



IRRIGATION INFRASTRUCTURE DEVELOPMENT IN TAMIL NADU: WITH SPECIAL REFERENCE TO RURAL INFRASTRUCTURE DEVELOPMENT FUND¹

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ABSTRACT

That irrigation is the sine-quo-non for agricultural development especially in India is beyond doubt. Although three important sources – canals, tanks and wells – contribute for the development of irrigation sector, the combined effect of these sources is not up to the satisfactory mark. This is because, irrigation performance requires multitude efforts starting from the beneficiary farmers to managing the larger irrigation system by the state functionaries such as the Public Works Department. In the case of common source irrigation systems such as canal and tank irrigation users participation has been gradually diminishing in the last few decades. Consequently, the maintenance and management part of the system became weak leading to very poor performance of irrigation. In this context, to develop irrigation system in Tamil Nadu, the National Bank for Agriculture and Rural Development has funded through Rural Infrastructure Development Fund to develop a few canal and tank irrigation systems in Tamil Nadu. To what extent this funding helped to achieve the distributional efficiency and productivity efficiency of irrigation systems is briefly discussed in this paper. The outcome of the project shows that due to poor involvement of beneficiaries in the upkeep of the system and poor functioning of irrigation

¹This paper is based on a larger study, “Impact Evaluation Study of RIDF Projects in Tamil Nadu funded by the National Bank for Agriculture and Rural Development, completed in 2015.

institutions led to average outcome from the investments undertaken in irrigation projects is put forth in the paper.

Key Words: Development, Implementation, Irrigation, Maintenance, Stakeholders

1. Introduction

This paper attempts to highlight the status and significance of National Bank for Agriculture and Rural Development (NABARD) funded Rural Infrastructure Development Fund (RIDF) minor irrigation projects in Tamil Nadu.

1.1 Status of Agriculture Sector in Tamil Nadu State

Irrigation is one of the basic inputs in agriculture sector. Although there are four sources of irrigation, viz. canals, tanks, wells and other sources, Tamil Nadu has mainly three sources and the contribution of 'other sources' is negligible. Canals are the major sources of irrigation, in which the State has 81 reservoirs with a present net capacity of 216.4 Thousand Million Cubic Feet (TMCft). The total storage capacity of 15 major reservoirs is 198.4 TMCft. Area irrigated by canal command in Tamil Nadu in 2012-13 is 5.9 lakh hectares, which is about 60 % of its registered command area. The remaining sources are considered as minor irrigation sources, in which the State has 41,127 tanks with a net capacity of 178.9 TMCft. Total number of wells in the State is 18.21 lakh in 2012-13 that contribute a net irrigated area of 16.3 lakh hectares. Due to negligence and less importance given to rehabilitation and maintenance of tanks its contribution in the state has drastically come down from a little more than a million ha (original registered ayacut of tanks) to about 4.20 lakh hectares in 2012-13 (Tamil Nadu an Economic Appraisal, 2011-12 to 2013-14 [1] and K. Sivasubramaniyan and Gandhiraj 2009 [2]). Since irrigated agriculture enhances productivity of land 3 to 4 times that of unirrigated land more importance is given to rehabilitate /restore canal and tank systems through RIDF projects.

1.2 RIDF Genesis, Status and Share of Rural Connectivity

Genesis of RIDF - Government Initiatives: The liberalization / globalization policies adopted by the Govt. of India since early nineties have helped to attract direct foreign investments in the infrastructure sector. But such investments are flowing into the core sectors like ports, power, highways etc., leaving the rural infrastructure entirely to be taken care of by the State

Governments. There are many infrastructure projects, which have been started but are lying incomplete for want of resources. Even though there is an urgent need for creating adequate employment opportunities in rural areas through development of infrastructure, there had been virtually no institutional arrangements for financing rural infrastructure. In this background, the Hon'ble Finance Minister in the Union Budget Speech 1995-96 announced that "Inadequacies of public investment in agriculture is today a matter of general concern. This is an area, which is the responsibility of States. But many States have neglected investment in infrastructure for agriculture. There are many rural infrastructure projects, which have been started but are lying incomplete for want of resources. They represent a major loss of potential income and employment to rural population." The Government of India announced in the Budget of 1995-1996, the scheme for setting up of Rural Infrastructure Development Fund to be operationalised from 1995 by NABARD for financing of on-going and new infrastructure projects with a corpus fund Rs 2000 crores. Subsequently, RIDF was made available for new projects as well and its ambit was broadened to cover other important areas of rural infrastructure.

1.3 Status of Rural Infrastructure Development Fund

Presently as many as 32 diversified activities are supported under RIDF. These activities with varying end use could be broadly classified under three sectors viz., Agriculture (including allied activities and rural warehouses) Social and Connectivity. "Of the cumulative RIDF loans sanctioned as on 31 March 2013, agriculture and related sectors accounted for 42 percent (including 29 percent for irrigation), rural roads 32 percent, and bridges 12 percent. The balance 14 percent of the loans was sanctioned under social sector projects" (Brief details of RIDF Loan – notes circulated to Common methodology workshop of RIDF Project, NABARD, Mumbai, November 2014).

