity of water for irrigation and drinking water purpose. The area was socio-economically backward. So, an integrated watershed development project was initiated to conserve the soil and water resources for socio-economic and the agro ecosystem development purpose. Farm pond based soil and water conservation measures address three basic issues in a decentralized watershed management manner. First, satisfying the water demand of individual farmers located in different reaches of the watershed; second, recharging the ground water for overall improvement in water availability within the watershed; and third, *in-situ* conservation of soil. (Kakade, et.al., 2001³).

Figure 1 Location Map (Kakade, et.al., 2001³)

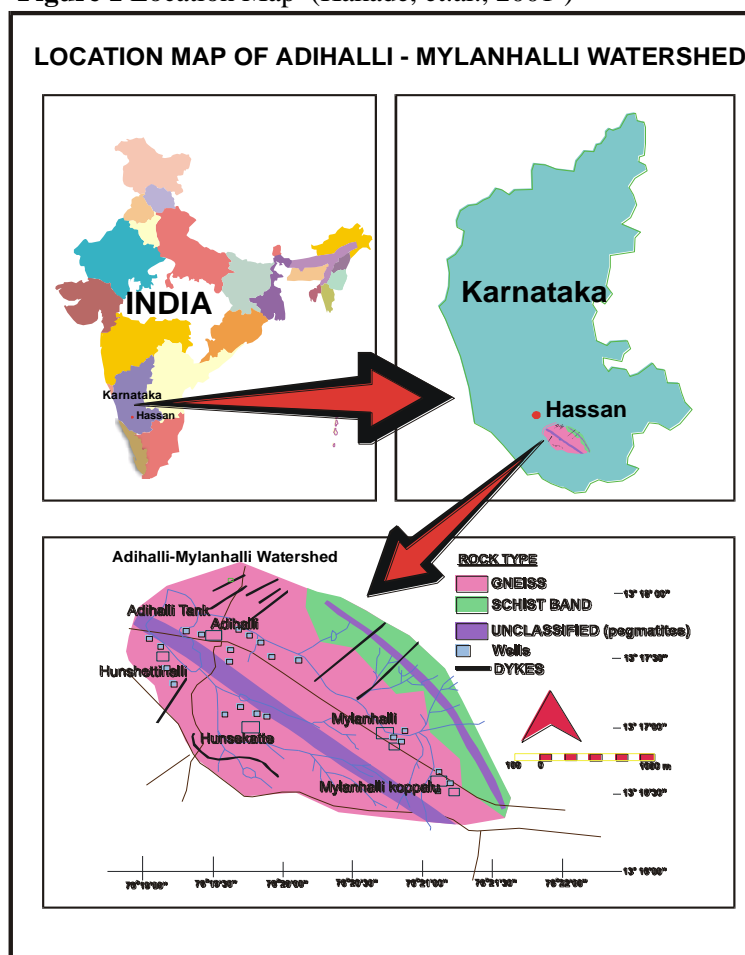
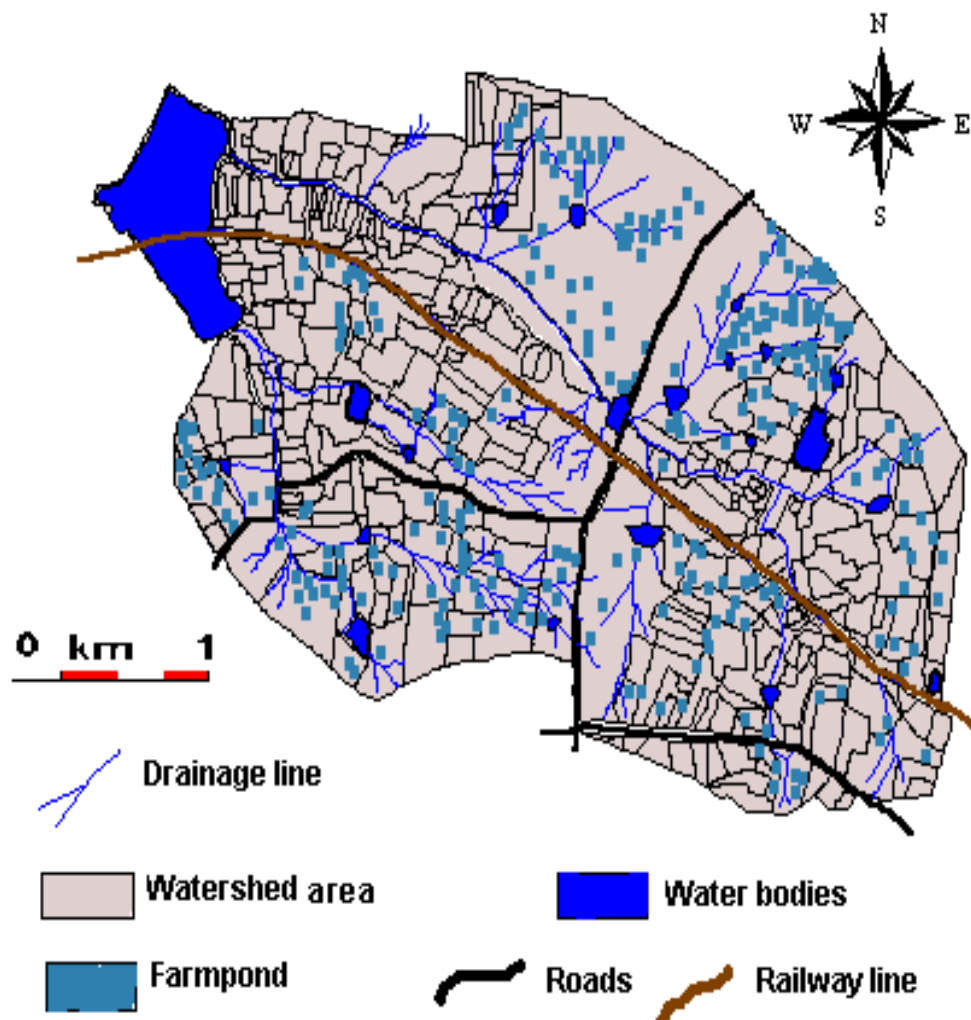


