International Journal of Social Science and Humanities
www.humanitiesjournals.com
Online ISSN: 2664-8628; Print ISSN: 2664-861X; Impact Factor: RJIF 5.44
Received: 28-12-2020; Accepted: 16-01-2021; Published: 22-03-2021
Volume 3; Issue 1; 2021; Page No. 30-37

Neither pani nor panchayat: Tracing hydraulic exclusion beneath pani panchayats

K Gulam Dasthagir
Professor, Department of Sociology, School of Social Sciences and International Studies, Pondicherry University, Puducherry, India

Abstract
Premised on the proposition that Participatory Irrigation Management (PIM) is imperative for improving the performance of irrigation systems, this study endeavors to examine the performance of tail-end Water User Associations (WUAs) in Tamil Nadu. For this purpose, since Tail-end deprivation is the pervasive issue in canal irrigation, applying cluster random sampling design, one of the nine major irrigation systems of Tamil Nadu *viz*. Sathanur irrigation system is selected for this study. Among the two districts served by this irrigation system, five tail-end WUAs under Villupuram District are chosen for data collection. Based on in-depth interviews with presidents of Tail-end WUAs and focus group interviews with farmers of Tail-end villages, this article articulates the predicaments of canal water management adversely affecting irrigated agriculture as well as farmer's participation in irrigation management at the tail-end villages in a major irrigation system. The multi-village and multi caste composition of WUAs formed on hydrological basis pose impediments to organization of collective action in tail-end villages. Further, gender disaggregated data depicts the impact of irrigation water source on the pattern of livelihood of land farmers in tail-end WUAs. Accordingly, this article argues that the persistence of hydraulic exclusion of tail-end farmers organized beneath the legislative paradigm of participatory irrigation management largely reproduce defunct WUAs, informal market of water hiring, landed agricultural laborers and women exclusion among tail-end farmers in large-scale irrigation systems.

Keywords: landed agricultural laborers, water hiring, tail-end farmers, hydraulic exclusion, canal irrigation, women exclusion

Introduction

Agricultural production to supply food for a large and growing population greatly necessitated construction of major and medium dams, large barrages, reservoirs and canal networks in India. These large-scale irrigation systems have been created in order to utilize their developmental and anti-poverty potential. The projected benefits of such irrigation systems include improving food production, increasing farm income, assured food supply, providing livelihood for millions of poor people, generating security against impoverishment and so on (Chambers, 1988) [5]. Paradoxically, in the post-colonial era, major and medium irrigation systems have fallen short of official objectives and projected benefits (Moss, 2003) [17].

Concurrently, under the neoliberal drive, Irrigation Management Transfer (IMT) policy brought significant transformation for launching Participatory Irrigation Management (PIM) in large-scale irrigation systems (Garces-Restrepo, *et al*, 2007) [12]. The neoliberal donor agencies while funding irrigation projects in India have laid down the condition of formation of Water User Associations (WUAs) to turn over the responsibility of managing a section or part of the irrigation systems (Pant, 2008) [19]. Thus, PIM refers to the national program for improving the performance of major and medium irrigation systems with greater farmer participation (Gulati, *et al*, 2005) [14].

A prominent feature of irrigation development in the 21st century is the legalization of PIM in the major and medium irrigation systems in India (Munoz, *et al*., 2007) [18]. Concomitantly, the Government of Tamil Nadu ratified and implemented Farmer Management of Irrigation Systems act, (2000) in order to incorporate PIM in all the irrigation systems across the state. In the backdrop of precariousness of canal irrigation performance and the significance of user participation to improve irrigation management, premised on the proposition that PIM and WUAs are essential for finding solutions to the problems of food security and water crisis, this article endeavors to examine the efficacy of PIM in mitigating tail-end deprivation in rural Tamil Nadu.

Hydraulic exclusion in Indian irrigation

During the second half of the twentieth century, performance of large-scale irrigation systems was largely characterized by widening gap between created potential and the actual performance in terms of area irrigated, yield, number of beneficiaries and so on (ADB, 2008). Such underperformance of Indian irrigation was due to unreliable water delivery, inequitable water distribution and tail-end deprivation, inefficient water use, over irrigation, and widespread deterioration of infrastructure (Joshi and Hooja, 2000) [11]. Besides, excessive canal seepage, inefficient drainage and water logging, main system's deficiencies, mismatched cropping pattern and water supply calendar aggravated widespread tail-end deprivation across India (ADB, 2008).

