International Journal of Science, Environment and Technology, Vol. 3, No 5, 2014, 1882 – 1892
ISSN 2278-3687 (O)

COMPARATIVE ANALYSIS OF CROPPING PATTERN AND SOCIO-ECONOMIC STATUS OF FISHERMANAND FARMERS IN FIVE MAJOR WETLANDS FROM AJARA TAHSIL, KOLHAPUR DISTRICT (MS), INDIA

Sachinkumar R. Patil[1], S.S. Patil[2] and T.V. Sathe[3]
[1]Department of Zoology, R. B. M. Mahavidhyalay, Chandgad, Dist.: Kolhapur (MS) India
[2]Post graduate center for Zoology, Krishna Mahavidhyalaya, Rethare (BK), Dist.: Satara (MS) India
[3]Department of Zoology, Shivaji University, Kolhapur (MS) India
E-mail: srp_zoo@yahoo.co.in (**Corresponding Author*)

Abstract: Present study deals with the cropping pattern and socio-economic status of farmers and fisherman concerned with five major wetlands from Ajara tahsil of Kolhapur district. The study was undertaken to analyze comparative change in the social and economic status of farmers and fisherman residing at the adjoining region of these wetlands. The study was carried out by using simple random sampling for farmers by the means of questionnaires and personal interviews of fishermen. The data obtained from questionnaires was analyzed by using bar charts and line charts. The study revealed that the both farmers and fisherman got socio-economically strengthened after construction of wetlands. Study also revealed that the cropping pattern was tremendously changed as compared before construction of wetlands. The study of fishery potential revealed that the gross income was more at Yarandol freshwater reservoir while net income was more at Dhangarmola and Ningudage reservoir. On contrary, gross income as well as net income observed less at Khanapur reservoir.
Keywords: Socio-economic, wetlands, agriculture, fishery potential, statistical analysis.

1. Introduction

Wetlands (Natural and artificial) plays an important role in socio-economic development of human population. The economic rationale for conserving and creating wetland ecosystems is thus linked to the services and goods they provide, which have been recognized to be extremely valuable welfare constituents to many people worldwide (Millennium Ecosystems Assessment, 2005).These are main source of inland water for both agricultural utilization and fisheries. Agricultural development by the means of economy with reference to villages away from rivers might be achieved by these reservoirs. The importance of the fisheries sector in India is demonstrated by the fact that it employs more than five million people (Anon, 2000), contributes to food and nutritional security and employment, supports livelihoods, and raises the socioeconomic status of poor fishing communities.

*Received Sep 18, 2014 * Published Oct 2, 2014 * www.ijset.net*

During the past half-century, Indian fish production registered excellent growth, from a meager 0.75mt in 1950 to 6.3mt in 2002 (Anon, 2000; Katiha *et al*., 2003). The industry contributes nearly INR 200 trillion to the national economy, forming 1.4% of national gross domestic product (GDP) and 5.4% of agricultural GDP (Anon, 2000). The sector is one of the major contributors to foreign exports.

During the past two decades, the inland fisheries in India, which include both capture and culture fisheries, have registered tremendous growth and change. Until the mid-1980s, capture fisheries were major source of inland fish production. Nevertheless, since then, fish production from natural waterways, such as rivers and lakes, has trended downwards, primarily due to proliferation of water control structures, indiscriminate fishing, and habitat degradation (Katiha, 2000). Diminishing resources, the energy crisis and the resultant high cost of fishing have led to an increased realization of the potential and versatility of aquaculture as a viable and cost effective alternative to capture fisheries (Ayyappan & Jena, 2001; Ayyappan, 2004; Jana & Jena, 2004; Pillai & Katiha, 2004).Recently, Millennium Ecosystem Assessment has shown that global food production has doubled in the past 40 years, and has been able to keep pace with the increasing human population. Based on the expected growth of the world population in the next 25 years, the need for food products will increase 50% by 2030 (Hassan *et al*., 2005).

Restoring ecosystem services and obtaining a symbiotically beneficial balance in ecosystem services has little evidence-based information or experience. It is an intricate and difficult issue to resolve as it inevitably means a redistribution of economic benefits among stakeholders in order to redress established trade-offs. To date there is only evidence of this in OECD countries and India, where economic compensation measures have been applied (Wood and Halsema, 2008).

