

# Water user association, self-help group and rural development: the case of study from Odisha, an eastern Indian state

## Abstract

Availability and access to water plays an important role in economic development. Regions with better access to water resources are prosperous compared to other regions. Agriculture is the main consumer of water that constitutes 70% of total available surface water covering only 20% of cultivable land. It has been that in some region water is being wasted while others don't have access to water for irrigation. Addressing these issues will help all farmers in a region to access water and can improve the crops as well water productivity. In this context, Water User Associations (WUA) is considered as an alternative institutional mechanism to increase the efficiency in water use in agriculture. In addition, it is expected to increase the farm income through increasing agricultural productivity and employment in the rural economy. In this context, we have carried out a study on two WUAs in Koraput and Kalahandi districts of Odisha, an eastern Indian state. These WUAs are unique in nature. Each WUAs has 8 to 10 self-help groups (SHGs) involved in different activities including agro-chemical business, farming, bee keeping, dairying and such others. The results show that with the formation of WUAs, all farmers were able to access and use water in an efficient way and able to achieve higher crop productivity. In addition, the income of the farmers increased and also employment in the village. The main constraints faced by farmers are marketing and so there is a need for better infrastructure facilities particularly daily weather road and cold storage. This study pools lessons and makes policy recommendations towards making irrigation projects more sensitive to poverty.

**Keywords:** agriculture, water user association, agriculture, SHG and rural development

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## Introduction

Availability and accessibility to water is the main driver of economic development.<sup>1-3</sup> Countries with high rainfall and better access to water tend to be richer, while countries with low level rainfall are associated with lesser economic prosperity. The very poorest of the poor are found in African countries where average water availability per person is low and high variability of rainfall. Water has spillover effect –excess use of it by some individuals will discriminate others to access it. Thus, the importance of water in economic development made a judicious management of water resources in policy issues across continents. The need for the action in this direction is growing, as countries and communities across the globe are increasingly experiencing of water stress.<sup>4,5</sup> The growing water stress represents the culmination of gross neglect and mismanagement of water resources over the years. It could be argued that the problem of water scarcity is not due to the absolute shortage of water, but the poorer mechanisms for conservation, distribution, and efficient use of it.<sup>6</sup>

Among different sectors, agriculture consumes major global water-about 70 per cent of surface water is used for irrigation, while with roughly 20 per cent of water consumed by the industry and rest 10 per cent is used for household purpose.<sup>7</sup> The share of water for agriculture uses even reaching figures over 85% in arid and semiarid regions like Israel and Spain. It is a surprise that the irrigated cropping system represents only 20 per cent of total cultivated land and contributes about 40 per cent of total global food demand, which intensifies the water scarcity scenario. Therefore, the future global food security cannot be met by depending on relaying the conventional method of irrigation or source of water access. The water stress in the economy is mostly due to the mismanagement in the agricultural sector. Marothia<sup>8</sup> observed that the impact of irrigation systems, particularly

canal irrigation, has been besieged with number of management and environmental problems. Some of the environmental and management problems associated with the irrigation systems include overflow of water, water logging, salinity and weed infestation. Oblitas and Peter<sup>9</sup> argued that irrigated agriculture is a persistent vicious circle in which poor irrigation services result in low yield and low incomes. In turn it becomes difficult to recover the cost, which results in poor irrigation systems and poor irrigation service.

Earlier approach on irrigation development was through technological innovations like lining canals to reduce transmission losses and installing proportioning device. However, due to the absence of farmers' participation in this innovation, it becomes difficult to distribute water in a sustainable way to all farmers. Chatterji<sup>10</sup> observed that benefits of most irrigation projects could not be reaped due to the absence of farmers' participation. Subramanian et al.<sup>11</sup> argued that without proper management and farmers' participation, such innovations fail to deliver the desired irrigation services. Therefore, local management is essential for sustainable use of surface and ground water. Joshi<sup>12</sup> and Marothia<sup>13</sup> argued that farmer's participation can play a crucial role in managing the problem of irrigation-induced land degradation and in exploiting the full potential of irrigation.

To bring the efficiency in distribution of water requires appropriate institutional arrangements or horizontal integration among the different stakeholders. Recently farmers' organization in the form of water users' association (WUA)<sup>14</sup> is highly eulogized as a befitting strategy for bringing efficient utilization, equitable distribution, and sustainable

<sup>14</sup>Water User Association (WUA) is a group of water users, such as irrigators, who pool their financial, technical, material, and human resources for the operation and maintenance of a water system.

use of water.<sup>4,8,13-15</sup> The WUA is a social system that ultimately determines how productively the water flowing in irrigation system will be managed. The goal is not to maximize participation, but to bring efficiency in water management in irrigation of crops. Meinzen-Dick et al.<sup>16</sup> argued that devolution of power to farmers empowered them economically through increasing the agricultural productivity and income. A large number of irrigation development programmes in India failed or could not yield anticipated outcomes due to a lack of understanding on the part of the water irrigation management and the application in the socio-economic network of village life.