Evidently, inadequacies in the management of canal water arise due to predicaments in the operation and maintenance of main

canals, branch canals sluices, water regulating structures and field channels. Consequently, the water transported from the dams or diversion weirs or system tank or largely lost through convenient due to canal seepage, leakages and evaporation. Consequently, the water intended to irrigate the entire projected command area gets lost, logged or evaporated depressing the tail-enders of their rightful share of canal water (Huja, 2006) [15]. Moreover, shortages in public financing for the maintenance of irrigation systems lead the irrigation infrastructure under repair. The damages, breakages and etc., water conveying structure facilitate head-enders to receive more water than required, even to the extent of waterlogging. On the other hand, when the access the surface water is constantly at stake, tail-enders recording to ground water entails capital investment. Caught between absence of surface water and lack of financing for ground water, tail-enders pursuits with water stress (Gulati, 2005) [14].

It is not uncommon for farmers in large scale irrigation system to await arrival of water for several days or weeks depending on the spatial spread of irrigation system if they are tail-ender. Accordingly, uncertainties in the availability of water unreliability of its arrival and inadequacies in the quantum, adversely affect not only cultivation but also crops that do not complete their growth and often get lost. Such, gamble of water supply in major irrigation system, circumscribe the tail-enders to deprival of livelihood and impoverishment. All these constraints constantly create conditions to sustain tail-enders with poverty and indebtness. Therefore, tail-enders also frequently characterize to the marginalized and depressed sections of rural community (ADB, 2008).

In India, common practices in large-scale irrigation systems include constructing illegal outlets, breaking padlocks, drawing off water at night, and bribing, threatening, or otherwise in some way inducing officials to issue more water (Dasthagir, 2002) [6]. Typically, those at the top end get their water first and get most of it, while those at the tail-end suffer. Thus, the predicaments posing non-performance or under performance of canal irrigation system culminate in creating conditions leading to hydraulic exclusion in which tail-end farmers constantly experience denial of access to canal water supply(Pant, 2008) [19].

Participatory Irrigation Management

PIM was introduced in Tamil Nadu through World Bank funding, with the imperative to adopt Irrigation Management Transfer (IMT) (Elumalai, 2000) [11]. The Government of Tamil Nadu incorporated PIM in order to facilitate farmers' participation in the operation, management and maintenance of the irrigation systems, maintained by the Water Resource Organization of PWD. Concomitantly, institutional reforms were initiated with the adoption of Water Policy (1994), execution of Tamil Nadu Water Resources Consolidation Project (TNWRCP, 1995-2004) (Elumalai, 2000) [11].

Accordingly, Tamil Nadu Farmers' Management of Irrigation Systems (TNFMIS) Act was enacted in 2000 rules to the act 2002 and election rules 2003 were also framed and notified by the Government. According to TNFMIS Act, Farmer Organizations have to be given the effective role in management and maintenance of the irrigation system for effective and reliable supply and distribution of water for agriculture (Dasthagir, 2009). Sathanur major irrigation system was subjected to several transfer experiments to institutionalize neoliberal governance in Indian irrigation since 1987 (Dasthagir, 2016) [10].

With the funding of Ministry of Water Resources, the Agriculture Engineering Department (AED) organized farmer participation under the Command Area Development (CAD) programme from 1987-1995 (Brewer, J. D., & Raju, K. V., 1995) [3]. Later, this command area was brought under the pilot experiments to implement TNWRCP in this state.

Under the provisions of TNFMIS Act, PIM is legalized in this irrigation system, while Elections of WUAs presidents were held in 2004 and 2009 (Dasthair, 2014) [9] and the third round of elections are scheduled to be held in 2020.

Methodology

Sathanur Irrigation system is one among the nine major irrigation systems with the three tiers structure of PIM in Tamil Nadu located in Villupuram district as well (Dasthagir, 2014) [9]. Accordingly, this research endeavors to analyze the performance of WUAs in Sathanur Irrigation Systems as the universe of the study. There are 24 WUAs of this irrigation system located in Villupuram district. In terms of hydrological stratification this WUAs can be categorized into head reach, middle reach and tail reach WUAs. Among them, three WUAs from Sathanur Right Bank Canal (SRBC) and two WUAs from Sathanur Left Bank Canal (SLBC) are selected for this study. *Erudaiyampattu*, *Thiruvaranagam and* Vanapuram WUAs acquire water from Sathanur Right Bank Canal (SRBC) and *Aarur* and *Sithapattinam* WUAs acquires water from the Sathanur left Bank Canal (SLBC). In sum, 4,845 farmers and 21 villages and 1964.615 hectares are benefited through these 5 tail-end WUAs. The irrigated area of these 5 WUAs are to be found in Sankarapuram and Tirukoilurtaluks. Correspondingly, In-depth-interviews with presidents of all the WUAs along with Focus Group Discussion (FGD) with farmers of Aarur WUAs were held to understand the predicaments faced by the tail-ender. Thus, as part of the sample survey of presidents of WUAs and FGD for ICSSR Major Research Project (2018-2020), the WUAs located at the tail-end were covered for the purpose of this article.