1.4 Implementation

Implementation of RIDF projects assumes greater importance as the process involves multiple government agencies at ground level and their coordination for its success. The quantum of loan to be sanctioned under each tranche and eligible activities under a tranche are decided by the GoI on an annual basis. Rate of interest and period of loan are as decided by the RBI.

The projects are sanctioned with General Terms and Conditions as well as project specific special terms and conditions/suggestions. State Governments are provided loans on reimbursement basis

against the actuals incurred in execution of specific sanctioned projects. Notwithstanding the above, mobilisation/start up advance is also released, if required by the State Govt. on acceptance of the terms and conditions by the State Govt. to speed up the implementation of the projects.

1.5 Rules, Regulations, Instructions, Manuals and Records held by NABARD or under its Control or Used by its Employees for Discharging of its Functions

1. Checklists have been made available to all the State Govt's for preparation of Detailed Project Report (DPR).
2. Operational Guidelines are issued every year under RIDF.

Budget allocated to each of its agency, indicating the particulars of all plans, proposed expenditures and reports on disbursements made: The corpus of RIDF is announced in the Union Budget by the Hon'ble Finance Minister every year. Under the tranche RIDF XX for 2014-15, the corpus is ₹25000 crore. The RIDF loan is generally phased up to 3 years and the loans are released by Regional Offices (RO). The reports of disbursements are maintained at RO as well as Head Office.

1.6 Tamil Nadu State Policy and Sector Plan

The 'vision 2023' the policy paper of government of Tamil Nadu state will be "to achieve in class productivity in key agricultural produce and to be a global supplier with robust infrastructure." This vision imperative calls for setting up of robust support rural infrastructure for planning, production, processing, storage, distribution, marketing and sales of agricultural produce etc. Also, the Vision 2023 has envisaged doubling of infrastructure spending 11.5 % of GSDP by 2014 (Source: Tamil Nadu an Economic Appraisal 2011-12 to 2013-14).

All the policy directives and vision statements amply demonstrate the significance of agriculture sector and the need for resources for financing those involving principally commercial banks in the context of development through credit. In this context, strengthening of irrigation infrastructure in Tamil Nadu, would be useful for studying their contribution in the given area / district in the process of capital formation in rural areas.

1.7 Literature Review

A review of earlier studies on the subject helps basic understanding of issues connected to irrigation infrastructure from the perspective of stakeholders and facilitates enriching the current exercise in the overall assessment of multi-disciplinary impact of RIDF projects in Tamil Nadu.

The study, which had been assigned to IIM, Bangalore to carry out 'A Macro Level Policy, Programme and Performance Evaluation of RIDF [3]' brings out the following findings.

In terms of sectoral allocations, Irrigation and Road Sector got the major share of the fund. Classification of investments into assets based/sector based showed that in all classifications, these sectors got fair share. The sectoral and projects thrust have been sticking to the broad objectives and guidelines of the fund. NABARD's role in project financing and management was considered as contributory for the better condition of the roads. In both road and irrigation projects the officials as well as the local representatives mentioned that NABARD projects are completed faster than other projects as the NABARD's systems are streamlined.

One significant finding which might be of interest to planners is that it has led to better access to services provided by states and better delivery of services as functionaries find it easy to visit these places. In the irrigation sectors, similar observations were made. Streamlined fund flow comes out as a significant factor in ensuring timely completion of projects. Land value has gone up tremendously due to these projects. It was observed from the study that the agricultural and other credits significantly went up after the implementation of the projects.

People's participation may help overcome their apathy towards the projects and maintenance and help their upkeep. For this aspect, their involvement is required at project initiation and formulation. The second aspect of people's participation is their involvement during implementation. Social monitoring and beneficiary participation will definitely help in better maintenance and usage of resources. It was observed that Water User Associations (WUAs) are rarely established and even where they operate they are ineffective. NABARD has to do further analysis and come up with areas where it can be of help and suggest methods for ensuring this. Presently it is observed that there is no clarity on what it can achieve. User charges are rarely levied. It emerges that it is more due to lack of political will than farmers' unwillingness.

1.8 The Focus and Coverage of the Paper

In the first, earlier study, referred to above brings out useful facts on the impact of RIDF but covering either in limited area with limited sample confining to specific sector. However, this paper based on evaluation study involves primary data collection and public opinion. The paper covers Minor Irrigation (MI) RIDF projects of 9 sample minor irrigation works (60% samples) implemented by PWD (WRO), spread over 9 districts in Tamil Nadu state.

Second, the RIDF project area in the selected districts in Tamil Nadu covering MI projects under agricultural sector can portray both tangible and intangible multidisciplinary benefits to the people at large in the command area served villages.