The studies on formation and functioning of WUAs and the impact on farmers' income are sparse. Most of the studies are available on the experience of WUAs are early year of experience and analysis bias towards the function of WUAs. Very few studies have focused on the impact of WUAs on livelihood. The WUAs are expected to be financially self-sufficient, socially strong, and politically united so as to manage the systems efficiently in the medium to long term. In this context, the present study makes an attempt to provide a compressive view on formation and functioning of WUAs, and the livelihood improvement through WUA by taking a case study from Odisha, an eastern Indian State.

The rest of the paper is organized as follows. Section II provides a description of the study area and methodology. Section III describes the participatory irrigation management system (PIMS) adopted in Odisha. Section IV presents the formation and functioning of WUAs. Section V provides a detailed analysis of the impact of water user association on water distribution and livelihood. Section VI concludes.

## Study area and methodology

The performance of WUAs is examined in this paper using a case study of two WUAs in Odisha state, from Eastern India. Odisha state predominantly falls in rice agro-climatic zone, where 70 per cent of gross cultivated area is devoted for paddy cultivation. The state is comprising 30 districts and covers 1, 55, 707 sq Km.<sup>ii</sup> The state is generally divided into four natural features, the northern plateau, central river basin, eastern hills and coastal plains. The coastal plains of the state extend from the Subarnarekha River in the north to Rushikulya in the south and are narrow in the north. The eastern hills cover much of the state's area and are a part of fertile and thickly populated. The central river basin is also fertile, and the plateau has the peculiarities of peninsular tablelands.

The case study was confined to two WUAs namely Veer Vairaba from Kalahandi district and Radha Krishna from Koraput district are selected purposely. Among them, one was from Upper Kolab irrigation project and other was from Upper Indrāvati irrigation project. The Upper Kolab irrigation project was launched in 1976, where Upper Indrāvati irrigation project was launched in 1978. The study area is one of the poorest regions not only in Odisha but also in India, which tends to suffer from drought and malnutrition. The main aim for launching these irrigation projects was to promote the compressive development of the region through increasing agricultural productivity and gross cropped area. The Upper Indravati irrigation project was irrigating 109, 000 hectares, where Upper Kolab irrigation project was irrigating 44, 000 hectares in both seasons. Only water cannot improve the agricultural productivity and farmer's livelihood farmers, it requires other financial support to use modern technology in agriculture. Therefore, in each WUAs, there are around 10-13 farmers self-help groups have formed.

<sup>ii</sup>Odisha is the tenth largest state of India, which constitutes 4.74 percent of India's land mass and has 36,706,920 populations, which accounted for 3.57 percentage of the total population of the country according to 2001 census.

Operation and maintenance work of the channels are under the supervision of WUA. This work was carried out with financial under participatory irrigation management (PIM) program. Information was gathered through participatory research approach (PRA) method on different aspects of WUA including management, financial, livelihood improvement and such others. Discussion was organized according to predesigned issues/questions related to awareness of institutional arrangements designed in the PIM Act and collective outcome of the institutional arrangements. The perceptions of members (elected and nominated) were used in analyzing the performance of WUAs. Information pertaining to various aspects of PIM was collected from the water resource department (WRD) of Government of Odisha (GoO)<sup>17,18</sup> and analysed to assess the performance of PIM at macro and micro levels (Figure 1).



Figure 1 Study area.

## Result and Discussion

### Participatory irrigation management in Odisha

The water management in earlier period was with State.<sup>19</sup> However, the trend has changed in recent years through the devolution of water rights from state to actual beneficiaries with the recommendation of National Water Policy in 1987, Government of India. From being a mere provider of water, the state has moved into a paradigm of sustainable water resources management with a focus on people's participation. Based on the water policy in 1987, guidelines were issued to all the states of India regarding PIM. The PIM stressed farmer's involvement in various aspects of management in irrigation system, particularly in water distribution like who, when should get how much water, and collection of water rate. During the second half of 1990s, several state governments had transferred irrigation management responsibilities to original users of water (farmers) in the form of WUAs. In most cases, full transfer of powers has taken place as far as responsibilities are concerned, while only partial transfer has taken place in case of assessment, assured water supply.

