Evaluation of Irrigation Projects under Soil & Water Conservation Department and Water Resources Department under AIBP

(Final Report)

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Directorate of Programme Implementation & Evaluation

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Submitted by

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Maj. Gen A M Chaturvedi (Retd.)

Director

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Abbreviations

AIBP	:	Accelerated Irrigation Benefit Programme
WUA	:	Water Users Association
EE	:	Executive Engineer
DoWR	:	Department of Water Resource
S&WC	:	Soil and Water Conservation
SCA	:	Special Central Assistance
SCP	:	Special Component Programme
DC	:	District Council
VC	:	Village Council
IPC	:	Irrigation Potential Created
IPU	:	Irrigation Potential Utilized
CE	:	Chief Engineer
SLSC	:	State Level Sanctioning Committee
DLSC	:	District Level Sanctioning Committee
SE	:	Superintendent Engineer
CLA	:	Central Loan Assistance
WMP	:	Watershed Management Programme
NABARD:		National Bank for Agriculture and Rural Development
RIDF	:	Rural Infrastructure Development Fund

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Executive Summary

The AIBP was adopted in the year 1996 by the Government of India for providing financial assistance to States in order to complete various ongoing irrigation projects in the country and sought to create irrigation potential and extend the irrigation to remote areas of the country.

Accelerated Irrigation Benefit Programme (AIBP) in Meghalaya was conceived during 1999-2000 in order to carry out the goals and objectives of AIBP in the State. Subsequently AIBP programme was implemented in various phases. There are number of projects being identified and covered under AIBP programme for their detailed performance, implementation process and the corresponding success and therefore being investigated and evaluated from 1999-2000 to 2011-12. The implementation of AIBP in Meghalaya is carried out by both Water Resource and Soil & Water Conservation Department. While the Water Resource Department started the implementation of AIBP in 1999-2000 and the Soil and Water Conservation department took up the implementation work since 2009-10.

Irrigation Potential Created:

The AIBP scheme in Meghalaya has enormously helped in creating irrigation potential. Both the departments made irrigation programmes accessible as well as improve the agricultural production to the extent that it all benefited the local farmers and therefore enhanced their livelihood and income facilities. After commencement of this programme, 166 (134 – Water Resource Department and 32 Soil & Water Conservation Department) minor irrigation schemes/ projects have been completed till 31st March, 2012. The irrigation potential created under AIBP scheme during 2010-11 covers 16% of the overall irrigation potential in Meghalaya. This further increased to about 18.49% - an increase of 2.49%. The anticipated irrigation potential for the year 2012-2013 is expected to be around 5400 hectares whereas for 2013-2014 it is stipulated to be 5940 hectares. Initiatives and attempts are taken to give irrigation a thrust to increase the coverage of the potential area. A total of 81 minor irrigation schemes are underway in year 2012-2013 which are estimated around Rs. 10, 523 lakhs with a covering area of 8,318 hectares. Of these 64 irrigation projects are being carried out under AIBP estimated around Rs. 9073 lakhs with a coverage area of 6,843 hectares.

However, there are still some factors that continue to impede the implementation process. Some of the prominent reasons that affect the implementation process are cited as follows:

(i) Inconsistency in land acquisition;

(ii) Difficulties in creating capacity building;

(iii) lack of cooperation from water user associations (WUAs);

(iv) Bad topographies

(v) Labour Problems/ lack of human resource

Irrigation Potential Utilisation:

Meghalaya's economy is primarily agricultural engaging around 80 percent of its total work force. The main agri-horticultural products of the State are rice, jute, potato, orange and other citrus fruits, bay leaf, betel, banana, plum, pears and pineapple. Meghalaya is mostly dependent on rain and surface water resources for irrigation purposes. Surface water is abundant but limited during non-rainy season. The research finds that the irrigation potential has been utilised quite well in the State except some shortcomings. The importance and contribution of ground water is felt in the recent years to cope up with development and scarcity situations, particularly to meet the drinking water needs. Of course, the physiography of the rugged terrain restricts development of groundwater, but areas with low gradients and valley areas are favourable areas for groundwater development. There is thus ample potential for further increasing the exploitation of ground water. However, scarcity of ground water is building up in urban areas due to over extraction of water for domestic purposes.

Quality Assets Created under AIBP

The responses of the beneficiaries are uniform across their location around the irrigation projects. For the Water Resource Department, according to 75% beneficiaries, proper maintenance of water outlets is very poor in the State, whereas 25% beneficiaries however, spelled out that AIBP has led to proper maintenance of water outlets. About 85% beneficiaries hold that there is still no proper maintenance of distribution channels in village has been made, and 45% further spelled out about lack of quality in check dams and other constructions in the region. Only 15% farmers gave response in favour of proper maintenance of distribution channels in village and 55% were having positive opinions about quality of check dams and other constructions in the region.

For the Soil and Water Conservation Department, according to 64% beneficiaries, proper maintenance of water outlets is very poor in the State, whereas 36% beneficiaries however, spelled out that AIBP has led to proper maintenance of water outlets. About 70% beneficiaries hold that there is still no proper maintenance of distribution channels in village has been made, and 40% further spelled out about lack

of quality in check dams and other constructions in the region. Only 30% farmers gave response in favour of proper maintenance of distribution channels in village and 60% were having positive opinions about quality of check dams and other constructions in the region.

Impact of AIBP on Agricultural Development in Meghalaya

The cropping intensity has been improved with the initiation of irrigation canal in the state. The study found higher satisfaction among beneficiaries with respect to agricultural production in the state. This has been possible with the agro-climatic condition along with the revamping of the irrigation system in the state. This has increased the opportunities for farmers for producing more crops in area. During the evaluation study, it was found that most of the beneficiaries were having on an average of Rs. 55, 000/- (approx.) annual income from agriculture related activities whereas an average annual income of Rs. 25, 000/- (approx.) is generated through non-agricultural activities.

This study shows that this irrigation interventions increased average households' income compared to before implementation of AIBP schemes. Irrigation increased crop diversification, cropping intensity from one crop to two or three crops per year, production volume, households' income and consumption and employment. Access to irrigation water created the opportunity for the households to diversify their income base and reduced their dependency on rain fed agriculture and livestock. This reduced their vulnerability to the seasonality of agricultural production and external socks. About 70% of the household respondents secured their family food consumption through increased income from irrigation.