Socio-economic aspect is one of the important aspects of wetlands for sustainable development as these provide beneficial services to human kind. In the present study, important socio-economic parameters have been considered and analyzed by questionnaire. The study included socio-economic aspects of villages residing at adjoining areas of reservoirs. The main object of present study is to focus on the economic and social development of local people after construction of dams and compare it with previous situations. As farmers and local fisherman are two important stakeholders (Sampling units) who involved directly in the ecology of wetlands, the present study was carried out for various socio-economic parameters.

2. Materials and Methods

2.1 Study Area:

Ajara is one of the important tahsil of Kolhapur district, located at southern region with N 16^0 12' and E 74^0 2'. Total population of the tahsil is about 1, 21, 430 residing in 74 villages. The total area of the tahsil is about 54, 853 ha. For the present study, five freshwater reservoirs were selected out of 30 reservoirs viz. Gavase, Dhangarmola, Yarandol, Khanapur and Ningudage. The selection of water bodies were made based on larger area and year of construction. Gavase freshwater reservoir is situated west south to the Ajara city at N 16^0 05' 761" and E 74^0 07' 596". The reservoir was man-made and construction of the dam was completed in the year 2003. Dhangarmola freshwater reservoir is situated at south-west to the Ajara city with longitude and latitude of 16^0 03' 687" and 74^0 05' 647". The dam was constructed in the year 2000.The location of Yarandol freshwater body is N 16^0 03' 629" and E 74^0 10' 539", situated to the south of Ajara city. This reservoir was constructed in the year 1998. Khanapur freshwater reservoir was constructed in the year 1995 which is situated at south-west of Ajara city with the location of N 16^0 05' 352" and E 74^0 18' 132". Ningudage freshwater body is situated at northeast of the Ajara city with the location of N 16^0 09' 325" and E 74^0 18' 132".The reservoir was constructed in the year 1982.

2.2 Collection of Data:

The socio-economic status was studied by questionnaires asked to farmers and personally interviewed fisherman during July 2011 to June 2012. As the total population of these villages is less than thousands consequently the number of families are also few, 10 samples were selected from each village by simple random sampling method. Interviews were conducted for fisherman due to the number of fisherman is limited as fishing activity is carried out through the process of lease. Hence, Individual fisherman was interviewed.

2.3 Statistical Analysis:

The data obtained from the questionnaire was analyzed by using Microsoft Excel 2010. Present study was carried out with the help of visual presentation of the data by the means of BAR chart and Line chart. BAR chart and line charts are an appropriate presentation methods for the present study as both can reveal the pattern of hidden data. These both methods facilitate proper comparison of data before and after the construction of dams.

3. Result and Discussion:

Age distribution of farmers is as given in Figure 1.1 and 1.2 and it has been revealed that the age group of farmers is between 20 to 70 years and generally, most of the farmers belong to

age group 35 to 55 years. The study also revealed that the age is biased towards upper age group and modal age is around 55 years. Distribution of family members is represented in Figure 1.3 and 1.4. The study revealed that average number of family members was four and it was decreased onwards.

Distribution of livestock is as depicted in Figure 1.5. During the study, it has been observed that the distribution of buffalos across the villages was more or less with similar trend and farmers have tendency to domesticate buffalos as supportive income source. Farmers from Gavase, Dhangarmola and Ningudage tends to domesticate buffalos while farmers from Khanapur and Yarandol tends to domesticate others livestock like sheep, goat, etc. Along with buffalo, the distribution of ox is also uniform across the villages but the number was relatively small. The distribution of cows is also uniform but villages like Yarandol and Khanapur do not have considerable number of cows. The villages Yarandol, Khanapur, and Ningudage tend to domesticate other animals like sheep, goat etc. which was not found at Dhangarmola.

The irrigation facility used by farmers at all study sites is bore-well, well and mostly irrigation facility except Ningudage village (Figure 1.6). Although the farmers from Ningudage reservoir not using reservoir water directly, they tend to use well water and the level of water was increased due to construction of reservoir.

