International Journal of Research in Engineering, Science and Management
Volume-3, Issue-3, March-2020
www.ijresm.com | ISSN (Online): 2581-5792


# Study of Traditional Ahar-Pyne System and Community Governance Methods in Asarganj Block, Munger District, Bihar

Pitabash Sahoo
*Project Executive, NGO, DHAN Foundation, Odisha, India*

***Abstract*: Agriculture is the backbone of India and it has to be supported through all the areas it needed. In present days due to climatic variations, India is no stranger to nature's fury and it would be well to learn from the old and traditional customs of supporting the agriculture whether it is in terms of traditional seeds, traditionally used fertilizers or traditional water governance structures for irrigation. There is a strong link between water, livelihoods and poverty. The area irrigated by Ahar-Pyne system in whole of Bihar has come down to about 0.53 mha constituting about 12% of all irrigated sources, compared to about 18% in South and North Bihar alone during the first two decades of twentieth Century. The study tries to unravel people perception about renovating Ahar-Pyne system and the factors influencing their adaption behavior by taking 155 respondents from Asarganj block, Munger District as respondent involved in different livelihood activities. This paper attempted to introspect farmers' perception to renovate and best utilize the traditional Ahar-Pyne system through formal mechanism by community governance method under the project "Water and Livelihood Security: Reviving Traditional Ahar and Pyne system irrigation in Munger district of South Bihar" with the funding support of ITC.**

***Keywords*: Ahar-Pyne system, Traditional water management, People governance, Poverty, Livelihood.**

## 1. Introduction

Fresh Water resources are scarce and they remain vital for survival of life on the planet. India commands mere 4 percent of the global fresh water resources, but supports 16 percent of the world population, Monsoon rain is an important source of fresh water. Indian Civilization thrived on the banks of rivers and water bodies. Tanks, Ponds, Ahars like fresh water resources in Indian subcontinent are centuries old and they played key role in collecting /harvesting, storing of monsoon run off and addressing the multiple needs of the community. There is a strong link between water, livelihoods and poverty, because a significant volume of fresh water has been utilized by the agriculture sector which remains as a major source of income for a large number of families. Ahar and Pyne systems of South Bihar are the important source of irrigation for the farmers. These structures support crop production in 0.53 million hectares. Ahars, with earthen bund on three sides, receives water from natural drainage or through pynes (local name of the diversion channel), which diverts water from the river. Pynes are artificial channels constructed to utilize river water irrigation. The Ahar-Pyne system of irrigation was overwhelmingly more important in South Bihar, where it was irrigating about 35% of 2.5 mha. of cropped land during the first two decades of twentieth century. Development of new irrigation sources, notably canals and tube wells leading to easy availability of water made people lose interest in Ahar-Pynes, which needed community effort for upkeep and maintenance. The extent of decline can be gauged by the fact from 0.94mha irrigation from Ahar-Pyne in 1930s in south Bihar, the area declined to 0.64mha in 1971 and to 0.55mha by 1975-76. As per the government figures, the area irrigated by Ahar-Pyne system in whole Bihar came down to about 0.53mha constituting about 12% of all irrigated sources in the year 1997 compared to about 18% in both south and north Bihar alone during the first two decades of twentieth century (Divy Ninad Koul, swati Singh, Ganesh Nilam, Gopal sukla 2012). In recent years there has been growing attention to local management of common property resources, and a recognition of the potential of farmer-managed irrigation systems. Many indigenous irrigation systems provide good examples of farmer management and are therefore, being studied for learning principles of management. But these studies often overlook that the "traditional" irrigation systems no longer exist in the traditional settings. Their functions are now conducted in an environment of formal rights (Nirmal Sengupta). The 'ahar-pyne' system in south Bihar is one such indigenous irrigation system in India, which has successfully galvanised the localfarming community in large numbers against caste divisions and ecological obstacles for over 100 years and entsured equitable distribution of water among individual cultivators (Niranjan Pant). The challenge today, in the context of policies favouring local governance over natural resources like Ahar-Pyne, is to find the appropriate balance between government coordination, and informal laws and regulations may not be followed in practice, they cannot be ignored, as they form an essential part of the context within which local negotiations take place (Nirmal Sengupta). Private and community management of small-scale irrigation and feeder systems has proved effective where communities have been able to organize and appropriate the benefits with low

bureaucratic or political interference (World Bank, 2005). Agriculture in Bihar has remained stagnant in spite of the rich soil, abundance of easily accessible water and a rich peasant tradition. The stagnation has been ascribed to several factors including the state's colonial legacy, ecological conditions, demographic pressure and most importantly, the land tenure system and the agrarian structure it supports. These factors are believed to have impeded the transition of Bihar's agriculture from a semi-feudal to capitalist production system, an essential condition for agricultural growth (Avinash Kishore, 2004).