Social structure of Tail-end Water User Associations

The jurisdiction of WUAs is delineated as per hydraulic criteria in accordance with water conveying structure adhering to the blue-print design. As depicted in Fig. 1, the sample survey of WUAs brought to light the fact that there are WUAs covering two to ten villages and radius of three to eighteen kilometers. WUAs differ in terms of geographical coverage in village composition.

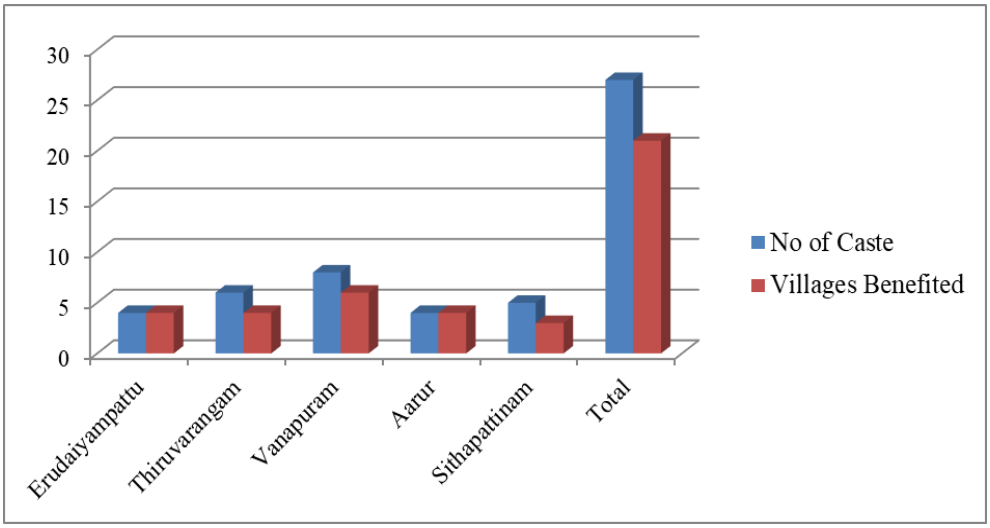

Fig 1: Caste and Village Composition of Tail-End Water User Association

WUAs are multi-caste and multi-village entities formed on hydraulic basis. *Erudaiyampattu* is the tail-end WUAs at the head reach of B4 canal in SRBC located in Sankarapuramtaluk covering four villages namely Erudaiyampattu, Mangalam, Ulagalapadi and Poruvallur villages. Majority of members of these WUAs are Christian Vanniyars holding sizeable lands, a sizeable proportion of Hindu Vanniyars and a small proportion of Konar and Udaiyar caste farmers. It is the only WUAs having a large number of Dalit farmers in the entire tail-end association of the SRBC irrigation system.

Thiruvarangam is the tail-end WUAs at the tail reach of B1 canal in SRBC located in Sankarapuramtaluk. It comprises of four villages namely Thiruvarangam, Kallipadi, Manianthal and Jambadai villages with 1,374 members. Majority of farmers hail from Vanniyar, Mudaliyar, Naidu, Chetty, Achari castes and a few members are Dalit.

Vanapuram is a tail-end WUAs under B2 canal in SRBC located in Sankarapuramtaluk. It covers six villages namely Vanapuram, Odiyanthal, Nagalkudi, Kadambur, Athiyur and Sirupaniyur villages. It is the unique WUAs in the SRBC that is spread across a radius of 10sq. Kilometers. A Majority of farmers are Udaiyars, Naidus, Pillai, Chettiyars, Reddiyars, Vanniyars holding sizeable lands and some of the Muslim Rowthers and Dalit have membership in tis WUAs.

Aarur is the last tail-end WUAs from the pick-up dam, under B3 canal in SRBC located in Sankarapuramtaluk. It includes four villages namely Aarur, Thimmanantal, Kidangudaiyampattu and Varagur villages. Hindu Udaiyars, Chettiyars, Vanniyars and Dalit members are found to be members in these WUAs.

Sithapattinam is the last tail-end WUAs under SLBC located in Tirukoilurtaluk. It covers three villages namely Sithapattinam, Devaradiyarkuppam and Athiyanthal villages. A greater proportion of Hindu Chettiyars, Konars, Naidu's, Vanniyars, are found to be landowners and a few Dalit farmers are members in this WUAs.

Thus, in south India village has traditionally been the basic social unit for organizing community activities including collective action in irrigation. As reaffirmed by foregoing discussion, every WUA comprises four to ten villages and all of them are multi-caste and multi-class. Therefore, in absence of socio-geographical organization farmers of different villages grouped into hydrological groupings of WUAs face challenges in organizing meetings, decision making and participation in elections of PIM. Thus, the blueprint design of user participation being implemented uniformly and unilaterally in the entire Irrigation System without adaptation to contextual requisites has culminated in the eventuality of dent WUAs in Tamil Nadu.