2. Scope and Objectives of the Paper

The paper covers minor irrigation (MI) works in 'agriculture' sector in 9 districts of Tamil Nadu. The reference period for the impact evaluation works undertaken are from **2008-09 to 2010-11** covering RIDF tranches XIV, XV and XIV. Since trench XIV has no sanctioned projects, the study has covered only the remaining two trenches. The paper is set to have the following objectives.

1. To present an overview on the significance of RIDF in the context of development through capital formation;
2. To critically study the process of implementation of RIDF investments in minor irrigation projects with special reference to Tamil Nadu state;
3. To evaluate the overall socio-economic impact of RIDF intervention at ground level from rural development perspectives;
4. To assess the implication of RIDF assets on credit absorption capacity and rural bank business in rural area; and
5. To draw some learning points and prescribe policy intervention and action points for different stakeholders.

2.1 Methodology

Methodology covers criteria for selection of sample size of projects, sources of data, estimation of various parameters and reference year of the study. The sample coverage is furnished in Table 1.

Table 1 RIDF Project wise Coverage in Tamil Nadu

Tranches	Type of	Sanctioned Project Works	Number of Samples Selected	% of Sample to No project works	No. of Districts Covered	No. of Villages	No of HH
1	2	3	4	5	6	7*	8*
15, 16	Irrigation	15	9	60	9	27	108

Note: 7* refers only the main villages benefitted and visited.

*8 no. of hhs refer those who are present during the interview as well as focussed group discussions.

Source: Tabulated from data given by NABARD regional office, Chennai (column 1 to 6).

Details of sanctioned MI projects and sample size covered in the state are furnished in table 2. A total of 15 projects in which 9 of them are selected in the study. The number of sample command area villages and households benefitted by MI projects account for 27 and 108 respectively.

2.2 Method of Selection of Samples

In Tamil Nadu, there are 12 districts in which 15 MI projects have been sanctioned under Tranches XV and XVI. For evaluation purpose, 9 MI works in 9 districts have been purposively selected. The tranche wise details of the sanctioned and samples selected are given in Table 2.

Table 2 Trench wise RIDF Projects Sanctioned and Selected for Impact Survey

Sl. No	Type of structures covered in the study	No of Projects Sanctioned				No of Projects selected for study			
		RIDF-15	RIDF -16	RIDF-17	RIDF-18	RIDF-15	RIDF -16	RIDF-17	RIDF-18
1	Flood Control	-	-	nt	nt	-	-	nt	nt
2	Irrigation	7	8	nt	nt	6	3	nt	nt
3	Others-	-	-	nt	nt	-	-	nt	nt
4	Total	7	8	nt	nt	6	3	nt	nt
5	No. of districts covered	6	6	nt	nt	6	3	nt	nt
6	No of Farmers Covered	na	na	nt	nt	25,417	7,024	nt	nt

Note: '-' indicates nil. nt = As per ToR, not taken up, na = not available.

Source: Data provided by NABARD, RO, Chennai [4].

2.3 Criteria for Sample Selection

- Total works completed in tranches 15 and 16 (in tranche 14 no irrigation work was sanctioned) under minor irrigation sector are 15 in 12 districts. Since only limited number

of works were sanctioned, 60% sample has been considered, which comes to 9 works in 9 districts.

- b. In each district at least one work was selected purposively. Wherever, the same type of work was repeated in other districts that work /district was not considered for selection, to avoid duplication.

2.4 Sources of Data (Primary &Secondary)

Primary data: For the RIDF survey, from each of the nine sample projects, primary data have been collected from 108 farmers by using questionnaire representing 36 farmers each from head, middle and tail reaches for in-depth study. Besides primary data collection, opinion of members of Panchayats, Self Help Groups (SHGs), Water Users Associations(WUA) members and other villagers through focussed group discussions were solicited. The 108 farmers of 9 projects have been distributed as: 12 farmers in each project representing 4 farmers each from head reach, middle reach and tail reach of the command area.

Secondary data: Before canvassing the sample farmers the following details were collected from the respective Village Administrative Officers as well as the respective PWDs at district level.

Initially, the Detailed Project Report (DPR) and Project Completion Report (PCR) for each one of the selected RIDF project were collected. Specific details of the selected irrigation systems such as number of districts / taluks covered, command area map, details of RIDF works executed; actual command area and present command area served by the irrigation system; total project cost; water requirement of crops for one irrigation season; present cropping pattern; number of irrigation wells available in the command area; number of years water available to the command area after completion of the RIDF project were collected.

2.5 Criteria Used for Selection of Households

The impact information was collected from the beneficiaries and other stakeholders of the projects. Care was taken to select the respondents from different socio-economic groups. For which, details from ayacut / command area farmer groups such as large, medium and small farmers, members of WUAs, agricultural workers, traders, agro-processors were collected. To be

more specific, for irrigation, in addition to Panchayat officials / VAOs, command area beneficiaries were contacted.