The development of irrigation in Odisha got accelerated after introduction of plan programmes and Hirakud multipurpose project in 1960s along with other major and minor irrigation projects namely Salandi, Dhanei, Budhabudhiani including expansion of Mahanadi Delta System.<sup>20</sup> The net irrigation potential created through construction of major and medium irrigation projects in different periods. At present irrigation facilities has been providing to 45 percent of gross cultivated area.<sup>21</sup> The government of Odisha adopted a similar policy of PIM in its state water policy in 1994, which emphasised on transfer of irrigation management to farmers. In addition, Odisha government brought an Act named as Odisha Pani Panchayat Act, 2002<sup>iii</sup> for strengthening WUAs.

<sup>iii</sup>Details about the Act see The Odisha Pani Panchayat Bill, 2002.

The main responsibilities of WUAs (or Pani Panchayat in Odia) include the collection of water rates, distribution of canal water among beneficiaries, operation and maintenance of canals at lower levels like minor, sub-minor, and distributary level. Generally, WUAs are created on a three-tier system with two informal associations and one formal association on hydraulic boundaries ranging from 300ha to 600ha of commanded area. At the lowest level, a chak committee is formed at the head, middle and tail reach of the ayacut of an outlet. A representative, called the chak leader of each of these levels is an executive member of the WUAs. The president, vice-president,

secretary, and treasurer of WUAs are elected from the executive body of the concerned WUAs. All water users are members of the general body of the WUAs. At the project level, a federation of all WUAs is established. This body is called the Apex Committee and has a formal but non-binding advisory role in mail system operation and maintenance. The executive members of the Apex Committee are elected from the presidents of all WUAs within the command are jurisdiction of the irrigation project. The Organizational structure of WUAs can be observed from figure 2.