The completion of minor irrigation schemes covered under AIBP has been quite satisfactory as these have low gestation periods. Outcome of the schemes in Meghalaya State has been even more encouraging wherein it has led to increase in irrigated area, increase in productivity, and motivation for farmers to adopt irrigated agriculture in place of JHUM cultivation, development of markets and change in socio-economic condition of small and marginal farmers. The total crop area, production and productivity in the entire agricultural sector have been showing an upward trend through the years. With the introduction of different crops of high yielding varieties over the decades, a remarkable increase in food grain and other crops production has been achieved.

Impact of AIBP on Socio-economic Development

The impact of AIBP on the overall social-economic development has been enormous. However, there are some shortcomings in the process of development as well. The expression of the farmers on various parameters on socio-economic development indicates that AIBP has not been much successful in increasing literacy rate of the farming community in Meghalaya. The development of this new irrigation projects in the targeted areas has increased cropping intensity and crop income. According to the survey results and group discussions with farmers their income has increased as compared to the situation before implementation of this irrigation interventions. Before implementation of the irrigation schemes, farmers used rain fed production both for home consumption and to cover other household expenses (school, cloth, health care) together with income from livestock. The farmers indicated that the income from crop sale and livestock was not sufficient for home consumption to cover these household expenses. As a result they faced shortages in food, seeds for the next season and cash to buy inputs. Implementation of the irrigation schemes helped them to diversify crops and income sources.

The labor-intensive nature (increased cropping intensity, cropping area and crop diversification) of irrigation development has increased the employment opportunity both on-farm and off-farm. The irrigation farmers cultivate both rain fed and irrigated land. As a result, family labor is not sufficient to support all production activities. This has created employment opportunities for local landless poor and others. Irrigation development has also created additional employment opportunities outside the project areas through increased demand for inputs and increased supply of outputs. Off-farm employment opportunities created due to the irrigation interventions include local traders, brokers, whole sellers, and loaders of products.

Few Constraints impeding the implementation process of the scheme

- Non-existence of effective Water Users Association (WUA),
- Lack of fund for monitoring.
- Low motivation amongst the staff.
- Lack of supervision.
- Lack of proper coordination amongst WR and S&WC dept.
- Non-release of fund during onset of monsoon season.
- Reluctance of beneficiaries to share benefits of water for irrigation.
- Inadequate fund for repairing, maintenance work, particularly for conveyance system.

Recommendations/Suggestions

1. Sufficient budget should be spent on creating capacity building which eventually may impact the socio economic development in the state.
2. High priority should be given to converging the irrigation system with the traditional method of cultivation in the state so that the productivity of crops can get increased to a larger extent.
3. High priority should be given to proper alignment of all the canal system with main, medium and minor canals along with an appropriate slope. High quality technical work is therefore an essential requirement. Besides, the concerned engineers and contractors of irrigation system should be provided with training to deliver quality work.
4. There is a need for restructuring the WUA as the findings show that there is not much emphasis given on the formation of Water Users Association (WUA) in almost all the districts of the state, inspite of the presence of the same in all the districts and the participation level is very low in the region. Therefore a participatory approach on irrigation management should be taken up in which proper operational guidelines are provided to carry out the process. It can also help in bringing more responsibility amongst the farmers, and can help in resolving conflicts related to water distribution, improvement of service through better operation and maintenance etc. To this end, training in the basic technical components of canal system and in the methods of monitoring technical work should be taken up. Moreover, WUA should be given a management and supervisory role, so that wastage of water can be prevented and equity in distribution of canal water can be ensured. WUA also should be assigned with power to monitor the construction and repair work of canals and can modify the norms for improving the canal system. Besides, field level irrigation officials should be provided with financial power and responsibilities so that they can implement corrective measures in time to save the canal from further damage.
5. Safety and security of the field staff like sub-engineer and field personnel of both the departments should be ensured and they should be efficiently able to supervise the canal operation in odd hours. This will prevent the wastage of water resulting from damage to canal during peak irrigation season.
6. Priority should be given to develop proper coordination between concerned departments and the respective officials related to irrigation agriculture, revenue and land development department so that an effective delivery mechanism is initiated. To this end, a committee consisting of

representatives from the relevant departments can be formed, to look at the holistic development of the command area.

7. A policy should be in place to make farmers adopting appropriate cropping pattern that could fetch optimum use of water. A balanced ratio should be made between high, medium and low water consuming crops, which may substantially maximize the benefits of canal water by evenly using the water distribution and at the same time protect the cultivated land from water logging and also keep the land fertile throughout. Farmers should be restrained from disproportionately growing high water consuming crops and should be fined for doing so. Producing high water consuming crops makes the land water logged to a large extent making it eventually saline and unsuitable for cultivation. Therefore, a balanced cropping pattern should be introduced and adopted in the state.
8. AIBP programme usually provides funds for construction of main canal, distributaries, laterals and sub laterals. There is much constrain regarding funding for Field Irrigation Canal (FIC) networks. The networking between the main canal and all its distributaries do not meet much of the requirement towards the wet potential and therefore FIC network needs to be put in place. As such it would be better, if AIBP assistance is extended even for construction of FIC networks so that the networking between main canal and FIC could be more effective and useful and wet potential could be achieved.
9. There has been a substantial amount of broken filed channels and water leak problem existing in almost all the districts. This is due to the reason that there is lack of funds available to operate and maintain the irrigation system. Moreover, lack of field staff, monitoring and non-functioning of water user associations also intensify the situation. Therefore, sufficient funds should be available for operation and maintenance of the canal system. More field staffs should be deployed so as to monitor and operate the entire process.
10. There should be a periodical reassessment system put in place for checking the ground water potential on a scientific basis. This may help in checking the quality of ground water available and environment and economic viability of its extraction. Exploitation of ground water should be kept in check and regulated so as not to exceed the recharging possibilities,
11. Ground water recharge projects should be developed and implemented for improving both the quality and availability of ground water resource. Integrated and coordinated development of surface water and ground water resources and their conjunctive use should also be envisaged

right from the project planning stage and should form an integral part of the project implementation.

12. The major constraints that impede the implementation process in the State are lack of fund for monitoring, lack of supervision facility, lack of proper coordination between concerned departments, delay in releasing funds for monsoon season etc. There is also no provision existing for repairing and maintenance of work particularly the conveyance system. Therefore all these issues should be addressed and resolved with appropriate measures.