2.6 Procedures for Data Collection and Method of Conducting the Survey

For collecting primary data and collective opinion from the group discussions on sample RIDF asset at village level, the following procedure has been followed.

The benefits from RIDF assets are captured subjectively based on the field observations. In addition to that the rural bank branches located nearest to the sample work were approached and discussed with the bank staff on the impact of RIDF work on credit absorption in their service area and collected business data in terms of savings and advances. The following are other considered views on the limitations of the household surveys.

1. The RIDF works like precast retaining wall, repairing right abutment, de silting, lining etc, is more for **protective investment** mainly for renovation and improvement of irrigation structures and no immediate **productive** impact could be precisely envisaged in the absence of adequate rainfall in the project command area.
2. **The protective and productive use distinction:** The details on these kinds of usages of MI asset contained in the Detailed Project Report (DPR) are only based on theoretical assumptions considered at the time of project estimation. But, after completion of MI works real situation at the site observed during visit after 3-4 years gives different picture nullifying the assumptions made earlier.

Even then, to capture the water distribution effect fairly the head, middle and tail approach of the irrigation system, was adopted and had interviews with WUAs members and other beneficiaries.

2.7 Methodology Followed in Estimation of Various Parameters

1. Estimation of Internal Rate of Return (IRR) for Minor Irrigation Projects for the Parameters viz., income and production: The discount rate often used in capital budgeting that makes the net present value of all cash flows from a project equal to zero. That is, the higher a project's IRR, the more desirable it is to undertake the project. Assuming all other factors remain constant among various projects, the project with the highest IRR would probably be considered the best and undertaken first.

The IRR to public investments on sustained high rates of return to irrigation suggest that investment in the productivity enhancing activities should be increased.”

2.8 Limitations: The following are the limitations of the study:

1. The Minor Irrigation under agricultural sector is more dependent on rainfall. Reportedly due to inadequate rainfall during the last two years (2013-14 and 2014-15) in sample area like Dharmapuri, Salem and Pudukkottai no tangible impact could be captured.
2. Although IRR is an effective tool to assess the outcome of RIDF investment for rehabilitation / improvements in the distribution system connected to MI projects, it has some limitations, because of presence of difficulties in accessing required field data for IRR calculation. For IRR, production cost data have been collected only from owner cultivation regardless of the location of the farm in the command area and size of holdings.
3. Whatever the rainfall pattern occurred in the agro climatic regions covered in the sample MI projects, the distribution of water is assumed normal. That is, the irrigation water is fairly shared among different reaches of the irrigation system. The pre-project cropped area is sustaining the given marginal addition due to RIDF project investments.
4. Difficulties are found in application of IRR tools uniformly in all the projects spread over in different agro-climatic zones, due to the following problems:
 - a. Poor execution of required infrastructure works – eg. Tiruchirappalli RIDF MI project.
 - b. Ineffective O & M – It is observed almost in all districts irrespective of zones.
 - c. Lack of ownership of stakeholders and inactive WUAs in most of the districts covered for the study regardless of the Agro Climatic Zones in protecting the RIDF structures.
5. For IRR calculation, only tangible direct benefits in terms of values of crop production have been considered. However, it is admitted that there are intangible social benefits also accrued from the RIDF projects, and if the imputed values of such benefits are considered, the total socio-economic benefits would be still more than the one arrived at in the study.

3 Results of the Study

This section, presents the consolidated observations of the study on MI works

3.1 Operation & Maintenance of Assets and Over Exploitation of Groundwater Resources

In majority of the RIDF projects, six out of nine surveyed, inadequate and poor maintenance of the irrigation systems causes inefficiency in their full utilization of irrigation benefits coupled with less active functioning of WUAs that creates poor strengthening of local irrigation institutions to work efficiently in managing the sample MI projects. Likewise, the same number of 6 MI projects (Table 3) face severe drainage and municipal sewage problems that create water quality problem leading to less productivity in the command areas served by them.

Table 3 Agro-Climatic Zone Wise Pollution and Maintenance Problems Reported by Beneficiaries under RIDF Project (Cost Rs in lakh)