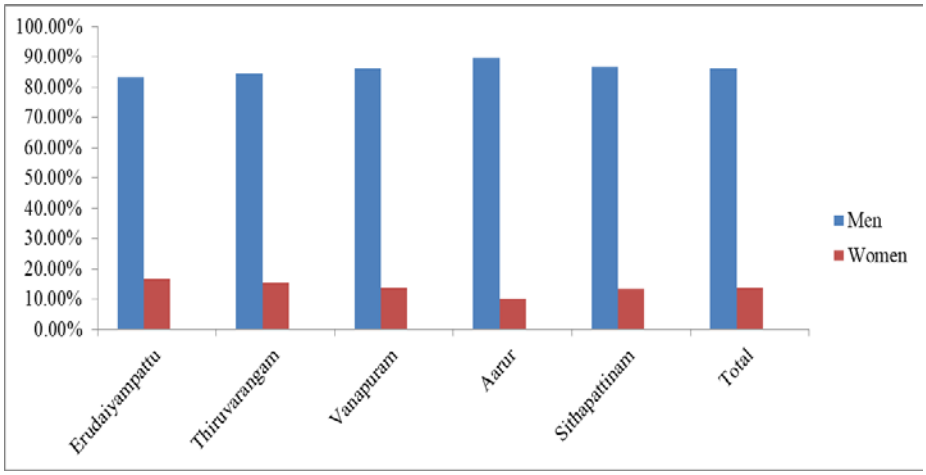

Fig 2: Size and Gender Composition of Water User Associations

TNFMIS act stipulates that the registered landowners only become members of WUAs. Concomitantly, all the registered men and women landowners as per the "record of Right" are enrolled as members of WUAs.

The Fig - 2, analyses the data of members of 5 Tail end WUAs in Sathanur irrigation system. It is apparent that WUAs differ in terms of size and gender composition. Size is a crucial variable in determining the structure and functioning of WUAs.

Accordingly, Erudaiyampattu is the smallest WUAs with lowest membership of 535 farmers (11.0%) and Thiruvarangam is the biggest WUAs having 1,374, (28%) members. Such wide variation in the size of WUAs is largely attributable to the hydraulic delineation of WUAs (Dasthagir, 2009b) [8]. Correspondingly, the principle of hydraulic boundary encompasses canal, distributary or tank command area as the jurisdiction of WUAs irrespective of the socio-cultural composition of the water users constituting the group. Further, such large composition of members poses challenge to the functioning of WUAs, especially in conducting General Body Meetings and voting in elections (Dasthagir, 2009a) [7].

Gender discrimination in WUAs manifests in the scanty membership (13.8%) of women in WUA. Consequently, out of 4863 members in 5 WUAs, there are 4192 (86.2%) men members as against 671(13.8%) women members in WUAs. This is primarily due to the fact that membership is based on ownership of agricultural lands as per "record of rights". Men farmers occupy (86.2%) in the total membership and whereas the women farmers occupy (13.80%) only in the total membership. It is apparent from the table that women membership ranges between (16.6%) in Erudaiyampatttu WUAs and (10.3%) in Aarur WUAs. This data amplifies the impact of gender discrimination in agricultural land ownership on membership in WUAs in so far as holding title to land is the criterion for WUAs membership (Dasthagir, 2016) [10]. Accordingly, gender inequality in land ownership affects the gender vise enrolment of members in WUAs (Kulkarni, 2011) [16]. Consequently, such gender discrimination in land ownership renders women farmers numerically less preponderant in user organizations (Aubr, 2013) [2]. This evidence amplifies the fact that although women by virtue of law have gained membership in WUAs without choice or selection, since ownership of land is adopted as the criterion of membership, their proportion of inclusion in WUAs is conspicuously low.

Hydraulic exclusion and livelihood of tail-end farmers

Thiruvarangam WUAs covers Kallipattu, Jambadai, Thiruvarangam villages. It is the largest and last tail-end locality in the SRBC. Farmers Gathered at the residence of the T.C member of Jambadai village. Majority of the landowners in this area belong to Most Backward Community. They responded to the meetings with greater enthusiasm as they reported that were invited for meetings regarding irrigated agriculture for the first time. They also said that they are recognized as landowners and water users through this meeting. The responses of the farmers participated in the FGD's are quantified in the table 1, given below.

Table 1: Gender Analysis of Source of Irrigation of Farmers in the Tail-End of Irrigation System

Source of Irrigation	Gender Composition of Farmers		
	Male	Female	Total
Canal water	1(100%) [8.0%]	------	1(100%) [5.3%]
Energised water	2(66.7%) [15.3%]	1(33.3%) [16.7%]	3(100%) [15.8%]
Rainwater	5(80.0%) [38.4%]	2(20.0%) [33.3%]	7(100%) [36.9%]
Hired water	3(100%) [23.0%]	1(0%) [16.7%]	4(100%) [21.0%]
Non cultivation	2(50.0%) [15.3%]	2(50.0%) [33.3%]	4(100%) [21.0%]
Total	13(68.4%) [100%]	6(31.6%) [100%]	19(100%) [100%]

Values in ( ) indicates row percentage while the values in the [ ] indicates column percentage.