Figure 2 Farm pond network in Adihalli-Myllanhalli watershed (Kakade, et.al., 2001³)



Direct impact

Table 1 infers that with respect to direct impact, income, agricultural crops, Horticultural crops, milk production, SHG enterprise, wages created for land less labourers has increased and reduced cost of cultivation the study area. The increased livestock ownership helps the study area farmers to effectively converting all the available crop and solid waste recycling in to various types of composts and manures to sustain the soil fertility and production.

Socio - economic impact

In the socio economic impact, food security and diet content has improved after completion of the project and it has further increased in the present conditions. The farmers risk taking abilities, economic motivation, social participation level, leadership abilities has improved in the study area. And so, participation in social organization has improved in the present conditions. Increased agricultural production has ensured the food security of watershed area. The families are consuming fruits and vegetables from their improved standard of living conditions. The health status of the farmers has increased due to decreased health hazards in food chain.

The social profile of the community has improved well. Women are managing business to gain some amount of economic freedom and improve their family income. Creation and maintain all community owned structures in the study area on sustainable basis. The farmer's son and daughters are going to alternative livelihoods like software engineers to software companies; private industries based jobs and business by their improved educational status.

Table 1 Impact of farm pond based watershed development in the Hassan district of Karnataka (n=100)

Sl. No.	Impact	Increased	%	Somewhat increased	%	No. change	%
I Direct impact							
1.	Income	79	79	12	12	9	9
2.	Field crops	66	66	24	24	10	10
3.	Horticultural crops	45	45	22	22	33	33
4.	Micro enterprises	5	5	17	17	78	78
5.	Milk	84	84	10	10	6	6
6.	Sheep rearing	32	32	26	26	42	42
7.	SHG enterprise status	26	26	54	54	20	20
8.	Wages created for land less labourers	42	42	28	28	30	30
9.	Cost of cultivation reduction	35	35	44	44	21	21
II Indirect impact							
A	Social – Economic impact	Before Farm pond based water shed	%	Immediately after the Farm pond based water shed activities	%	Present status of the Watershed area	%
1.	Participation in social organization	--	--	87	87	13	13
2.	Risk taking abilities	--	--	64	64	36	36
3.	Leadership abilities	--	--	45	45	55	55
4.	Economic motivation	--	--	68	68	56	56
B Environmental impact							
1.	Improvement in water level	--	--	85	85	65	65
2.	Surface water availability	--	--	90	90	70	70
3.	Ground water level	--	--	85	85	75	75
4.	Drinking water status	--	--	70	70	70	70
5.	Soil fertility	--	--	65	65	85	85
6.	Area under two crops	12	12	47	47	55	55
7.	Area under three crops	4	4	18	18	22	22
8.	Green cover and biodiversity conservation	25	25	66	66	88	88

Environmental impact

In the environmental impact, improvement in water level, surface water availability, ground water level and drinking water status has improved well. Improvement in soil fertility, area under two crops and area under three crops has improved well. The other impacts of Livestock rearing and fodder availability, improved green cover and biodiversity conservation has improved well. Majority of the farmers suggested the bio diversity of the farm field increased with the increased impact of floral diversity, faunal diversity, habitat diversity, landscape, soil organic matter improvement, soil biological activity, soil structure, soil erosion, reduced nitrate leaching and improved nutrient use efficiency. The farm pond based farming practices also helps to control pests, and application of farmyard manure and compost as the best soil microbial activity.

Table 2 Constraints and suggestions to improve the sustainability of farm pond based water shed development process (n=100)

Sl No.	Constraints	Major Constraint	%	Somewhat constraint	%	Not at all a constraint	%
1.	Maintenance of agri-HortiPlantations	15	15	22	22	63	63
2.	Maintenance of trench cum bund structures	28	28	46	46	26	26
3.	Clearing the bushes in the farm ponds	30	30	48	48	22	22
4.	Pest and diseases	18	18	31	31	51	51
5.	Topography maintenance	12	12	27	27	61	61
6.	Soil siltation in farm ponds	26	26	46	46	28	28
7.	Lack of environmental awareness	20	20	35	35	45	45
8.	Lack of social participation	12	12	37	37	51	51
9.	Rainfall and other meteorological constraints	43	43	25	25	22	22

The constraints faced by the farmers are maintenance of agri- hortiplantations, maintenance of trench cumbundstructures,clearing the bushes in the farm ponds pest and diseases issues, Topography maintenances in the watershed areas are very important problems. The soil siltation mainly from degraded areas, denuded gullies, and steep slopes contribute greatly to the sedimentation and siltation of stream channels. And so, lack of environmentalawareness, lack of social participation and Rainfall and other meteorological constraintsare other important constraints in the study area. Promotion of alternate livelihood opportunities, providing environmental awareness training programmes, crop insurance programme, strengthening the social institutions based activities are some strategies to solve the constraints.

Conclusion

The farm pond based watershed practices transforming the lives of rural communities through the agro forestry and horticultural based sustainable livelihoods. It also enriches the natural resources.In the direct impactof increased income, agricultural crops diversity, improved horticultural crops, enhanced milk production, potential SHG enterprises, creation of wages for land less labourers has increased and reduced cost of cultivation the study area. Irrigated land increased even though in less rainfall conditions. The farmers risk taking abilities, economic motivation, social participation level, leadership abilities has improved in the study area. It leads the social motivation to help farmers to improve their decision making ability. In the environmental impact ofimprovement in soil fertility, improvement in surface water availability, increased ground water level and drinking water status, area under two crops and area under three crops has improved well. Other impacts of Livestock rearing and fodder availability, improved green cover and biodiversity conservation has improved well.

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