The cropping pattern plays an important role in economic development that is directly dependent on either rainwater or irrigation system. In present study, cropping pattern before and after construction of reservoir was studied through questionnaire and represented in Figure 1.8, 1.9 and 1.10. The study revealed that before the irrigation facility, farmers used to adapt traditional farming and tend to cultivate traditional crops of the area. However, after irrigation facility farmers were aware to cultivate cash crops like sugarcane, vegetables, fruits, cereals etc. The cultivation of traditional crops got increased and it was observed in the cases of groundnut, cashew and sugarcane. The notable observation of present study is that the cultivation of rice was decreased after availability of water facility.

Crop pattern before irrigation facility at Gavase was cashew, rice and sugarcane (Less percentage). These three were the only crops before irrigation and rice was the dominant crop. The trend of cropping after irrigation was tremendously changed and the number of crops has increased from three to more than seven. The cash crops include groundnut, sugarcane, cereals, fruits etc.

The Dhangarmola village exhibited only four crops before construction of dam among which rice was major. Farmers tend to cultivate seasonal crops like finger millet. The cropping pattern was considerably changed with sugarcane and cashew being on top position. However, cultivation of rice was notably decreased.

During the study period, it has been revealed that majority of farmers from Yarandol tend to cultivate rice before construction of reservoir. However, the cropping pattern over here was rich as compared to other study sites. The notable difference observed at this site is that the crop varieties after irrigation facility were increased; indeed cultivation of rice is also retained as it was before.

The crop pattern at Khanapur village before construction of the reservoir was very low with cultivation of rice and cashew as major crops. However, after irrigation facility cultivation of rice decreased to some extent while cashew retained its position. Along with these, two farmers started cultivating crops like maize, sunflower, finger millet etc.

Like other sampling units, Ningudage was also dependent on rice along with cashew and other crops before the reservoir construction. Since then, almost the same change has been observed at this site as the reduction in the proportion of rice cultivation and increase in the cultivation of sugarcane. Overall, farmers view about construction of reservoir is depicted in Figure 1.7 and it reveals that farmers from all study sites were benefited by the construction of the reservoir except 4 farmers at Gavase and two farmers from Ningudage.

Along with agricultural dependence of farmers on the reservoirs, fisherman community is one of the communities which directly depend on reservoirs for their survival. The fishery potential was assessed by an interview and economic status of fisheries is givenin Table 1. During the study period, it has been revealed that fishermen used to release finger-limbs of carps like Rohu, Catla, Mrigal and Silver at all reservoirs. The comparative yield was highest at Yarandol freshwater reservoir but the net profit was more from Ningudage reservoir. During the study, it was observed that the yield at Khanapur reservoir was low. Overall, it can be concluded that the fishermen are getting economically strengthened by the fishing activity. The harvested fish from all reservoirs were sold at Gadhinglaj fish market.

The Gavase freshwater reservoir was given on lease to a private contractor, with the amount of 5,800 INR per year. The study revealed that average fish yield obtained was 7 ton and the gross earning was about 4,20,000 INR when fisherman sold fish at 60 INR/ kg. The expenditure amount noted during this period was 2,28,800 INR including lease amount,

seeds, transport, net maintenance, harvesting and other charges. From the fishing activity, fisherman can get net profit of 1,91,000 INR.

The fishery potential at Dhangarmola freshwater reservoir was observed during the period of study and it has been revealed that the average annual yield at this reservoir was about 7.5 tons. The annual gross earnings from the fishing activity was 4,50,000 INR while the net profit excluding expenditure was 2,13,000 INR. The society involved in fishing activity at this reservoir is Matshakanya Co-operative fishing Society Ltd, Harali-Khurd.

The Economics of fishery at Yarandol reservoir was noted during the tenure of study and it revealed that average annual yield was 8.5 tons and annual gross income was about 5,10,000 INR. The annual average net profit obtained by fisherman was about 2,16,000 INR. Matshakanya Co-operative fishing Society Ltd, Harali-Khurd is harvesting fish from this reservoir.

Fisherman does the fishing activity at Khanapur reservoir.The average annual yield from this reservoir was quite less with 2 tons. The gross earnings from fishing activity was 1,20,000 INR and the annual net profit was about 53,200 INR excluding expenditure.

Shendri Co-operative fishing Society Ltd, Shendri is harvesting fish from Ningudage freshwater body. The total yield was about 6 ton per year and comparatively the society earns more profit than that of other reservoirs. The annual gross earning was 3,60,000 INR while the annual net profit was about 2,16,000 INR. The profit was as same as Yarandol freshwater reservoir even though the yield was less. It might be due to reduced expenditure.