Exclusion from Canal Water

Gender disaggregated data in the table-1 depicts the impact of irrigation water source on the pattern of livelihood of landowners in the Thiruvarangam WUAs. It is manifest from the Focus Group Discussion that farmers rely upon ground water or rainwater or purchase water for irrigation. This evidence establishes that none of the farmers do receive canal water despite their ownership of lands in the command area of the major irrigation system. Therefore, it is necessary to probe into the reasons for non-availability of canal water to their land.

The participants expressed that the farmers in the head end and middle ends of the canal divert water to their fields that does not allow the possibilities of canal water flowing to the tail-end lands. Further discussion revealed that middle end and head end farmers wield economic and political power who would like to receive water first and irrigate their fields entirely with canal water- as it is entirely free of cost. Consequently, the tail-enders have to go without canal water. Moreover, damages to the irrigation channels and water control structures obviate the possibility of canal water reaching their lands. Therefore, these farmers rely on alternative sources of water for irrigation.

Water Hiring

The discussions brought to light the prevalence of a distinct practice of sale and purchase of irrigation water existing in this command area. A majority of the participants reported that they rely on hired water priced on hourly basis. These farmers informed that the well to do farmers who have energized well (or) bore wells who own are in a position to extract ground water and selling to neighboring farmers for an informally prescribed price. The middle-aged women farmer added "due to this reason, most of us have given up cultivating our land as agriculture has become a costly endeavor". Thus, non-availability of canal water and purchase of irrigation water has made the tail-end farmers landowners to give up cultivation as their livelihood.

The male farmers in the group expressed that a majority of farmers have to depend on the rainwater or other source of energized water only. That source of their cultivation will be in only one season in a year. They bewail that during non-rainy season, these farmers work as agricultural laborer for their livelihood. Some participants disclosed about their dependence on rainfall for cultivating crops for a season. The cultivation is

confined to dry crops and there to the rainy season. Thus, in these case farmers are deprived of their income from their land due to absence of canal water supply to the tail-end.

Table 2: Gender Analysis of Farmer Participation in Cultivation in the Tail-End Irrigation System

Nature of livelihood	Gender Composition of farmers		
	Male	Female	Total
Owner Cultivator	2(75.0%) [15.3%]	1(25.0%) [16.7%]	3(100%) [15.7%]
Owner cultivator cum laborer	4(75.0%) [31.0%]	1(25.0%) [16.7%]	5(100%) [26.4%]
Landed agricultural laborer	3(75.0%) [23.1%]	1(25.0%) [16.7%]	4(100%) [21.1%]
Non cultivator	2(50.0%) [15.3%]	2(50.0%) [33.2%]	4(100%) [21.1%]
Non cultivating laborer	2(75.0%) [15.3%]	1(25.0%) [16.7%]	3(100%) [15.7%]
Total	13(68.4%) [100%]	6(31.6%) [100%]	19(100%) [100%]

Source: Focus group discussion with Tail-end farmers; Values in ( ) indicates row percentage while the values in the [ ] indicates column percentage.

The Table – 2, examine the impact of water scarcity at the tail-end on the pattern of livelihood of landowners in cultivation in Thiruvarangam WUAs. It becomes apparent from the data that a majority of the farmers do not cultivate their lands. There are (53.7%) of farmers belong to this category. Among them there are Non-Cultivators classified into:

1. Aged landowners lease out their lands or permit their male relatives to cultivate.
2. Landowners who do not cultivate their lands but work as agricultural wage laborers in other's fields.
3. Landowners who lease out their land for cultivation and work for wages as laborers in other's fields.

Landed Agricultural Laborers

It is ironical to know that in the case of sizeable number of farmers land situated in irrigation command area does not generate employment or income in the absence of water supply. Thus, the ownership of agricultural land failed to empower them in the absence of access to irrigation water. Paradoxically, these farmers even though are owners work as wage laborers in others agricultural fields. Thus, farmers in spite of their participation in agriculture are deprived of their usufruct rights of their own lands and are pushed to the status of agricultural laborers. Literature cites cases of landless agricultural laborers and land is a major employer in the context society. Contradictorily, in the case of farmers ownership of land does not assure livelihood. Their title to land did not safeguard them from their traditional status of wage laborers. Thus, these can be termed as 'landed agricultural laborers'.