Chapter 1: Introduction

1.1 Overview of Meghalaya:

Meghalaya (25.47–26.10N latitude and 89.45–92.47 E longitude) is one of the most picturesque states of India (Fig.1), offering a spectrum of sylvan surroundings, rich cultural heritage and luxurious vegetation comprising of a large variety of flora and fauna. It is one of the seven sister states of the North-eastern region, bounded by Assam on the North and East, and on the West partly by Assam and Bangladesh. Bangladesh forms the southern boundary of this state. Meghalaya is divided into seven districts, Jaintia hills, East Khasi hills, West Khasi hills, Ri-bhoi, East Garo hills, West Garo hills and South Garo hills. It is among the wettest places on earth (Mawsynram) and is the home of an extraordinary diversity of people that includes the Khasi, Jaintia and Garo tribes.

Figure: 1 The Geographical Map of Meghalaya

1.2 Agricultural cropping practices

Meghalaya is predominantly an agricultural state with about 80% of its population depending entirely on agriculture and allied activities for their livelihood. Nearly 10% of its geographical area is under cultivation. The state with its highly diversified topography, altitude and climatic conditions enormously offer scope for cultivation of a wide variety of agricultural crops. The state produces a variety of agricultural crops such as food grains, commercial crops, horticultural crops, etc. Of the total

agricultural land in Meghalaya, 62% is used for food grains, 25% for cash crops, 9% for horticultural crops and the rest 4% is used for raising miscellaneous crops.

Major agricultural crops in the state are Rice (*Oryza sativa* Linn); maize (*Zea mays*Linn) etc. Besides this, important fruits grown in the state are orange (*Citrus reticulata* Blanco); pineapple (*Ananas comosus* Merrill), lemon (*Citrus limon* Burm); guava (*Psidium guajava* Linn), jack fruit (*Artocarpus heterophyllus* Lam.); bananas (*Musa* sp.). The major commercial crops in the state are Potato (*Solanum tuberosum* Linn.*)*, jute (*Hibiscus cannabinus*Linn.), cotton (*Gossypium* sp.), arecanut (*Areca catechu* Linn.), ginger (*Zingiber officinale* Rosc.), turmeric (*Curcuma domestica* Valeton), betel leaf (*Piper betle* Linn.) and black pepper (*Piper nigrum* Linn). However, agriculture in the state is characterised by limited use of modern technique and low productivity which result in into majority of population engaging in agriculture with traditional method of cultivation like *Jhum* or the shifting cultivation and Terrace cultivation. These cultivation processes therefore help the process of cultivation to a large extent.

In Jhum cultivation, hand tools such as spade, khurpi, sickle, dibbler, daw, grass slacer etc. are being used on a large scale. In this process, lands are prepared by cutting down forests with the help of fawrah or spade and sowing is done manually by dibbling. The average size of land holding (Individual and Joint) of Meghalaya is 1.37 ha. whereas the institutional land holding in the State is around 1.53 hac. And the irrigated crop area is 22.1% ha. The available farm power in Meghalaya is 1.072 kw/ha against the required power 2.5 kw/ha.

Although Meghalaya is highly susceptible to acute soil erosion due to it's undulating topography and high intensity rainfall and these primitive cultivation practices like *jhum* and *bun,* enhances these degenerative trends to some extent, but the traditional knowledge of indigenous communities for growing cereals and other agricultural crops along with well adapted cultivation practices have enabled them to maintain an ecological balance. However, rampant deforestation, wild fires, extensive grazing, unscientific mining and quarrying etc., have adversely affected to a large extent the overall ecological as well as the agricultural condition of the State.

1.3 Irrigation practices in Meghalaya:

Irrigation is one of the most important factors for a successful yielding of crops. It allows for better utilization of all production factors resulting into increasing yield per unit of land. Irrigation practices in agriculture provide suitable moisture environment to the crops to obtain optimum and sustained crop yields with maximum economy in the use of water as input. An irrigation practice begins at the time of

rain and continues until it is efficiently used by the growing agricultural crops. Thus, it encompasses soil management and cropping pattern according to the rhythm of the plant.

Meghalaya literally means the 'Abode of Clouds'. As the name suggests the state is associated with clouds and rains. The climate of Meghalaya is generally very humid. It is directly influenced by the south west monsoon and the north east winter winds. The four main seasons of Meghalaya are Spring (March to April), Monsoon (May to September), Autumn (October to November) and Winter (December to February). The average rainfall in the state is 12000 mm. The temperature starts warming up with the advent of spring and reaches the maximum in the summer (monsoon) months of May and June. The winter is quite severe with minimum temperature coming down to as low as 2° C in the Khasi Hills. April and May are the warmest months and January is the coldest month. Therefore, the irrigation is required only in the areas where soil is having poor water holding capacity and in undulating valleys. In such places, farmers mostly practice bamboo drip irrigation and continuous flow irrigation. ***Bamboo drip irrigation system*** is widely adopted by the farmers in *Jaintia* hills of Meghalaya, where hill slopes are quite steep with low soil depth and having boulder soil. In this drip irrigation system locally available bamboo species are being used and water is carried out with the help of different form of bamboo culms, which further distributed into different bamboo water channels for irrigation of cropland. Bamboo drip irrigation practice prevents leakage and loss of water on the way. The indigenous farmers of the *Jaintia* hills have the potentiality to layout the bamboo networks with proficiency so that the sites remain productive. Plantation crops such as areca nut (*Areca catechu* Linn.), betel vines (*Piper betle* Linn.) and black pepper (*Piper nigrum* Linn.) are irrigated following this system. Since the water is carried through bamboo culms in the indigenous farming areas, the system indirectly helps the forest areas and helps in conserving the environment and preserving the prestigious natural resources in the hilly terrain of Meghalaya.

Besides Bamboo practice, *Bench terrace Irrigation system is also prevalent i*n Meghalaya as well as throughout the North East Himalayan region as a common irrigation practice. In this process, the hill streams are tapped as soon as they emerge from the forests and the water is channeled to accommodate a series of terraces. In this system, water flows continuously from the upper to lower terraces. This method of irrigation practice is widely used for non-fertile land to be utilized for raising rice crops. Bench terracing becomes an important conservation measure for the valleys and hill slopes in the region. The bench terrace agriculture which is practiced under rain-fed condition, crops like

maize, bean and potato are planted on upper slopes and crop requiring more water such as rice and jute are grown on lower slopes[1].