The fishing activity at all study sites has strengthened the socio-economic status of fisherman while farmers have also benefited by the irrigation facility by construction of these reservoirs. Since, before development of wetland fishermen have only river as an option for harvesting fish and the harvesting was seasonal. Hence, the production was considerably less.

4. Conclusion

Based on cropping pattern, it can be concluded that farmers are shifted from traditional cropping pattern to advanced cropping pattern by cultivating cash crops. Hence, were considerably strengthened by the means of economic as well as social development after construction of reservoirs at all five sites. It can also be concluded that the fishing activity at all reservoirs supported economy of local fishermen.

References

[1] Millennium Ecosystem Assessment (2005).*Ecosystem and human well-being: synthesis*. Washington, DC: Island Press.

[2] Anon (2000) Handbook on fisheries statistics.Ministry of Agriculture (Department of Agriculture and Co-operation, Fisheries Division), Government of India.153 p.

[3] Katiha, P.K., Jena, J.K. and Barik, N.K. (2003) Profile of key aquaculture technologies in India. In: A profile of People, Technologies and Policies in Fisheries Sector of India, pp 59–82.National Centre for Agricultural Economics and Policy Research, New Delhi.

[4] Katiha, P.K. (2000) Freshwater aquaculture in India: Status, potential and constraints. In: Proceedings of the Aquaculture Development in India: Problems and Prospects Workshop (eds. M. Krishnan and P.S. Birthal), pp 98–108. National Centre for Agricultural Economics and Policy Research, New Delhi.

[5] Ayyappan, S. and Jena, J.K. (2001) Sustainable freshwater aquaculture in India. In: Sustainable Indian Fisheries (eds. T.J. Pandian), pp 88–131. National Academy of Agricultural Sciences, New Delhi.

[6] Ayyappan, S. (2004) Enhancing global competition. Survey of Indian Agriculture 2004.*The Hindu,* 97–100.

[7] Jana, R.K. and Jena, J.K. (2004) Overwhelming growth enhancing global competition Survey of Indian Agriculture 2004.*The Hindu*, 101–103.

[8] Pillai, N.G.K. and Katiha, P.K. (2004) Evolution of Fisheries and Aquaculture in India. Central Marine Fisheries Research Institute, Kochi, p. 34.

[9] Hassan R, Scholes R, Ash N. (2005). Ecosystems and human well-being.Current state and trends. Washington, DC: Island Press.

[10] Jos T. A. Verhoeven and Tim L. Setter (2010).Agricultural use of wetlands: opportunities and limitations.*Annals of Botany,* 105: 155–163.

[11] Adrian Wood and Gerardo E. van Halsema (2008).Scoping agriculture–wetland interactions towards a sustainable multiple-response strategy.Food and agricultural organization of the United Nations, Rome.

Table 1: Economic status of fishery activities at study sites

S. No	Particulars	Gavase	Dhangarmola	Yarandol	Khanapur	Ningudage
A	**Capital Cost in INR**					
1	**Lease amount**	5800	5800	5800	5800	5800
2	**Fish seed and transport**	95000	97000	133000	21000	38000
B	**Operational Cost in INR**					
3	**Nets and Gears**	13000	12000	15000	5000	5000
4	**Harvesting**	105000	112000	127000	30000	90000
5	**Other**	10000	10000	13000	5000	5000
C	**Annual Production**					
6	**Fish yield/ year in tons**	7	7.5	8.5	2	6
7	**Gross income/ Year in INR**	420000	450000	510000	120000	360000
8	**Net income/Year in INR**	191200	213200	216200	53200	216200