### *A. About the project*

DHAN Vayalagam Tank Foundation (DVTF) is a professional grassroots action oriented development organization with sub sector focus on water, promoted as a thematic institution promoted by DHAN (Development of Humane Action) Foundation to ensure water and Agriculture Development Programme reach a large number of poor community with quality. DVTF is implementing the project called "Water and Livelihood Security: Reviving Traditional Ahar and Pyne system irrigation in Munger district of South Bihar" with the funding support of ITC (India Tobacco Company) Munger since November 2015. The project aims to promote community-led water conservation, self-governance and agriculture development to eradicate poverty and promote community owned irrigation system.

## 2. Methodology

A literature study and secondary data on the existence of the Ahar-Pyne system and the intervention area in Munger District helped me selecting the study location. A cross sectional household survey was carried out with qualitative and quantitative data. Purposive sampling technique was used as the focus was on renovation and community governance of traditional Ahar-Pyne system. This study was focused on primary as well as secondary data. Data was collected structured questionnaire and face-to-face interviews as well as some Participatory rural appraisal(PRA) technique and Ahar-Pyne renovation Index(APRI) method. The questionnaire was prepared keeping an eye on different issues related to factors affecting traditional Ahar-Pyne system, people governance and situation of agriculture in the study area. The questionnaire also consists of parts people perception on renovating the Ahar-Pyne system and constraints. Thus a total of 155 respondents were selected randomly in different Panchayats in Asarganj Block and questionnaires were administered. Interviews for the selected respondents were conducted individually during November-December 2018. The respondents interviewed include farmers in the command area, land-less farmers, Agriculture labors, Livestock rears and daily wage labors.

## 3. Analysis and Discussions

### *A. People's perception on Ahar-Pyne System*

Almost all the respondents are agreed that encroachment, shortage of people's awareness on saving water bodies, shortage of collective action to save Ahar-Pyne and frequently extraction of ground water level has reduced the focus on Ahar-Pyne which results in drastic reduction in irrigation through traditional Ahar-Pyne system.

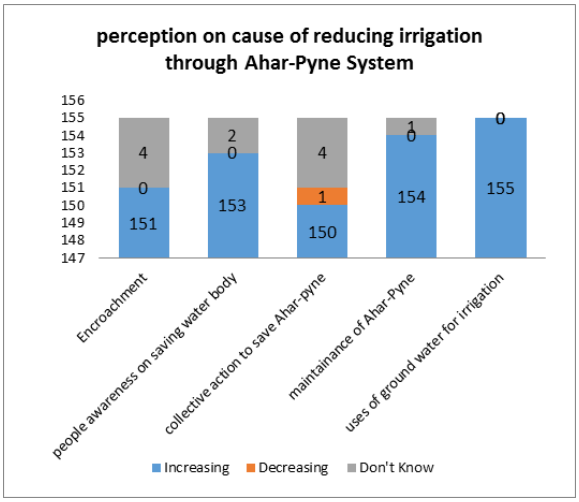


Fig. 1. People's perception on cause of reducing irrigation through Ahar-Pyne (Source: Primary Data)

### *B. Present status and farmer's dependence, agriculture and irrigation pattern*

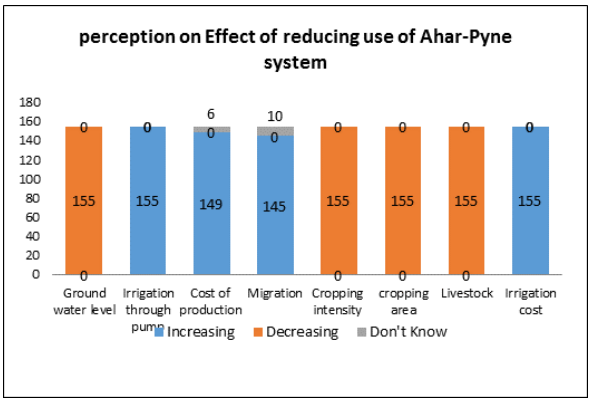


Fig. 2. People perception on effect of reducing use of Ahar-Pyne system (Source: Primary Data)

The above figure shows, presently the farmers depends on electric pump to draw the ground water for irrigation. Mostly rich farmers are able to afford sufficient water through motor but it is not same in case of marginal, small and leased-in farmers who are unable to afford the irrigation cost which effects in reducing the cropping intensity. Even if the farmers go for irrigation using electric pump the cost of production reduces which effects in reducing the Benefit cost ratio (BCR).

This graph shows there is reduction in food grains production in south Bihar in last 3 years, due to unavailability of on time rain. It can be introspecting through people perception on increasing cost of production, reducing ground water level and reducing cropping intensity which put direct impact on the total food grains production.