S. No.	District	Name of Irrigation work with Cost & Amount Utilised based on Sanctioned budget	Approximate % of Pollution with Maintenance problems reported by the beneficiaries
ACZ - WESTERN ZONE			
1	Theni	Rehabilitation and Improvements to the Palayamparavoo Channel & P.T. Rajan Channel for Increasing the Carrying Capacity in Uthamapalayam and Theni Taluks in Theni District (1008.05 & 1051.29)	10 %. Municipal Sewerage is the main cause.
2	Erode	Rehabilitation of Arakkankottai and Thadapalli Channels in Gobi Tk, Erode Dt. (1745.02 & 1743.62)	20 %. Mainly municipal sewerage is the main cause.
3	Trichy	Improvements to Panangudi & Kuyavan Channels off taking from Malatar River in Lalgudi Taluk of Trichy District - (300 & 193.47)	50 %. Due to Sewerage problem even the estimated work was not completed.
4	Pudukkottai	Construction of Anicut Across Vellar river to feed Mumbalai & Vadakku Manamelkudi tanks in Manamelkudi Tk, Pudukkottai Dt (250.00 & 249.50)	50% area - no supply so far. Faulty construction of one of 2 sluices only half the ayacut is benefitting still.
ACZ - NORTH WESTERN ZONE			
5	Dharmapuri	Excavation of Supply Channel from Jerthalav Canal to Feed 17 Lower Down tanks in Palacode and Pennagaram Tk of Dharmapuri Dt (629.00 & 508.49)	Difficult to Assess. This is a new work developed in the Dry area & no supply was possible in the past 3 years.
6	Salem	Rehabilitation & Improvements to Neikkarapatti tank supply channel in Kondalampatti Village of Salem Taluk	100 %. No Irrigation supply was possible in the past 3-4 years due to Polluted water.

		& District – (270.00 & 237.97)	
ACZ - CAUVERY DELTA			
7	Thanjavur	Construction of Grade wall across Kudamurutty River to feed Serumakkanallur and Chakkarapalli Channels in Papanasam TK, Thanjavur Dt – (402.28 & 480.54)	30 %. Municipal Sewerage & ayacut land for Real estate led to severe problems.
ACZ - SOUTHERN			
8	Ramnad	Modernization of Ramnad Big Tank in Ramnad Block of Ramnad Dt (973.20 & 1033.66)	20 %. Severe maintenance & Real estate problems.
9	Thoothukudi	Rehabilitation of South Main Channel and its System Tanks in Srivaikuntam Anicut (1000.00 & 997.16)	15 %. Municipal Sewerage and maintenance problems.

Source: Project Completion Reports & Direct Visits & Discussions by the Evaluation Team, March to May 2015.

Beyond pollution issue, another kind of problem like over exploitation of groundwater has been witnessed in Thanjavur district falling in Cauvery delta zone thereby affecting the overall potential of water resources available for agricultural sector. In this regard the DDM of Thanjavur district opined that in ten out of 14 blocks, over exploitation of groundwater takes place with the involvement of the farmers availing bank loans since sanction of loan was done without adhering the norm or groundwater rules, by the banks for lending scheme for the means of tapping groundwater resources like bore wells/tube wells.

3.2 Impact of RIDF Projects Socio-Economic Benefits

A consolidated observation on the impact of RIDF MI projects is given under three heads:

1. Social benefits to the stakeholders
2. Economic benefits – quantitative & qualitative and
3. Benefits to Banking Sector in the Command Area

3.3 Impact on Social Status

Nearly three-fourth of the sample respondents belong to BC and MBC and equal percentage (13 %) belong to Forward and Scheduled Castes communities in the project areas. The opinion of the focussed group revealed that the pattern of agriculture activities has been changing gradually

without any profitability in the farm activities in the past couple of decades in the project areas. Eventually, a major shift in young agricultural as well as non-agricultural population seeking studies / employment to urban centres is visible in the RIDF irrigation projects.

However, it could be seen that the cropping pattern practised in the sample projects, apart from sustainability in a few already developed canal commands, improvements in crop pattern and yield level have been reported. In the case of paddy, the major crop sown in all RIDF project areas, yield level has increased from up to 20% than the normal level. This is due to assured water supply and other agronomic and cropping practises adopted by the farmers. As a result, income level in some of the projects has improved up to 15%. Moreover, crop failure during lean irrigation supply period is averted due to adequate water available to lands after implementation of the RIDF projects.

So, the RIDF project investment in the 9 sample irrigation projects has given a mixed picture of impact on social status and income generation in the project areas

3.4 Economic Impact

The changes in the level of asset, income and employment during pre-and post project periods are furnished in Table 4. Consequent to the RIDF projects in agricultural sector the status in all types of assets viz livestock, machinery, pukka houses, cattle population among the sample households has increased positively to a higher level although in varying degree among them during pre-project to post project period.

Table 4 Asset Creation - Stabilization during Pre and Post Project Period

Type of structures Covered in the study	Pre-project (per household)				Post Development (per household)			
	Average Animal /hh	Average Machine ry/ hh	Average Pukka housing Status /hh	Others (Two-wheeler)	Average Animal /hh	Average Machine ry / hh	Average Pukka housing Status /hh	Others (Two-wheeler)
Refer Note	2.3	0.3	0.92	0.42	3.7	1.9	0.98	1.49

Note: hh- households. Animals are Bullock, cow, goat and sheep only. Machinery includes Tractor, Harvest Combiner and Power tiller only.