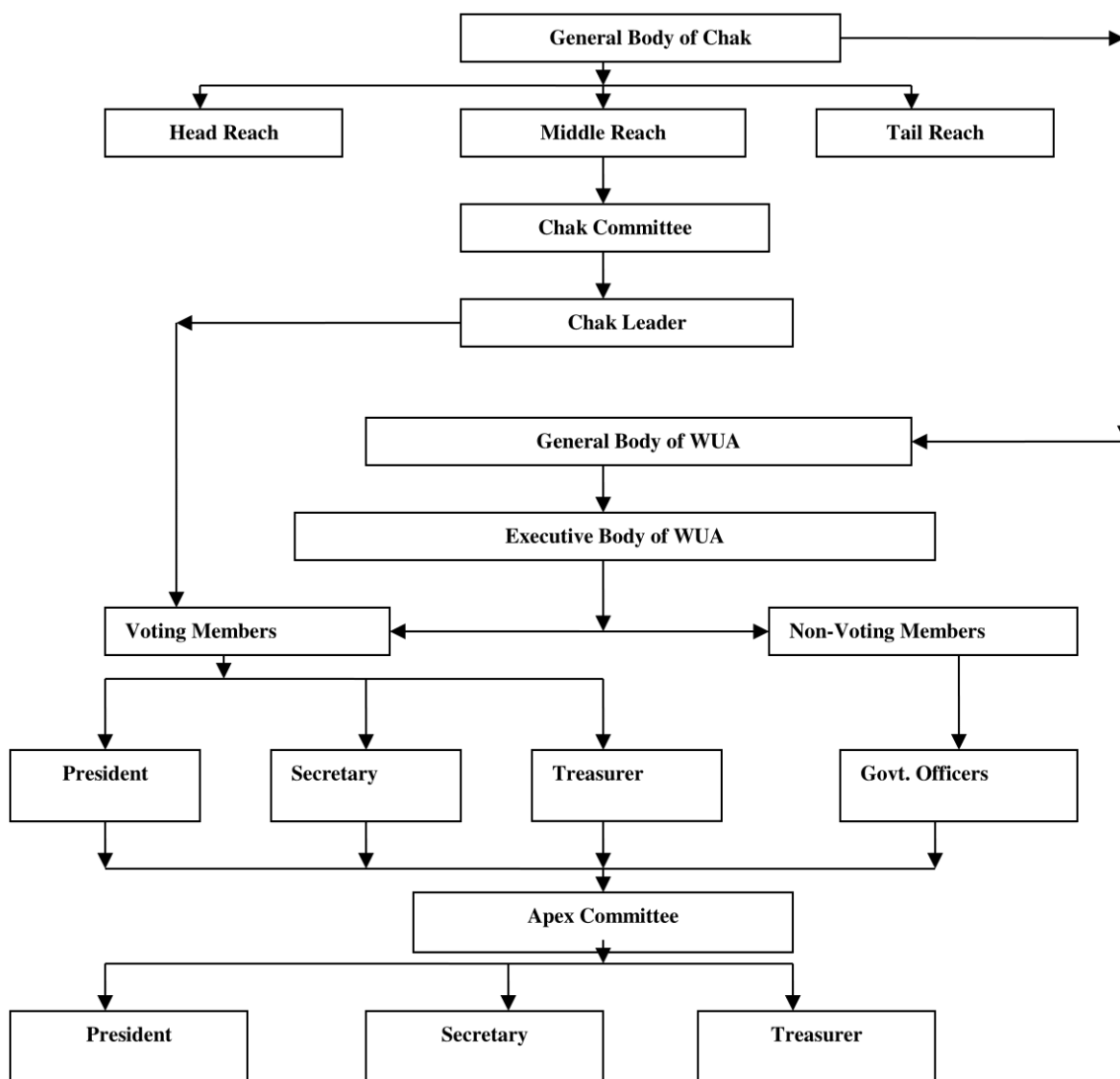


Figure 2 The organizational structure of WUAs.

**Structure, organization and functioning of selected WUAs**

The Veer Vairaba WUA was prepared based on hydraulic boundary of canal inside the village Jammunda and Telia under Upper Kolab irrigation project. Radha Krishna WUA was formed in the effort of groups of farmers of Sanyasi Kundamal village under Upper Indrāvati irrigation project. There were 177 and 223 beneficiaries under ayacut (the area served by an irrigation project such as a canal, dam or tank) of the Veer Vairaba and Radha Krishna WUAs respectively. There was no electoral process involved in Veer Vairaba WUA for selection

of president, vice-president and secretary. They were selected unanimously based on knowledge regarding water management and farming as well landholding size. However, in case of Radha Krishna WUA, president, secretary and treasurer were selected through electoral process. For strengthening the cooperation among members, farmer’s self-help group (SHG) was formed based on land holding size and water outlets. Suppose in Radha Krishna WUA there are 13 outlets and so 13 SHGs were formed. The members of the SHGs were from different categories (landholdings-small, medium, and large). The members of SHGs varied from 10-15. The main aim of the SHG was to look after for one outlet and to strengthen the financial

sustainability of SHGs members. The president and secretary of each SHG were selected based on knowledge about the maintaining the records.

The main aim of WUAs is to improve the water management system in terms of equitable distribution of water, financial sustainability of the system and to promote self-management of the system. The effectiveness of WUAs mostly depends on the process of their evolution. Both pre-and post-implementation processes play an important role in this regard. Our results indicate that most farmers are involved in the pre-planning phase of the WUAs and majority of them expressed that formation of WUAs is appropriate to solve the problems of irrigation. It is observed that caste, gender, and activity did not play an important role in the formation of WUAs. No women were member of the WUA though they are not actual land holders. The composition of WUAs members reflects not only the socio-economic milieu of the community but also the political economic dimensions of institutional innovation and development. In our sample, the executive members of WUAs are spread evenly across socio-economic groups in terms of their representation in the committee. In case of the highest position – president and secretary are from upper caste and have better socio-economic background (large farmers). Though all type of land holders including Schedule Tribe (ST) can be members of WUAs, we did not found representative from such group.

As per the guidelines, two general body (GB) meetings should be held in a season, one before the start of season and mid of the season. However, the executive committee meets when necessary. From experience, it is observed that the executive committee meets once a month, however in peak time (harvesting to planting) meeting extends to 40 to 45 days. Each member of the WUA was able to express their problems on micro-channels and access to water. The frequency of executive committee meetings was observed more in tail end WUAs followed by middle and head of WUA. It shows that farmers in the tail of irrigation canal face more problem than middle and head. As per the farmers' perception, there was no problem in accessing water for tail farmers. A farmer or a group of farmers clean the micro-channels of his/their respective length of the channels whenever it needs. However, the initial cleaning of micro-channels is usually done by the WUAs. If the tail farmer faces problem in accessing water, he/she sometimes informs to president of the SHG. The president tries to solve the problem inside the SHG, if not, the SHG president informs to president of the WUAs. Regarding the technical problems, farmers inform engineers through water use associations.

The members of the water user associations are the main driver of the all-around development of the village, and they protect resources and rights of members. Since WUA deals with water – is a Common Property Resource (CPR), no relationship between the size of individuals' land holding and number of water shares that he holds. This reflects members of the WUAs self-enforced to work together for water development. The pro-active role of president in supervising water flow on daily basis increases the efficiency level. Though, members of the association followed the rules formed by association lead to strong motivation among them which was different from other WUA.