Besides, this category there is certain farmers who also continue the traditional status of being agricultural laborers who due to irrigational constraints handed over the lands for the cultivation to the male relatives. In the case of these farmers though their land is used for cultivation it does not provide them employment. Nonetheless the land is the source of minimum income as determined by the cultivators. Consequently, these women had to continue their traditional occupation of agricultural laborers. Therefore, the wage labor becomes their livelihood while their own land becomes additional income.

The FGD's brought to light that there are more owner cultivators cum laborers in among men than women farmers and contrarily. Landed agricultural laborer is more among the men farmers and few among the women farmers.

Women Exclusion

There are a few women who rely on ground water from energized well. These women declared that these energized wells are not owned by them. But, owned by their male relatives they receive supply of water to their fields. Accordingly, they carry on cultivation along with their male relatives and in most cases said to be assisting their husbands or brothers in cultivation and irrigation. Thus, dependence on ground water in the absence of canal water subjugates the women to their male relatives.

In distinction to all these categories there is a small percentage of women cultivators who participate in the cultivation of their own land. Nonetheless, the discussions brought to light that this woman rely on water supply from their male relatives, and thereby depend on them for organizing cultivation. They said that they assist their male relatives in agricultural activities. Thus, the absence of independent water supplies the women owner cultivators are subjected to male relatives.

The FGD's have made it amply clear that farming landowners are deprived of their right to irrigation water. In the absence of water supply they either denied of their livelihood from their own land or made to serve their male relatives or relegated to wage laborers.

Nonetheless, in a majority of cases land ownership has been to a large extent less instrumental in liberating from their traditional occupation of serving as agricultural wage laborers, due to non-availability of irrigation water supply. Further, land ownership has been to a greater extent less successful in overcoming gender discrimination in agriculture. The arena of agriculture has landed women subjected to the male relatives for irrigation water supply to cultivate their lands.

The FGD's have thrown light towards the ongoing debate in gender theorizing and feminist literature that it is feasible for ownership of land by itself being a more powerful instrument of women empowerment. Property ownership necessarily ensures socio-economic independence of women, so far, the functionality and utilization of the property necessities the participation and power of the patriarchy. Thus, lands owned by women without irrigation are dysfunctional in engendering livelihood to them and have disproved to be instruments of their empowerment at the tail-ends of the irrigation systems.

Impact of Hydraulic Exclusion on Participatory Irrigation Management

In-depth interviews with the presidents of WUAs brought to light the nature of functioning and performance of tail-end WUAs. *Erudaiyampattu* WUAs president is a big landlord and a Lawyer by profession. He was unanimously elected twice as president in 2004 and 2009. He regretted that there is no special provision to act and to serve the needs of the farmers in the association as there has been no canal water supply in the past 10 years. Though Executive Meetings are conducted twice in a year the TC representatives do not show much interest to participate in the EC meetings due to the Non-availability of canal water.

In *Thiruvaranagam*, WUAs president was unanimously elected twice in 2004 and 2009, lamented that canal water does not reach our fields. Though government is releasing the funds to the irrigation officials, but maintenance work is not complete, while WUAs are involved. He asserted that since irrigation officials are not co-operating for our requests and demands, I am not interested to become WUAs president for the next term. WUAs General Body (GB) meetings are not held because wide command area surrounding of nearly 8 kms. And it is impossible to gather all the village farmers to conduct the WUAs meetings. We conduct the TC meetings in the Vanapuram Irrigation office campus. We have no resources or funds to meet the GB meeting expenses. Executive Meetings are conducted twice in a year. The TC representatives do not show much interest to participate in the EC meetings. Women TC representatives send their husbands to participates in the EC meetings.

Vanapuram WUAs president elected unanimously in 2009 espoused that the farmers in the command area gather once in a month and collect ten rupees as small savings for agricultural purposes as customary practice. However, in the absence of GB meetings, Executive Meetings are conducted thrice in a year, he said.

Aarur WUAs president is also the Distributary Committee representative and project committee member since 2004.He, bewailed that While Executive Meetings are conducted twice in a year, General Body (GB) meetings are conducted once in 2 years, farmers' participation is little as canal water supply does not reach our villages.

President of *Sithapattinam* WUAs also unanimously elected in 2009, reported that no GB meetings were conducted as it is difficult to gather farmers of three villages, while Executive meetings are conducted once in a year. He lamented that Irrigation Department officials are not responding properly to our water demands for the past 15 years.

In this regard, the WUAs presidents realized the need for reforms that would improve the WUAs functioning. For this purpose, The WUAs leaders advocated for according greater power to the WUAs.

They indicated that legal provisions enhanced by the act have not been fully implemented in the operation of PIM and demanded for devolution of authority accompanied by the decentralization of growth and responsibilities essential for the effective functioning of WUAs including the operation of the bank account of the WUAs. They lamented the maintenance works pertaining to the irrigation tasks within the jurisdiction of WUAs is being offered to contractors by the WRO officials. Hence, they demand the maintenance contracts to be given to the respective WUAs in order to ensure quality, timeliness and farmers participation.