1.4 Accelerated Irrigation Benefits Program (AIBP):

The Accelerated Irrigation Benefits Program (AIBP) was initiated in 1996 by the Central Government of India for providing financial assistance to the States to complete various ongoing multipurpose and irrigation projects in the country. It seeks to create irrigation potential of the projects undertaken and extend the irrigation to more areas of the country. Earlier financial assistance was given in form of interest-free (for a period of five years) loan. However, with effect from 2005-06, assistance is being given in the form of grant. Central Assistance is given at the rate of 90% of the cost of works involved in case of some special category of projects, while in the case of others, it is given at the rate of 25% of the cost. This effort on part of Union Government has enormously helped in increasing the creation of irrigation potential and completion of ongoing projects in the States.

India's rooted agrarian set up made the irrigation system indispensable for overall sustenance of rural economy and its poverty alleviation as it enhances the agricultural production in the country. Therefore, it is important to expand irrigation facility through sustainable development of both the surface and the groundwater resources. The development of irrigation has been listed as highly prioritised area in the successive Plans after independence and many new irrigation projects were therefore taken up to address the problem of food security in the country. During the Eighth Plan, an investment to the tune of Rs 52,600 crores was made to revamp the irrigation projects in the country. However, the completion of projects got delayed due to various reasons and the benefits derived from these projects were short of expectations. The lack of funds with the state governments resulting in thin spreading of available resources over many projects was being cited as the single most important reason for the inordinate delay in completion of irrigation projects. It was in this context that the Government launched the Accelerated Irrigation Benefits Programme (AIBP) in 1996 - 97 with an aim to accelerate creation of irrigation potential with a realisation of bulk benefits from completed irrigation projects in the country.

Under AIBP, Central Government provides financial assistance to State Governments for expeditious completion of Major, Medium, ERM and Minor surface water irrigation projects. This effort on part of

[1] Source: http://www.niscair.res.in/sciencecommunication/researchjournals/rejour/ijtk/Fulltextsearch/2006/January%202006/IJTK-Vol%205(1)-January%202006-pp%207-18.htm).

Union Government resulted into increasing the pace of creation of irrigation potential and completion of ongoing projects.

AIBP was therefore launched during 1996-97 with an outlay of Rs.900 crore, and is subsequently revised to Rs.500 crore to accelerate the completion of selected ongoing irrigation projects. Initially, this programme had two components. The first component was designed to include projects costing more than Rs.1000 crores where substantial progress had been made. The other component was for major/medium projects in advanced stage of completion, i.e. expenditure to the extent of 75% or more had been incurred and which could be completed within four working seasons. Priority was to be given to inter-state projects costing more than Rs 100 crore where completion of certain components would benefit the co-basin states or work in one state would benefit the other state. The amount of loan was in the ratio of 1:1 (Centre:State) for each project. In 1997-98, Minor surface irrigation projects (both new and ongoing) of States of North-East and hilly states (HP, Sikkim & J&K) and drought-prone KBK districts of Orissa were also included. The Central Loan Assistance was extended to the States in the ratio of 2:1 (Centre:State) for projects except for Special category states, North-east, HP, Sikkim, J&K, KBK districts of Orissa).

According to the sources provided by the Ministry of Water Resources (MoWR), Government of India, the State governments have been provided an amount of Rs. 37931.1732 crore as CLA/Grant under AIBP scheme since its inception for 272 major/medium irrigation projects and 10236 surface minor irrigation schemes. After commencement of this programme, 134 minor irrigation projects have so far been reported completed till March, 2012 by Wter Resource Departemnt, Govt. of Meghalaya. An additional irrigation potential of 59.39 lakh ha has been created upto March 2009. Cumulative central assistance released since inception of the AIBP till 31st December 2009 to the North Eastern States is Rs. 2647.68 crore including Rs.546.61 crore released during 2009-10 upto December 2009.

However, in the last decade and a half it was observed that there were delays in the completion of major, medium and minor irrigation projects under AIBP. While capital investment was taken care of during the operational span of AIBP, it was not leading to proper utilisation of irrigation potential. The chart below indicates the central loan assistance (CLA)/ grant released, the irrigation potential created and the cost per ha year-wise for the AIBP programme.

While investing in developing irrigation potential (major, medium and minor) in the country under AIBP, Government of India sought to address two primary issues that are critical for AIBP evaluation

like (i) to what extent the irrigation potential had been fully utilised and (ii) what has been the impact of AIBP scheme on the farmers livelihood.

1.5 Current situation of water resources in Meghalaya

The total area of Meghalaya is 22,429 sq.km. Meghalaya comprises a hilly upland plateau formed by the Khasi, Jaintia and Garo Hills with an elevation ranging from 150 to 1961 meters above sea level. Due to the undulating terrain only 12% of the geographical area of Meghalaya is suitable for agricultural cultivation. The state of Meghalaya is blessed with bountiful water resources that need to be harnessed. Hydrologically, the State comprises of two basins, viz., the Left Bank of Brahmaputra Basin (11220.11 sq. km) and the Brahmaputra Tributaries Basin (11208.89 sq.km), three catchments viz., Kalang to Dhansiri Confluence (about 4499.61 sq. km), Bangladesh Border to Kalang Confluence (about 6720.50 sq.km) and South Flowing Drainage of Meghalaya (11208.89 sq. km), eight sub catchments with a size range of 2.08 to 2. 46 lakh hectare 35 watersheds with a size range of 0.03 to 0.22 lakh hectare. Meghalaya is sharing water resources with Assam and Bangladesh, with Meghalaya being located upstream. The state has 3300 km of rivers and 390 ha of swamps. Rivers and streams in Meghalaya are generally fast flowing.

There are various initiatives to integrate various water and soil conservation system and promote their benefits in the State. One such programme in Water shed management programme. This is a package scheme integrating various soil and water conservation measures and is taken up in selected micro watershed basis. The main objective of the scheme is to promote maximum utilization of land and vegetation resources for optimum production. The works carried out under the scheme are terracing and land reclamation; follow ups; water harvesting; facilitating drinking water,; afforestation; horticulture crop plantation; fodder and pasture development and erosion control works. Soil Conservation programme sets to cover the general area which is not specifically covered by other schemes. Its objective is to reduce the erosion of hazardous land degradation in situation where individual farmers adopt faulty cultivation practices. Works taken up under these schemes are terracing; reclamation; water harvesting; farm ponds etc.