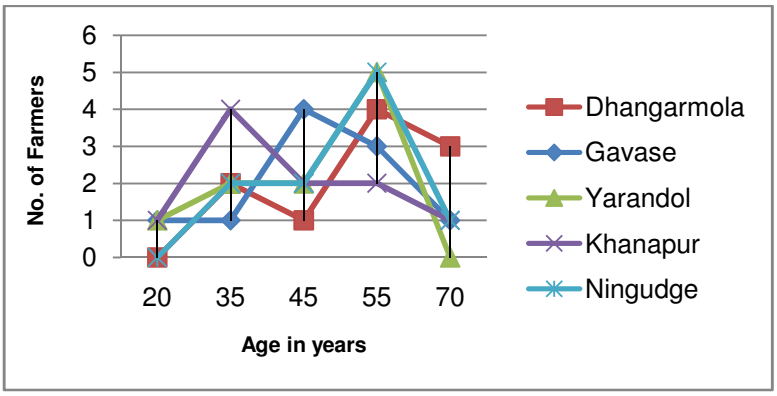

Figure 1.1: Age distribution of farmers at study sites

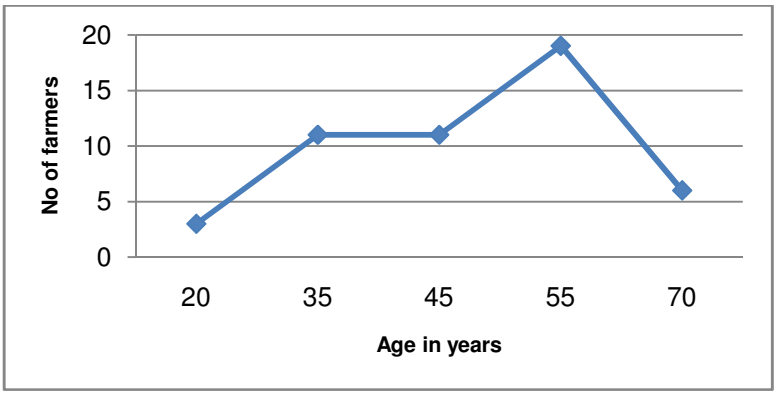

Figure 1.2: Overall age structure of farmers

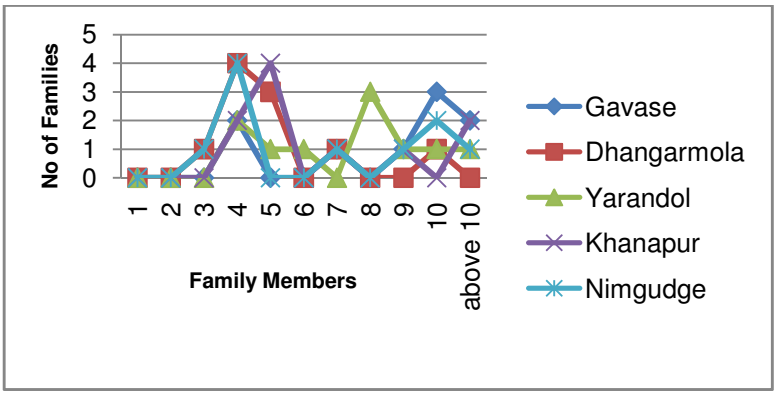

Figure 1.3: Distribution of family members of farmers

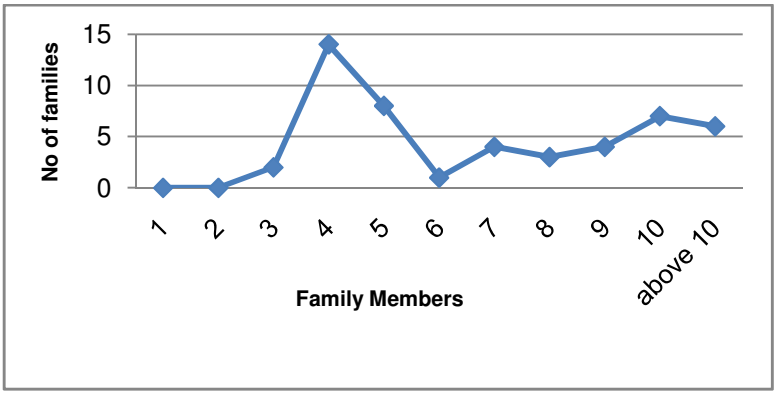