Note: * Type of structures covered (above 10% of project cost in each item indicated) in the study: 1. Clearing scrub and related earth works; 2. Lining and Cement Concrete; 3. Improvements to canals & tanks and supply channels; 4. Lining and repairing the outlets for rehabilitation; 5. Reconstruction of Regulator; 6. Reconstruction of falling shutters; 7. Standardisation main bund and desilting of supply channels; construction of anicut, head sluice & scour sluice; 8. Formation of flood banks and protection works of supply channel.

Source: RIDF Field Survey March-May 2015.

Similarly, upward trend in the changes for income and employment of the stakeholders is evidently observed in the sample projects studied (Table 5). It may be evident from the table that post development period has helped the farmers to achieve a higher status in their income, employment and health expenditure. This is what considered necessary in a project where investment, especially under RIDF, has been made on development orientation purpose.

3.5 Outcome of Economic Returns

3.6 Internal Rate of Return (IRR) - Impact Analysis

While examining the economic impact of MI projects in terms of income and employment in the

Table 5 Impact on Income and Employment of Sample Farmers

Type of structures Covered in the study	Pre-Development (Rs / Ha.)				Post Development (Rs / Ha.)			
	Average Income /ha	Average employment/ha.	Education expenditure / family	Health expenditure / family	Average Income /ha	Average employment/ha.	Education expenditure / family	Health expenditure / family
Refer Note in Table 4	55368	120 man-days	18400	6250	74095	135 man-days	23770	10350

Note: Average income per working day @: Pre-development - Rs. 461 Post devpt - Rs. 549.

Employment in man-days per ha in a year.

Source: RIDF Field Survey March-May 2015.

sample districts as presented above, it will be interesting to observe the inter district variance in the results of IRR analysis in the given different characteristics features of 7 agro-climatic zones in Tamil Nadu (Refer figure 1).

Table 6 reveals the distribution of 31 districts in 7 agro-climatic zones in Tamil Nadu. Of these 7 zones, the RIDF sample MI projects are found in 4 zones namely western zone (Theni, Erode,

Table 6 Agro-Climatic Zone Wise Distribution of RIDF MI Projects and IRR (in %)

Agro Climatic Zones	North Eastern	North Western	Western	Cauvery Delta	Southern	High Rainfall Area	Hilly Area
Districts	1.Prambalur	1.Dharmapuri	1.Madurai	1.Thanjavur	1.Virudunagar	1.Kanyakumari	1. Nilgiris
	2.Ariyalur	2.Krishnagiri	2.Dindigul	2.Thiruvarur	2.Ramanathapuram		
	3.Kancheepuram	3.Namakkal	3.Theni	3.Nagapattinam	3.Sivaganaga		
	4.T.V.Malai	4.Salem	4.Coimbatore	4. Cuddalore	4.Thirunelveli		
	5.Vellore	5.Thiruvellre	5.Erode		5.Thoothukudi		
	6.Villupuram	6.Karur	6.Thiruppur				
			7.Trichy				
			8.Pudukkottai				
Districts with sample of RIDF MI Projects with IRR %		1.Dharmapuri 14 %	1.Theni 122% 2.Erode 104% 3.Trichy 7% 4.Pudukkottai 1%	1Thanjavur 48%	1.Ramanathapuram 7% 2.Thoothukudi 59%		

Note: The sample MI works are distributed in 4 zones, viz., North Western (sl. nos. 1 and 4), Western (sl. nos. 3, 5, 7 and 8), Cauvery delta (sl. no. 1) and Southern (sl. nos. 2 and 5) The Percentage figures represent the IRR of respective districts.

Source: Agro Climatic Regions – NABARD RO, State Focus Paper 2015-16 p 62. [5]