Chapter 2: Objectives and Methodology

2.1 Objective of the study

The Evaluation study has been undertaken with the following specific objectives:

- To identify the number of irrigation projects with location (block-wise) under both the departments
- To assess the operational and non-operational irrigation projects with reasons for non operation of irrigation schemes.
- To identify the percentage of functioning projects for the last 15 years, beneficiary and area covered project wise.
- To verify the command area and farmers benefited from each scheme.
- To assess the potential outcomes of check dams for ensuring rural sustainable livelihood.
- To assess the impact of the scheme on agricultural production and productivity, crop-wise, area-wise and year-wise.
- To assess the Impact on potential created and potential utilized for optimizing productivity in command areas.
- To identify the production of crop-wise per hectare before and after irrigation projects in respective areas and in the state.
- SWOT Analysis of the scheme.
- To assess the social impact and acceptability of the scheme.
- To evaluate the feedback of the targeted beneficiaries.
- To provide suggestion and recommendation for overall improvement of the scheme.

2.2 Approach and Methodology

The proposed study has used a mix of research tools. Primarily the study has been carried out through sample survey/site verification in the respected districts and the projects identified under the AIBP programme. At the initial level, the primary data was collected from concerned departments (in this case, soil and water conservation resources and water resource department) through existing official documents and official records. This provided a detailed understanding of the current status of the irrigation projects underway under each department. The sample survey has been supplemented through participatory evaluation/assessment methods for which a set of participatory tools have been

used namely semi-structured questionnaire, focus group discussion and observation technique. In order to assess the performance, process of implementation, quality of work and effectiveness of the irrigation projects as indicated in the study objectives, data were collected from each of the selected irrigation project by the AMC research staff and members. To this end, officials involved in the implementation of the scheme at the district, block, and village levels were interviewed to ascertain information regarding the implementation of programmes, their experiences in implementation, nature of effects/ impacts observed, factors influencing success of programmes, cases of positive impacts, etc. Besides this, information regarding nature of constraints / difficulties faced that come in the way of implementation was explored. All these help to identify the status of the irrigation projects; the operational condition of the projects; the potential outcome and impact of the project on ensuring rural sustainable livelihood as well as agricultural production in the irrigated region. All the interviews were conducted with the help of semi-structured interview schedule. The evaluation of the impact of economic development of the scheme were assessed through following main indices:

- Increase in area irrigated;
- Gaps between irrigation facilities and irrigation needs;
- Vertical movement of population in levels of living;
- Enhancement in facilities of drinking water;
- State and status of irrigation projects in the sampled areas.

Sources of Information:

Desk research

Various records available with the concerned department involved in the implementation of the Scheme were examined to ascertain relevant information regarding implementation of the programme.

Interviews with officials

The data related to irrigation potential created (IPC) and irrigation potential utilized (IPU) was gathered from the respective office of the Chief Engineer of each project. Besides, discussion was carried out with the officials of each of the selected project to explore the impact of the project on potential created and potential utilized for optimizing productivity in command areas. Officials involved in the implementation of the scheme at the district, block, and village levels were interviewed to ascertain information regarding the implementation of programmes, their experiences in implementation, nature of effects/ impacts observed, factors influencing success of programmes,

cases of positives impacts, etc. The discussions also brought out the nature of constraints / difficulties faced in implementation and help identify corrective measure to enhance the impact of the scheme. The interviews were conducted with the help of semi-structured interview schedule.

Discussion with District/Village council members

District Councils in Meghalaya have a proper understanding of the local situation which helped in gathering valuable information to understand the nature and magnitude of impact of scheme, implementation related limitations, its relevance and proper targeting of the programmes in the local context. These discussions were conducted using semi-structured discussion guide.

Observation

An observation technique was used to capture the visual information of the ongoing situation, the use and effects of various interventions under the programmes. Both structured and unstructured observation were conducted in a natural setting to observe the situation. This was supplemented with the information provided by beneficiaries / officials and other representative related with the scheme with the help of a questionnaire or a tally sheet with guidelines.

Interviews with beneficiaries

Moreover, in order to explicate data on social impact of the scheme, as well as social acceptability of the scheme and to what extent the scheme has impacted the beneficiaries of the command area region under AIBP, feedbacks are collected from beneficiaries /target groups through face to face personal interview with semi-structured interview questionnaire. The interview schedule was developed so as to help measure the impact of these irrigation projects on both the individual beneficiary and family beneficiaries of the scheme.

Focus group discussion

To obtain an overall understanding of project-beneficiary dynamics, 24 Focus Group Discussions were conducted. Each FGDs comprise 8-12 members who represent the implementing authority or targeted beneficiaries. These discussions helped in overall SWOT analysis of the scheme. Besides, an in-depth understanding of the potential outcome and impact of the project on ensuring rural sustainable livelihood as well as agricultural production in the irrigated region, the social impact of the scheme, degree of social acceptability of the scheme, and various factors contributing and hindering the progress of the projects was acquired through the FGDs. All the primary data, based on questionnaire and FGDs were collected by professionally trained research staff of AMC Research group Pvt. Ltd.

Altogether: 5 questionnaire models were designed to collect the required information at various levels which are as follows:

Schedule 1: Questionnaire for state implementing officials on AIBP scheme

Schedule 2: Questionnaire for departmental officials/chief engineers on Irrigation Projects/ under AIBP Scheme (benefits and impacts)

Schedule 3: Questionnaire for SWOT analysis

Schedule 4: Questionnaire for target groups / beneficiaries survey

Schedule 5: Questionnaire for Focus Group Discussions to be conducted at village level

2.3 Sampling Plan and Sample Size

A two stage stratified sampling design was taken up for selection of villages, followed by selection of households. The 2011 census was taken as a reference for listing out villages for sampling the frame for the selection of blocks and villages respectively. Villages were stratified prior to the selection on the basis of a number of variables. The first level of stratification was based on geographic location, with blocks grouped into regions according to their geophysical characteristics. Within each of these regions, villages were further stratified using the following variables: village size, distance from the town, proportion of agricultural workers and, proportion of population belonging to scheduled casts / scheduled tribes.

The sample size for each district were specified in terms of a target number of completed interviews with eligible beneficiaries. The target sample size were made considering the size of districts, the time and resources available for the survey.

All the seven districts were covered under the study. Four blocks each from East Khasi Hills and West Garo Hills district, three blocks each from East Garo Hills, West Khasi Hills and Jaintia Hills district and two blocks each from South Garo Hills and Ri Bhoi district are taken up for the study.