- The WUAs leaders suggested the issue of Identity cards to the WUAs members and leaders. Such a provision will help to create awareness among the farmers about their membership and identification with WUAs. This enables leaders to identify and recognize the members and distinguish in prevent and participation of the non-members in the WUA meetings and elections. All the WUAs presidents put forward the need for organizing training programs for farmers regarding PIM.
- Since the tail-end farmers are constantly deprived of access to water, incentive structure could be effected to provide compensation and greater financial support and such other provisions that would encourage them to participate in their WUAs. Hence, tail-end WUAs deserve greater attention in order to secure efficacious PIM.

Thus, PIM needs to be disentangled from bureaucratic apathy with improved canal management and enhanced water supply in Order to craft efficacious WUAs at the tail-ends for mitigating hydraulic exclusion in large-scale irrigation in India.

Unequivocally, tail-end WUAs are staggering under water scarcity and paucity of farmer participation. While, the leaders are elected without voting, they hail from dominant castes with high socio-economic status of their respective villages. Consequently, without voting, meeting etc., tail-end WUAs prove to be 'paper organizations' on government records.

Conclusions

PIM is implemented with great institutional and financial cost premised on the proposition that devolution of management to WUAs can improve canal water supply and management. Such assurance and expectations about PIM to a large extent were assumed to benefit the tail-end farmers. Indeed, formation of WUAs has facilitated the PIM all over the irrigation system with institutional support. After the formation of WUAs farmers have begun to evince greater interest and contribution to the performance of participation of users that has considerably reduced irrigation conflicts. This has also included the relationship between farmers and WRO officials and staffs. WUAs president are in a position to redress farmers' grievances and also expressed their requirements to WRO officials as well as government authorities.

Contradictorily, though PIM is operationalized for the past one and half decades, institutional reforms and WUAs have been unsuccessful in delivering canal water and other benefits to the tail-enders. Evidently, underperformance of Sathanur irrigation system at the tail-ends is marked by low equity, heavy water losses, declining crop yield, reduction in total cultivated area, water logging and salinity, tail-end deprivation, conflicts among farmers, unauthorized diversions in the head reaches, encroachment and so on (Chambers, 1988, Brewer and Raju, 1995) [5, 3]. Consequently, tail-end farmers experience hydraulic exclusion in major irrigation systems.

Concomitantly, evidences gathered from tail-end WUAs reiterate the fact that PIM has been less instrumental in mitigating the predicaments faced in canal irrigation management. Consequently, tail-end deprivations persist not only jeopardizing irrigated agriculture but also rendering WUAs defunct at the tail-ends of the branch canals. Moreover, when canal water supply is not assured to the farmers, they do not extend their support and participation. Thus, at the tail-end of major irrigation systems there is 'neither Pani nor Panchayat' in spite of the operationalization of TNFMIS legislation for PIM.

Directions for Research and Policy

Premised on the successful experience of community based small scale irrigation systems managed by collective action of people culminating in self-governance in irrigation, the idea, the program and Policy of IMT is propagated worldwide through the public private partnership in the governance of large-scale irrigation systems under the rubric of PIM policy, programmes and legislations. Nevertheless, the key agenda of adopting PIM

through IMT policy is to achieve Improved irrigation system performance necessitating distribution and supply of water to the talent command area. Research literature in this subject repeatedly reinstates that talent deprivation persists in large scale irrigation systems Tail-end and WUS.

Although, the study of tell-end deprivation before the adoption of PIM was dominant in the irrigation development discourse in search of rational for universalizing PIM globally, the post transfer management of irrigation systems are studied to show the positive effects of PIM largely drawn from cases of head-reach, middle-reach and tail-reach command areas. In combination with different hydraulic locations the understanding of Tail-end deprivation reminds rather sublime. Thus, one of the most appropriate research strategies to evaluate the efficacy of PIM is to promote research studies on tail-end WUAs, as demonstrated by this study. Such exclusive studies on the performance and functioning of tail-end WUAs could bring to light the reality of the process of PIM and post-transfer management of irrigation systems. Research of this kind can help in documenting the marginalisation and impoverishment experienced by tail-end farmers.

This research advances a critique of the advocacy of new liberal policy of blueprint model of irrigation development, by challenging its unilateral approach, uniform procedures and the blue-print design applied to major, medium and minor irrigation systems. This study recommends evolving a distinctive plan and approach for the effective implementation of PIM in large scale irrigation systems in contrast to the small-scale irrigation systems. By developing distinctive strategies to tackle tail-end issues approach for the interface between hydraulic bureaucracy and farmers in the governance of major irrigation systems which deserve greater attention for ensuring sustainable development.

Acknowledgement

This article is the outcome of the research project funded by Indian Council of Social Science Research (ICSSR, New Delhi), 2018-20.