Figure 1.4: Consolidated distribution of family members

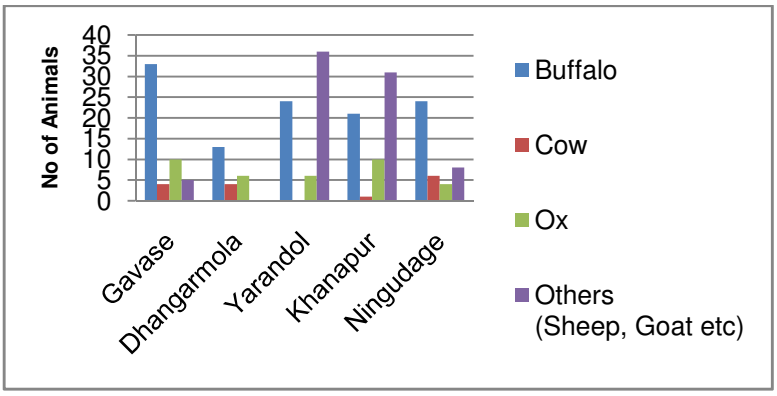

Figure 1.5: Distribution of livestock at study sites

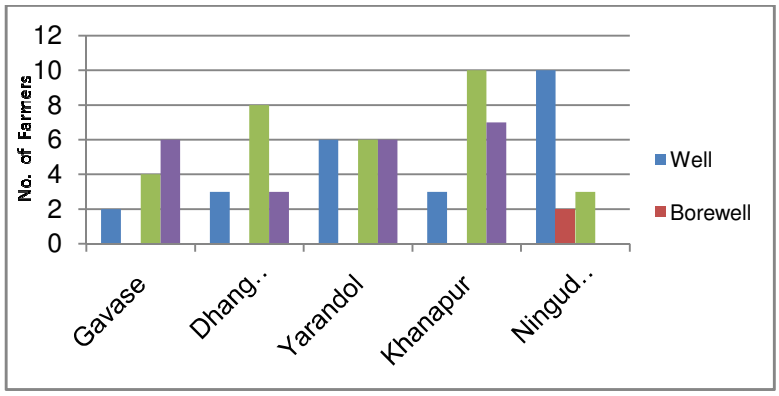

Figure 1.6: Source of irrigation at study sites

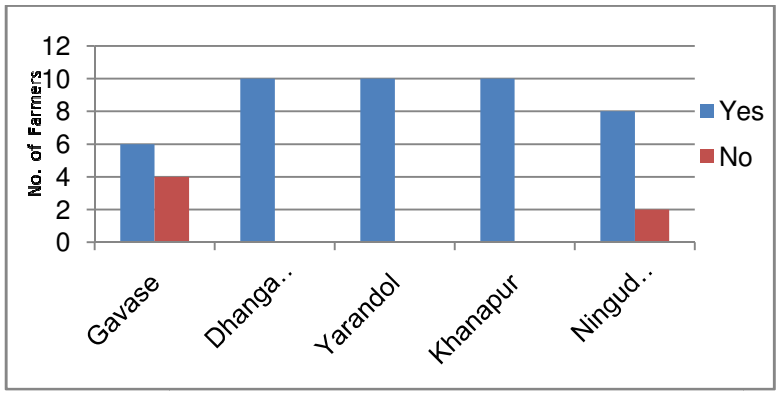

Figure 1.7: Status of reservoir by the means of beneficial or not