The sample sizes were drawn in such a way that there were sufficient number of observations in the sample of beneficiaries. The details of sample size covered under the study are as follows:

Table – 2.1: details of sample size covered under the study

Sl.no.	District	Nos. of Project Covered		Nos. of Beneficiaries	
		Water Resource Department	Soil & Water Conservation Department	Water Resource Department	Soil & Water Conservation Department
1	East Garo Hills	4	3	15	15
2	East Jaintia Hills	3		10	
3	East Khasi Hills	38	5	90	30
4	North Garo Hills	13		35	
5	Ri Bhoi	12	3	25	30
6	South Garo Hills	15	3	25	30
7	South West Garo Hills	6		25	
8	South West Khasi Hills	2		20	
9	West Garo Hills	9	8	60	160
10	West Jaintia Hills	19	7	30	145
11	West Khasi Hills	13	3	45	70
Grand Total		**134**	**32**	**380**	**480**

A total of 860 benificiries, approximately under each scheme around 5% of the beneficiaries were interviewed. The field work was carried out during the month from June-August 2013.

2.4 Project Execution and Quality control

The field work was conducted by a team of graduate/post graduate investigators specially trained for the purpose of the study. Trainings were provided to the field investigator team for carrying out the overall observation and exploration of the study. Both theoretical (regarding key concepts and techniques) and on-the field trainings were given to the teams on the following issues like:

- Study and understand the objectives
- Target segment
- Orientation to questionnaires
- To sensitise the respondents and to exercise mock interviews and role plays
- Process to be adopted for approaching the respondents
- Manner of canvassing questionnaires and possible ways to tackle sensitive / hostile attitude of the respondents.

During the field visit, the team was instructed to adhere to the ethical standards. The respondents were taken into confidence and interviewed under the condition of assured anonymity. During the process, the respondents were given liberty to refuse to participate in the process of investigation/exploration and also could refuse to be a part of the sample coverage. Further, to ensure quality, the entire field work was continuously monitored and evaluated by the field executive, under

the direct supervision of research professionals of AMC Research Group.The field investigators were accompanied by the supervisors to ensure and maintaining the quality of field-work. Scrutinies of the questionnaire schedules were also done on daily basis in the field itself, to avoid discrepancies in the data collection and to ensure timely completion of fieldwork.

2.5 Data Entry and Analysis

The finding of the study is being presented in the tabular/graphical format containing absolute as well as relative values. The values of explanatory variables have been presented against the background variable in the tables. The quantitative findings of the study were corroborated and elaborated with the qualitative analysis of the research. The data analysis plan was made simple so that it can be understood easily. Further, consistency and validity checks were carried out.

The findings of the study are being compiled into a report that incorporates the introductory material, literature review, and methodology section of this report. The study report also elaborates upon the criteria developed for the content analyses. Additionally, the report includes a discussion of the findings, the potential implications for the archival profession, and any difficulties discovered during the research process. Where the team discusses findings derived from content analyses, exemplary comments offered by the participants provided to add greater depth.

2.6 Report Writing

The findings of the study are being compiled into a report that incorporates the introductory material, literature review, and methodology section of this report. The study report also elaborates upon the criteria developed for the content analyses. Additionally, the report includes a discussion of the findings, the potential implications for the archival profession, and any difficulties discovered during the research process. Where the team discusses findings derived from content analyses, exemplary comments offered by the participants provided to add greater depth. The report is included frequency distribution tables and graphs of the findings, as well as a copy of the survey data collection instruments.

Chapter-3

Findings and Evaluation of AIBP in Meghalaya

3.1 Block Wise Number of Irrigation Projects in both department

Accelerated Irrigation Benefits Program (AIBP) in Meghalaya:

Accelerated Irrigation Benefit Programme (AIBP) in Meghalaya was started during 1999-2000 and continued to get implemented in various phases. There are number of projects being identified and covered under AIBP programme for their detailed performance, implementation process and the corresponding success and is investigated and evaluated. The implementation of AIBP in Meghalaya is carried out by both Water Resource and Soil & Water Conservation Department. While the Water Resource Department started the implementation of AIBP in 1999-2000, the Soil and Water Conservation department took up the implementation work since 2009-10.

The exploration of block wise number of irrigation projects have been identified and evaluated in the following.

Water Resource Department

3.1.1 AIBP Scheme under Water Resources Department:

There has been remarkable progress made by the Water Resources Department in carrying out the AIBP scheme. According to data, total irrigated land under Water Resources Department for the year 2010-2013 is around 15796.45 hectares which contain 145 irrigation projects. Although the irrigational activity has been minimal before the set up of Water Resource Department, with the state managing to irrigate only 3,894.62 hectares in three years from 2007 with 75 minor irrigation projects, however, the irrigational activity increased to a great extent, after the set up of the department and thus the State increased the irrigation activity to around 11,901.83 hectares more than what the State achieved during 2007. At functional level, Directorate of Irrigation under the Agriculture department used to carry out irrigation activity of the state before setting up of the department. Currently, the Water Resource Department is responsible to carry out irrigation projects, flood control and flood management works for agricultural land, preserving water bodies, protection and conservation of springs and other such activities.

At present there are some minor irrigation projects being carried out under the Accelerated Irrigation Benefit Programme (AIBP). Some of these projects are being implemented under the State plan and Rural Infrastructure Development Fund of NABARD. The Ministry of water resources is responsible for the overall financial assistance of these projects. "Under AIBP, 8685.88 hectares were irrigated, which is 60 per cent of all the projects undertaken in the State in the past three years from 2010. The central assistance in the past three years has been Rs. 14,531 lakh as against the release of Rs. 4036.27 lakh released in the preceding three releases from 2007.[2]"

Minor Irrigation: A total number of 166 minor irrigation schemes with a total command area of 16577.64 Ha. has been sanctioned till 2012-13, under the AIBP at a total cost of Rs.16948.29 lakhs (Table 1). Out of which 134 schemes have been completed till the end of March 2012 having a covering an area of 13541.55 Ha with 7167 beneficiaries. Under the project, there are 32 ongoing schemes underway to cover an area of 3216.09 Ha and which is expected to be completed by the year 2013. New proposals for the year 2012-13 are under process. Overall, agricultural production has witnessed significant growth and development in the state because of these minor irrigation schemes and accordingly the economic status of the farmers has improved to a great extent.