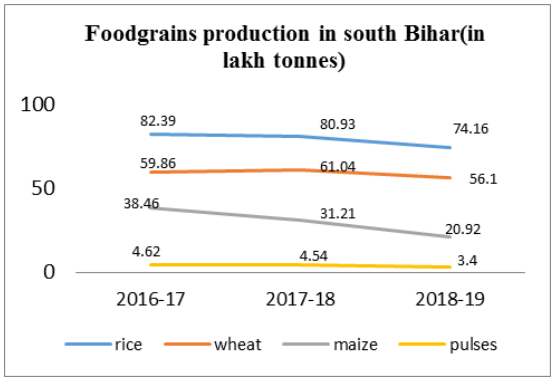


Fig. 3. Food grains production in south Bihar
(Source: Directorate of economics and statistics, govt. of Bihar)

### C. *Rainfall Pattern and Ahar-Pyne*

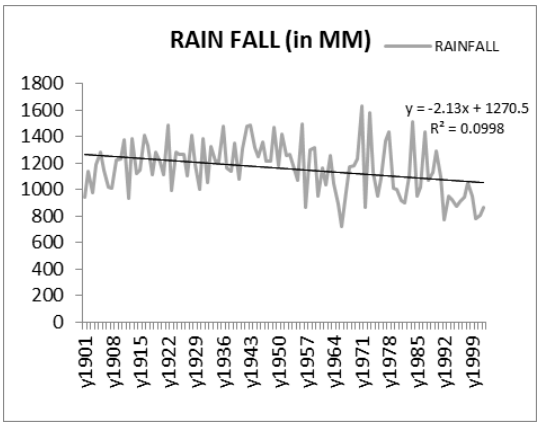


Fig. 4. Rainfall pattern in Munger District
(Source: Indian rainfall data)

Both the above figure shows a reducing trend in rainfall pattern since last 100 years. As there seen negative impact of climate change in terms of reducing number of rainy days, reducing the amount of rainfall and on time rainfall, it directly effects in unavailability of surface water, reducing the cropping intensity, leaving agriculture, increasing migration, reducing the number of livestock. These impacts can only be solved by renovation of Ahar-Pyne system through which ground water recharge will be possible, there will be increase in cropping intensity and decreasing cost of production can be possible.

The following table shows the amount of rainfall shortage for different crops which can be solved by renovating the Ahar-Pyne system.

Table 1
Amount of rainfall shortage for different crops

| Crops | Seasons | Water Required | No. of Irrigation Required | Amount of Rainfall | Deficit in water(mm) |
|---|---|---|---|---|---|
| Paddy | Kharif | 1250-1400mm | 3 | 952mm | 373mm |
| Wheat | Rabi | 500-800mm | 3 | 140mm | 510mm |
| Potato | Rabi | 500-700mm | 3 | 140mm | 460mm |
| Sugarcane | All | 1400-1500mm | 5 | 1100mm | 350mm |

(Source: IMD, NABARD-2018 and primary data)

### D. *Present status of Ahar-Pyne in the study Location*

Table 2
Present status of Ahar-Pyne

| Block | Numbers | Potential for renovation | Actual renovated | Balance to be renovated |
|---|---|---|---|---|
| Asarganj | Ahars | 55 | 15 | 40 |
| | Pynes | 35 | 11 | 24 |

(Source: Annual report DHAN Foundation Munger 2017-18)

### E. *The process of renovation of Ahar-Pyne system through Renovation Index*

The Ahar-Pyne Renovation Index gives a detail view whether to go for renovation of the Ahar-Pyne or not. If all the indicators taken in the Ahar-Pyne renovation index (APRI) is satisfying the conditions, then the further procedure is carried out for the renovation. These 13 indicators have been taken to finalize the renovation process are given below:

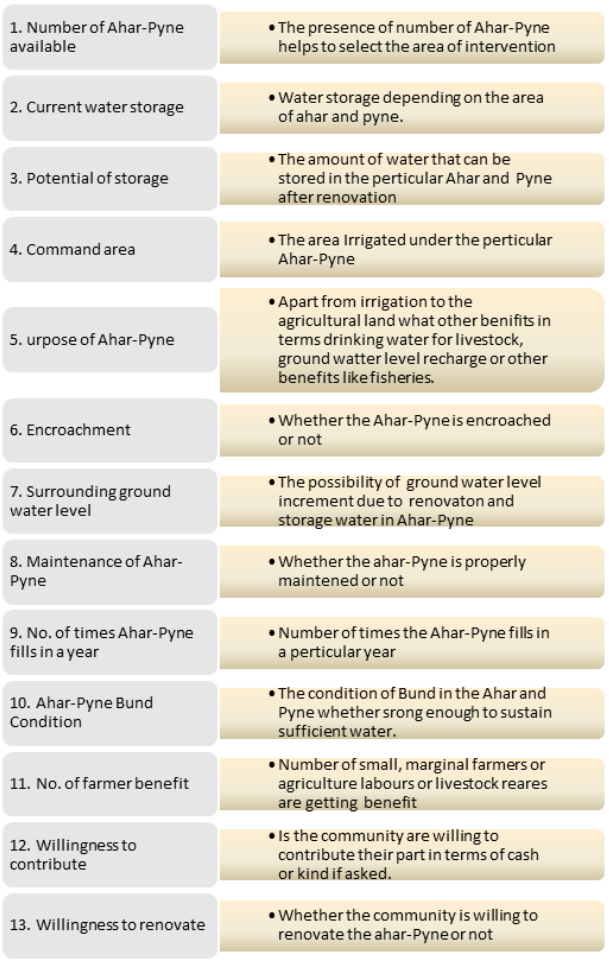


Fig. 5. Ahar-Pyne Renovation Index (APRI)

#### 1) *The Process of Community Governance*

The community involvement brings in transparency and sustainability in to the process. The farmers and agriculture labours in a watershed are organised as village level association (VLA). The VLA is the core feature to identifying Ahar and Pyne for renovation. The entire stake is with the VLA to own,

manage and govern the institution which brings the community governance into action. In the VLA, the general body are formed which consists of all the members of Ahars and pyne, the representative body or the executive committee consists of three members. They act as the office bearers in the capacity of president, secretary and treasurer who are selected by the members of the VLA. The executive committee plays te role of decision making guided by the general body and is responsible for implementing all types of structural renovations in its beneficiary area.

The members of the VLA also organised themselves into multiple Agriculture finance groups (AFGs) comprising 12-20 members. The AFG do financial intermediation by pooling its member's resources. The members of the AFG are the direct beneficiary of financial intermediation. The AFG provides financial support to the VLA for ensuring its sustainability. For ensuring the sustainability development professionals form DHAN Foundation help the VLA in all aspects if it needs any support.

## 4. Conclusion

From the study it is clear that the small and marginal farmers are highly vulnerable due to unavailability of water for irrigation and they are not financial sound to overcome the issue due to which side effects in terms of migration, reducing cropping intensity, increasing production cost, reduction in cropping area and decrease in livestock due to unavailability of surface water has been noticed. The reducing the amount of rainfall and on time rainfall also giving a negative impact on the farming sector in the study location. It is seen that even if the family goes for irrigation through pump the benefit cost ratio (BCR) reduces. To cope up with the change that is happening in last two decades, the small and marginal farmers facing more difficulties in terms of financial needs. The renovation of Ahar-Pyne with the support of DVTF through people governance method will definitely help the farmers increase their production as well as reduction in production cost and formation of AFGs will help the poor farmers to get financial support at the time of need and save their livelihood.

## 5. Way Forward

The government of Bihar should take adoptive measures like renovation of Ahar-Pyne through MGNAREGA (Mahatma Gandhi National Rural Employment Guarantee Act/Scheme) and support NGOs like DHAN foundation to work effectively to mitigate the water shortage by renovating the Ahar-Pyne system in the study area. New policy to increase the awareness on saving and storing the surface water in Ahar-Pyne will keep alive the traditional water harvesting structures which will support the farmers to irrigate their land and recharging the ground water level.

## References

[1] Nirmal Sengupta 2004, "Negotiation with an Under-informed Bureaucracy: the Case of Water Rights on System Tanks of Bihar, Governance - Water/Watersheds/Irrigation", Statistics and Econometrics and Planning.
[2] Niranjan Pant, "Indigenous Irrigation in South Bihar: A Case of Congruence of Boundaries" Economic and Political Weekly, Vol. 33, No. 49, pp. 3132-3138, Dec. 5-11, 199
[3] Divy Ninad Koul, Swati Singh, Ganesh Neelam & Gopal Shukla "Collectives for Integrated Livelihood Initiatives", Jamshedpur-831005, 2012
[4] Pant Niranjan, "Major and medium irrigation projects: Analysis of cost escalation and delay in completion" Economic and Political Weekly, June 1982.
[5] Sherrard, G. C. "Indigenous irrigation works in Bihar and their improvement" 1916.
[6] World Bank "Bihar: Towards a development strategy," 2005
[7] Galanter, Marc. "Law and society in modern India". Delhi: Oxford University Press, 1989.
[8] Sengupta, N, "The Indigenous Irrigation Organization in South Bihar' in B C Barah (ed), Traditional Water Harvesting Systems - An Ecological Economic Survey," New Age International Publishers, New Delhi,1996.
[9] Chambers, R, "In search of a water revolution: questions for managing canal irrigation in the 1980s', mimeo, Institute of Development Studies," University of Sussex, and forthcoming from International Rice Research Institute, 1980.
[10] NABARD, "Water productivity mapping of major Indian crops," 2018.