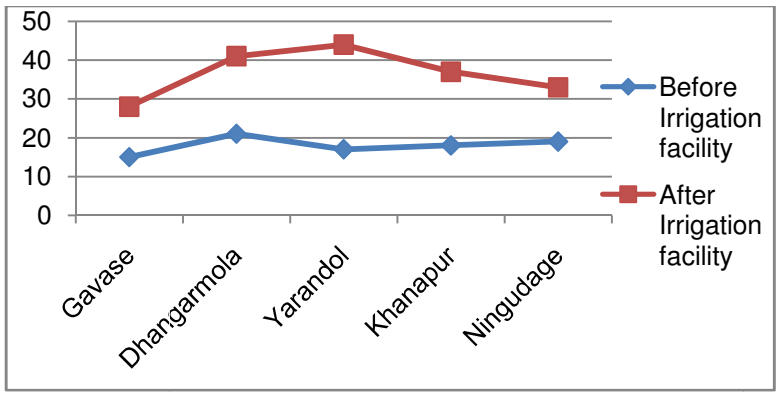

Figure 1.8: Crop pattern before and after construction of reservoirs

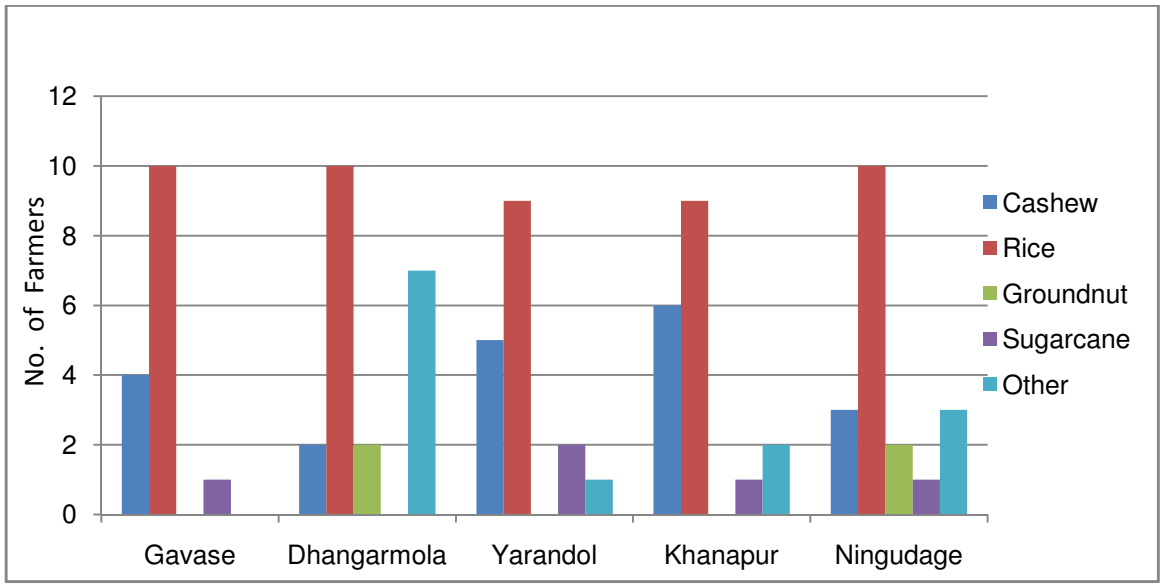

Figure 1.9: Crop pattern before construction of reservoirs

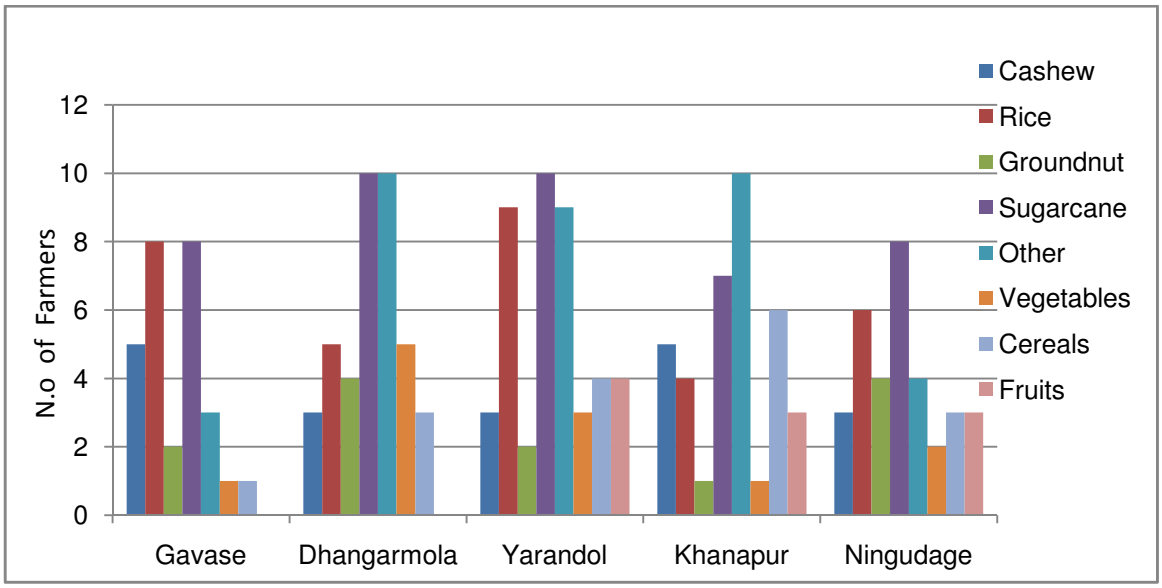

Figure 1.10: Crop pattern after construction of reservoirs