Table 3.1: Details of Minor Irrigation Schemes under AIBP since 1999 upto March 2012

Sl.no.	District	Nos. of Project	Command Area (Ha.)	Potential Created (Ha.)	Nos. of Beneficiaries
1	East Garo Hills	4	238.00	238.00	297
2	East Jaintia Hills	3	314.05	314.05	82
3	East Khasi Hills	38	2855.48	2855.48	1786
4	North Garo Hills	13	1085.73	1085.73	685
5	Ri Bhoi	12	1636.00	1636.00	492
6	South Garo Hills	15	1155.00	1155.00	453
7	South West Garo	6	1154.00	1154.00	563
8	South West Khasi Hills	2	462.11	462.11	198
9	West Garo Hills	9	2054.00	2054.00	1145
10	West Jaintia Hills	19	1667.79	1667.79	557
11	West Khasi Hills	13	919.39	919.39	909
Grand Total		**134**	**13541.55**	**13541.55**	**7167**

[2] http://meghalayatimes.info/index.php/front-page/21112-meghalaya-s-water-resources-department-justifies-its-creation

3.1.2 Location wise completed Minor Irrigation Scheme under AIBP and their operational stauts

Table 3.2: District wise completed Minor Irrigation Scheme under AIBP during 1999-2000

Sl. no.	Name of the schemes	District	Block	Estimated Cost	Year of inclusion	Year of completion	Status
1	2	3	4	5	6	7	8
1	Pyndenglitha FIP	East Khasi Hills	Mawphlang	4.49	1999-2000	1999-2000	Operational
2	Krang Umsier FIP	East Khasi Hills	Mawphlang	1.28	1999-2000	1999-2000	-do-
3	Umsaw Nongbri FIP	Ri Bhoi	Umsning	20.98	1999-2000	1999-2000	-do-
4	Amlamar FIP	West Jaintia Hills	Amlarem	1.55	1999-2000	1999-2000	-do-
5	Matlang Kdonglapatha FIP	West Jaintia Hills	Laskein	15.11	1999-2000	1999-2000	-do-
6	Mynkseh FIP	West Jaintia Hills	Laskein	12.51	1999-2000	1999-2000	-do-
6	**TOTAL**			**55.92**			

Table 3.3: District wise completed Minor Irrigation Scheme under AIBP during 2000-2001

Sl. no.	Name of the schemes	District	Block	Estimated Cost	Year of inclusion	Year of completion	Status
1	2	3	4	5	6	7	8
1	Nongwar FIP	East Khasi Hills	Shella	8.23	1999-2000	2000-2001	Operational
2	Mawrasai Shillianfwah FIP	East Khasi Hills	Mawkynrew	40.64	1999-2000	2000-2001	-do-
3	Patharsyngkhaw FIP	West Khasi Hills	Mairang	52.71	1999-2000	2000-2001	-do-
4	Phudumjer FIP	West Khasi Hills	Mairang	9.08	1999-2000	2000-2001	-do-
5	Donglun FIP	East Jaintia Hills	Khliehriat	13.31	1999-2000	2000-2001	-do-
6	Mynsar Neng FIP	West Jaintia Hills	Laskein	8.87	1999-2000	2000-2001	-do-
7	Mynthet FIP	West Jaintia Hills	Laskein	9.88	1999-2000	2000-2001	-do-
8	Madan Rawan FIP	West Jaintia Hills	Laskein	61.84	1999-2000	2000-2001	-do-
9	Bamdolloi FIP	West Jaintia Hills	Thadlaskein	16.72	1999-2000	2000-2001	-do-
10	Pynthorsong FIP	West Jaintia Hills	Thadlaskein	22.52	1999-2000	2000-2001	-do-
11	Myntwa FIP	West Jaintia Hills	Laskein	16.89	1999-2000	2000-2001	-do-
12	Nengstock FIP	East Garo Hills	Songsak	13.65	1999-2000	2000-2001	-do-
13	Rongak FIP	East Garo Hills	Samanda	3.34	1999-2000	2000-2001	-do-
14	Bongbong FIP	North Garo Hills	Rongreng	24.76	1999-2000	2000-2001	-do-
15	Dengnakpara FIP	South West Garo	Betasing	16.27	1999-2000	2000-2001	-do-
15	**TOTAL**			**318.71**			

Table 3.4: District wise completed Minor Irrigation Scheme under AIBP during 2001-2002

Sl. no.	Name of the schemes	District	Block	Estimated Cost	Year of inclusion	Year of completion	Status
1	2	3	4	5	6	7	8
1	Umlew FIP	East khasi Hills	Mylliem	20.28	1999-2000	2001-2002	Operational
2	Thangbnai FIP	East khasi Hills	Mawryngkneng	54.28	2000-2001	2001-2002	-do-
3	Awanga FIP	East Garo Hills	Rongjeng	11.97	1999-2000	2001-2002	-do-
4	Gengnang FIP	North Garo Hills	Resubelpara	9.01	1999-2000	2001-2002	-do-
5	Rangsi FIP	North Garo Hills	Resublelpara	12.30	1999-2000	2001-2002	-do-
6	Rongbu FIP	North Garo Hills	Rongjeng	22.79	1999-2000	2001-2002	-do-
7	Bodo Apal FIP	North Garo Hills	Resubelpara	44.38	1999-2000	2001-2002	-do-
8	Rongadathgiri FIP	West Garo Hills	Dadenggiri	5.04	1999-2000	2001-2002	-do-
8	**TOTAL**			**180.05**			

Table 3.5: District wise completed Minor Irrigation Scheme under AIBP during 2002-2003

Sl. no.	Name of the schemes	District	Block	Estimated Cost	Year of inclusion	Year of completion	Status
1	**2**	**3**	**4**	**5**	**6**	**7**	**8**
1	Bamundanga FIP	West Garo Hills	Tikrikilla	79.89	1999-2000	2002-2003	Operational
1	**TOTAL**			**79.89**			

Table 3.6: District wise completed Minor Irrigation Scheme under AIBP during 2003-2004

Sl. no.	Name of the schemes	District	Block	Estimated Cost	Year of inclusion	Year of completion	Status
1	**2**	**3**	**4**	**5**	**6**	**7**	**8**
1	Lyting Lyngdoh FIP	East Khasi Hills	Pynursla	30.60	2000-2001	2003-2004	Operational
2	Chiljhora FIP	North Garo Hills	Resubelpara	115.73	1999-2000	2003-2004	-do-
2	**TOTAL**			**146.33**			