About the Author

Dr. K. Gulam Dasthagir holds a consistent academic record of being topper in high school; topper in higher secondary school; Gold medals thrice in Ist, IInd, and IIIrd years of Graduation in Sociology, University 1st rank in Post-Graduate in Sociology, UGC-NET with JRF in depute, and Ph.D. in Sociology, with twenty-five years of teaching and research experience is serving as Professor in the Department of Sociology in Pondicherry University. He holds Post-Graduate diplomas in Higher Education, Public Relations, Personnel Management and Industrial Relations. Prof. Dasthagir represented India in the World Water Week as Ford Foundation's consultant, published Scopus indexed and IWMI Cited articles and research articles in journals of repute. He directs ICSSR & NCW funded research projects, developed self-instruction study materials for UG and PG programs in Sociology and Social Work, as well as Authored 2 books and edited 1 volume, besides **c**hapters in ISBN numbered conference proceedings and edited books. He organized seminars, workshops and webinars, conducted gender sensitization and capacity building for engineers of Public Works Department and engineering students, Capacity building and sensitization on disability management for students and teachers in schools and colleges. He is a serving member of Academic Council of Pondicherry University and other Academic bodies within outside India and referee of International Journal. Dasthagir is honored with the Best Teacher Award of Pondicherry University, Outstanding Employee State award of Government of Puducherry, Best Employee State Award twice by Government of Tamil Nadu, in addition to Alumni Achievement Award, Outstanding Faculty Award, Young Social Scientist Award, Youth Merit Award, Outstanding Personality Award, Best Research Paper Awards etc.

References

1. Asian Development Bank, Irrigation Management Transfer: Strategies and Best Practices. New Delhi, Sage Publication, 2008.
2. Aubriot O. Tank and well irrigation crisis: spatial, environmental and social issues. Cases in Puducherry and Villupuram districts (South India), Concept Publishing Company: New Delhi, 2013.
3. Brewer JD, Raju KV. Irrigation management transfer policies and law. In International Irrigation Management Institute. Paper for workshop on Irrigation Management Transfer in India. Ahmedabad, 1995, 11-13.
4. Centre for Water Resources. Tamil Nadu Water Resource Consolidation Project Final report, Anna University, 1997.
5. Chambers R. Managing canal irrigation: Practical analysis from South Asia. Cambridge University Press, 1988.
6. Dasthagir KG. Restructuring the governance of large –scale irrigation system in India. *Samaja Shodana*. 2002; 2(11):45-55.
7. Dasthagir KG. Participation of Women in Water Management: An Appraisal of Water User's Associations of the Cumbum Valley Irrigation System. The Indian Journal of Social Work. 2009a; 70(3):455-466.
8. Dasthagir KG. Women's Exclusion in Farmer Management of Irrigation Systems in Tamil Nadu: A Case Study. *Indian* Journal of Gender Studies. 2009b; 16:401-410.
9. Dasthagir KG. Who Governs Water User Associations? A Gender Assessment. Man & Development. 2014; 36:77-98.
10. Dasthagir KG. Panipanchayats for Whom: Investigating Preclusion of Dalit Women in Participatory Irrigation Institutions. Contemporary Voice of Dalit. 2016; 8:163-176.
11. Elumalai KG. Introduction to strategies for implementation of PIM in Tamil Nadu in PIM – Paradigm for the 21st century. ed. L.K. Joshi and Rakesh Hooja, Rawat Publications, New Delhi, 2000.
12. Garces-Restrepo C, Vermillion D, Muoz G. Irrigation management transfer: Worldwide efforts and results. FAO Water Reports Series, No. 32 Rome: FAO, 2007.
13. Government of Tamil Nadu, TNFMIS Act, Chennai: Government of Tamil Nadu, 2000.
14. Gulati, Ashok, Ruth S, Meinzen-Dick, Raju KV. Institutional Reforms in Indian Irrigation, Edition-I, New Delhi: Sage Publications Pvt. Ltd, 2005.
15. Hoojah, Rakesh, Management of water for Agriculture, Jaipur: Rawat Publications, 2006.
16. Kulkarni S. Women and decentralized water governance: Issues, challenges and the way forward. Economic and Political Weekly, 2011, 64-72.

17. Mosse D. The rule of water. Statecraft, Ecology and Collective Action in South India. New Delhi: Oxford University Press, 2003.
18. Munoz G, Garces-Restrepo C, Vermillion DL, Renault D, Samad M. Irrigation management transfer: worldwide efforts and results, Paper 16 presented at the 4th Asian Regional Conference & 10th International Seminar on Participatory Irrigation Management, Tehran, Iran, 2-5, 2007.
19. Pant Niranjan, Some Issues in Participatory Irrigation Management. Economic & Political Weekly. 2008; 43(1):30.