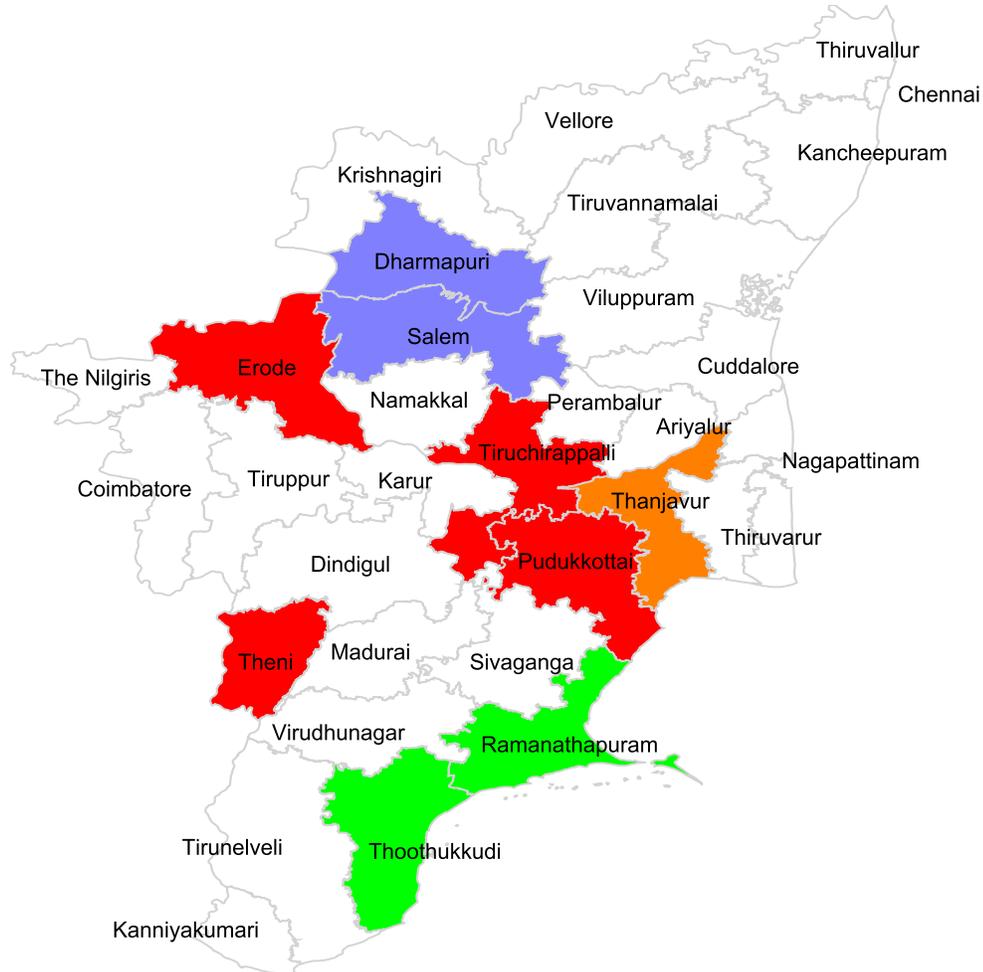


Figure 1 Agro Climatic Zone Wise District wise Distribution of RIDF MI Sample Works



Tiruchirappalli and Pudukkottai), North western (Dharmapuri and Salem), Southern zone (Ramanathapuram and Thoothukudi) and one in Cauvery delta (Thanjavur). For calculating IRR for all 9 MI works in Tamil Nadu an attempt has been made to explore a critical analysis that examines the associated implications or causal relationship between agro-climatic characteristics of the zone/districts and the impact in terms of respective IRR percentage at district level.

3.7 Rationale and Hypotheses

1. Geographically with the given natural endowments, the districts in Tamil Nadu have been classified under seven different agro climatic characteristics as portrayed in table 6 showing maximum number of 8 districts falling under western zone. The four main factors, considered for such classification include a) rainfall distribution, b) irrigation pattern (tank or canal), c) soil characteristics (black & red majority) and d) cropping pattern. Since the output (assured water and additional area under crop cultivation area) and outcome (incremental production & income) of RIDF MI project works in sample area are directly influenced by these external factors, eventually the annual returns in terms of IRR % is bound to respond to these external agro climatic factors variably (Table 7).

Table 7 IRR Results in the Sample Minor Irrigation Projects

Sl no	Details of Irrigation Works carried out	District and Type of irrigation work	IRR % (After Adjustment)
1	Rehabilitation & Improvement to Palayamparavoo & PTR channels	Theni - Canal	122
2	Rehabilitation of Arakkankottai & Thadapalli Channels	Erode - Canal	104
5	Improvements to Panankudi & Kuyavan Channels	Tiruchirappalli- Canal	7
7	Construction of Anicut across Vellar River to feed 2 tanks	Pudukkottai - Tank	1
8	Excavation of Supply Channel ... to feed 17 tanks	Dharmapuri - Tank	14
9	Rehabilitation & Improvement of Neikkarapatti Tank Supply Chl	Salem - Tank	-6
4	Construction of Grade Wall across Kudamurutti River	Thanjavur - Canal	48
6	Modernization of Ramnad Big Tank	Ramanathapuram-Tank	7
3	Rehabilitation of South Main Canal & its System Tanks	Thoothukudi – Canal +Tank	59

Source: Field Survey data, 2015.

2. Given the rationale, **inter zone** variations in IRR% in RIDF sample districts, driven by the said external factors is arguably acceptable as the range of such variations starting from 1% in Pudukkottai to plus 50% in Theni and Erode is perceived among RIDF sample districts. However, witnessing a wide variation **in intra zone** districts having similar agro climatic features in the study area is causing concern – for example in western zone – IRR % ranges from plus 50 % in Theni to 1 % in Pudukkottai. Therefore, an academic probe on the causative factors for such skewed IRR in the western zone has become inevitable.
3. The field data on RIDF MI works falling in the jurisdiction of western agro climatic zone, reveals that the intra zone variance in IRR is principally caused by the internal factors such as poor execution (Tiruchirappalli, Pudukkottai), ineffective O&M (Tiruchirappalli, Pudukkottai, Dharmapuri, Thanjavur, Ramanathapuram, Thoothukudi) and lack of ownership of stakeholders and inactive WUA (in all districts except Erode) are not driven by the aforesaid external factors.
4. The key point from the above analysis is that internal management for proper implementation of improvement works under RIDF MI project in the supply side and users' ownership/participation in the demand side assumes significance than the covariant risks caused by external factors for sustaining the economic impact at village level..