### Impact of WUAs

The advent of WUAs is expected to have direct bearing on water availability and crop production in the event of a positive impact on these indicators, there is possibility of impact at the secondary level like employment and income. Similarly, some environmental impact is also expected such as water logging and salinity. Attributing

assessment of all these is difficult. Here an attempt has been made to assess the beneficiaries' perceptions.

**Water Availability:** Better water delivery distribution is assumed to be an important indicator of the efficient functioning of any WUA. Water delivery performance can be assessed based on the flow of water from head to tail, number of watering and crop productivity. The adequacy of water reaching the farmers at the end of the canals i.e., the number days that sufficient water reaches the canal is measured in terms of number of actual watering in comparison with water requirements. The cooperation among the farmers tends to increase the efficiency in the use of water. If there is overflow of water in case of head farmers, he/she close his/her micro point and opened for other's one. The head farmer also looks after the tail farmer's land whether water reached or not.

**Livelihood Improvement:** Successful agricultural development in most developing countries today requires increased output per hectare and per worker. This agricultural intensification depends on the availability and financing of new technology, agricultural inputs like agro-chemicals, and new seeds. Unfortunately, these inputs are often unavailable and sometimes costly. This is worse in the case of small farmers, particularly those who are living in remote regions and upland areas. So, it becomes difficult for small and poorer farmers to access these inputs without financial assistance. In response to this, each WUA formed SHGs with the help of Japan Bank for International Cooperation (JBIC). Each SHG has an account in Kalinga Gramya bank in the name of president and secretary. The members of the SHG deposit INR 10 monthly at regular intervals. If any members could not deposit his/her share for a month, other member of the SHG helps him to deposit. It is observed all members of the SHG followed the rules and norms of the SHG. Each SHGs of the WUAs were given Rs. 33, 000 by JBIC to enhance their livelihood. With this financial help, farmers were able to extend their agricultural activities along with other farm activities. Some SHGs were doing goat farming, dairy and fish farming in addition to vegetable and mushroom cultivation.

Some members of the SHGs could be able to access credit from Bank through SHG and open agro-chemical fertilizer shops in the village. With the opening of the Agro-chemical shop in the village, becomes easier for farmers to access fertilizer and other inputs at the right time. Before the formation of the WUAs, farmers were cultivating rice in their fields and were not able to grow any other crops. After the formation of WUAs, all farmers are able to access water even during winter season, which helped them to grow other crops like sugarcane, vegetables and others. The cropping pattern in the studied villages has changed from rice-based farming to rice-sugarcane-vegetable. During the discussion with farmers, we observed that crop productivity has increased. To enhance the agricultural activities, JBIC had provided two sugarcane crushers to Veer Vairaba WUAs and two harvesters along with 13 sprayers to Radha Krishan WUAs. There were 10 SHG in-charge of two sugarcane crushers. SHG were making Jaggery and exporting to neighbor states and other places. The employment for rural people particularly rural women has increased. Though sugarcane is a labor-intensive crop, it is generating more employment especially for women than rice. There are increased livelihoods not only among the farm households but also among the non-farm households.

### Conclusion

The failure of many large, medium and small irrigation projects to deliver the benefits to farmers, WUAs became the important policy intervention to increase the efficiency in water distribution and to maximize the benefits. In the line of recommendation of National



Water Policy (1987), Odisha state government adopted the PIM in 1994 and brought an Act named as Odisha Pani Panchayat Act, 2002 for strengthening WUAs. The analysis presented in this process indicates that WUAs are in the process of transformation and the members of WUAs are in learning process. The preliminary result of the present study indicates that after the formation of WUAs, farmers can use water in efficient way and increase the cooperation among the members. In addition, the agricultural productivity, income, and employment have increased.

The essential condition for benefiting from the market is to produce goods and services that are in demand. The producer in agriculture should have knowledge about the output market in reference to type, quantity, quality of product demanded in market. Market forces are not serving the perceived public interest i.e. producer in agriculture and consumer in markets. These markets deficiencies are more pronounced in rural areas with lack of supporting infrastructure. Due to this market deficiency in rural areas, it becomes difficult to bring commodities to market. In our study, we found there was no road and farmers have to walk three kilometers to reach a concrete road. In the time of field visit, it was reported that the Jaggery price was very due to lack of good infrastructure like concrete road or market. Though some farmers were ready to shift from paddy to vegetable cultivation, absence of good road hinders them to do so. We strongly recommended building rural infrastructure along with such WUAs for strengthening the rural livelihood.

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## Conflicts of interest

There is no conflict of interest.

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