3.8 Benefits to Banking Sector in Command Area of RIDF- MI Projects

The RIDF Irrigation development project has contributed positive impact in different spheres in the rural bank branches as evidenced in **Table 8**. Table 8 reveals the impact on three aspects such as loans issued, number of accounts opened and deposits mobilized between 2008 and 2014. Apparently, an upward trend showing 40.2% increase in issuance of agricultural loans; 75.8% increase in opening of bank accounts and 158% increase in deposit mobilization could be observed during the period between 2008 and 2014.

Table 8 Impact on Credit Flow in Rural Banks in the Sample Villages

Sr No	Name of Branches Covered	Location of Branch	Agri Loan issued (Rs. lakh)		No of Accounts		Deposits mobilised (Rs in Lakh)	
			Pre (2008) develo p-ment	Referen ce year (2014)	Pre (2008) develo p-ment	Referen ce year (2014)	Pre develo p-ment 2008	Referen ce year 2014
1	SBI-Erode	Kodumu di	3026	3115	4868	6086	2085	3688
2	Indian Bank	Dharma- puri	1839	2213	2577	5135	831	1174
	Dharmapu ri							
3	Canara Bank Theni	ND Patti	nil	21.54	nil	7500	nil	133
4	IOB Theni	KK Patti	nil	1484	nil	6917	nil	132
5	IB Puduk- kottai	Maname l-kudi	30.26	31.15	4868	6086	20.85	36.88
	Average	-	4895.2 6	6864.69	12313	31724	2936.8 5	5163.88
% increase between 2008-14			-	40.23	-	75.83	-	157.65

Note: nil indicates branches were opened only after the year 2008.

Source: State Level Bankers Committee, Annual Reports, Background Papers, IOB, Chennai [6].

4 Conclusion and Policy Interventions

Agriculture remains a basic sector of state economy which absorb RIDF assistance productively for development of irrigation works. The present RIDF impact study on MI projects involving field observations and interactions with the local people in rural areas has given panoply of

evaluative evidences to appreciate the complexities of capital formation in the development process. The major concern in the process of implementation that poses hazards for execution of work as scheduled and for effective utilization of the benefits accrues are uncontrolled pollution and misuse of MI assets studied. Arguably, therefore, following are evidence based suggestions for policy considerations.

4.1 Towards RIDF Planning from Below

In the context of presence of variance in geophysical feature of human habitation in the district, it is imperative from equity perspective, to adopt bottom up planning for RIDF investment in the area at block level which remains excluded persistently as identified as priority locally.

4.2 Monitoring Branch Level Credit Flow

It was observed from the field observations as well the discussion with rural bank officials and Lead District Manager/District Development Manager that the flow of credit to agricultural and allied activities significantly went up after the implementation of the projects both at district and service area levels. A development axiom, therefore, emerges that building of rural infrastructure more particularly MI projects in the sample districts, helps in making the local area credit worthy in terms of enhanced collateral values of the land and market access for assured sale of proceeds.

4.3A Concern on the Widening Inequity Gap in Rural Area

In the context of presence of skewed development within district level with most developed block and the most backward block lying cheek by jowl at sub district level, any new development intervention ignoring the persisting inequality situation at sub district level would only facilitate further widening the inequality gap both among the blocks and people. Although normative principles and pro poor policies are adhered to at macro level, the lingering question remains is 'who gets ultimately the benefits from the various capital formation created' in agricultural sector in the rural areas?

In Irrigation projects, it is the progressive farmers who reap the benefits. It provides insignificant help in raising the levels of living of the people who live below poverty line as well in unconnected habitations in the last mile. Although rural poverty level has been declining over a

period – from 37.5 % in 2004-5 to 15.8% in 2011-12 – the widespread inequality among the rural population still threatens the growth of the rural areas of the state as well as the country. This point may be authenticated in the case of development activities put forth under irrigation works of agriculture sector, where the progressive farmers who reap more benefits than the (small & marginal) farmers living at the lower stratum.

There are many factors depend crucially on organizations outside the purview of agriculture. Deficiencies in the functioning of organizations –both public and private- responsible for these activities have contributed significantly to dampening both the pace of expansion in growth potential and its actual exploitation.

In view of the above fact on distributive justice on the accrued benefits from capital formation through RIDF investment in rural area, a micro level study on the nature and causes for exclusion of vulnerable people in RIDF project area is needed for suggesting for inclusion plan that suits the excluded.

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