Table 3.7: District wise completed Minor Irrigation Scheme under AIBP during 2004-2005

Sl. no.	Name of the schemes	District	Block	Estimated Cost	Year of inclusion	Year of completion	Status
1	**2**	**3**	**4**	**5**	**6**	**7**	**8**
1	Madan Jynru FIP	East khasi Hills	Mawryngkneng	46.38	2000-2001	2004-2005	Operational
2	Nekora FIP	South Garo Hills	Rongra	21.89	1999-2000	2004-2005	-do-
2	**TOTAL**			**68.27**			

Table 3.8: District wise completed Minor Irrigation Scheme under AIBP during 2005-2006

Sl. no.	Name of the schemes	District	Block	Estimated Cost	Year of inclusion	Year of completion	Status
1	2	3	4	5	6	7	8
1	Lyngkhoi FIP	East khasi Hills	Mawphlanh	192.20	2000-2001	2005-2006	Operational
2	Nongtraw FIP	Ri Bhoi	Umsning	114.55	1999-2000	2005-2006	-do-
3	Gandual FIP	North Garo Hills	Kharkutta	61.30	2000-2001	2005-2006	-do-
4	Galasora FIP	South Garo Hills	Rongra	60.60	2000-2001	2005-2006	-do-
4	**TOTAL**			**428.65**			

Table 3.9: District wise completed Minor Irrigation Scheme under AIBP during 2006-2007

Sl. no.	Name of the schemes	District	Block	Estimated Cost	Year of inclusion	Year of completion	Status
1	2	3	4	5	6	7	8
1	Amdep FIP	West Jaintia Hills	Amdep FIP	155.44	2000-2001	2006-2007	Operational
2	Selsella FIP	West Jaintia Hills	Selsella FIP	30.41	1999-2000	2000-2007	-do-
2	**TOTAL**			**185.85**			

Table 3.10: District wise completed Minor Irrigation Scheme under AIBP during 2007-2008

Sl. no.	Name of the schemes	District	Block	Estimated Cost	Year of inclusion	Year of completion	Status
1	2	3	4	5	6	7	8
1	Andherkona FIP	West Garo Hills	Selsella	330.31	2000-2001	2007-2008	Operational
2	Khanukol FIP	South Garo Hills	Baghmara	127.94	1999-2000	2007-2008	-do-
2	**Total**			**458.25**			

Table 3.11: District wise completed Minor Irrigation Scheme under AIBP during 2008-2009

Sl. no.	Name of the schemes	District	Block	Estimated Cost	Year of inclusion	Year of completion	Status
1	2	3	4	5	6	7	8
1	Mynrud Moopasor FIP	West Jaintia Hills	Thadlaskein	59.51	1999-2000	2008-2009	Operational
2	Rongrong Kharkutta FIP	North Garo Hills	Resubelpara	43.96	1999-2000	2008-2009	-do-
3	Renegiri FIP	South Garo Hills	Chokpot	39.37	1999-2000	2008-2009	-do-
3	**Total**			**142.84**			

Table 3.12: District wise completed Minor Irrigation Scheme under AIBP during 2009-2010

Sl. no.	Name of the schemes	District	Block	Estimated Cost	Year of inclusion	Year of completion	Status
1	2	3	4	5	6	7	8
1	Wah Ryiong FIP	East khasi Hills	Mylliem	32.67	2007-2008	2009-2010	Operational
2	Umrangriah FIP	East khasi Hills	Shella	40.53	2007-2008	2009-2010	-do-
3	Pomshutia FIP	East khasi Hills	Pymursla	100.83	2007-2008	2009-2010	-do-
4	RaidNongkhieng FIP	East khasi Hills	Pymursla	97.98	2007-2008	2009-2010	-do-
5	Nonglait FIP	East khasi Hills	Mawsynram	36.34	2007-2008	2009-2010	-do-
6	PaitheinMawiong FIP	East khasi Hills	Mawsynram	68.75	2007-2008	2009-2010	-do-
7	Rtiang FIP	Ri Bhoi	Umsning	30.21	2007-2008	2009-2010	-do-
8	Syad Heh FIP	Ri Bhoi	Umsning	68.01	2007-2008	2009-2010	-do-
9	Baklapara FIP	Ri Bhoi	Jirang	117.98	2007-2008	2009-2010	-do-
10	Laitkseh FIP	East khasi Hills	Mawthadraish	90.09	2007-2008	2009-2010	-do-
11	Lawrapha FIP	West Khasi Hills	Nongstoin	81.06	2007-2008	2009-2010	-do-
12	Nongsohma FIP	West Khasi Hills	Mairang	75.96	2007-2008	2009-2010	-do-
13	Daram Mangtu FIS	North Garo Hills	Resubelpara	49.40	2007-2008	2009-2010	-do-
14	Pakrek FIP	North Garo Hills	Kharkutta	59.900	2007-2008	2009-2010	-do-
15	Kharigoan FIP	West Garo Hills	Selsella	131.63	2007-2008	2009-2010	-do-
16	Grengngandi FIS	South West Garo	Betasing	45.18	2007-2008	2009-2010	-do-
16	**TOTAL**			**1126.52**			

Table 3.13: District wise completed Minor Irrigation Scheme under AIBP during 2010-2011

Sl. no.	Name of the schemes	District	Block	Estimated Cost	Year of inclusion	Year of completion	Status
1	2	3	4	5	6	7	8
1	Pyndengkha FIP	East khasi Hills	Mawphlang	95.81	2007-2008	2010-2011	Operational
2	Snoin F.I.S	East khasi Hills	Mawsynram	112.53	2007-2008	2010-2011	-do-
3	Wah-Shyiap MIP	East khasi Hills	Mawsynram	73.49	2007-2008	2010-2011	-do-
4	Nongsder FIP	East khasi Hills	Pynursla	52.300	2008-2009	2010-2011	-do-
5	Iapdkoh FIP	East khasi Hills	Mawryngkneng	63.168	2008-2009	2010-2011	-do-
6	Siltham FIP	East khasi Hills	Mawryngkneng	55.947	2008-2009	2010-2011	-do-
7	Mawpran FIP	East khasi Hills	Pynursla	38.460	2008-2009	2010-2011	-do-
8	Mawkhap FIP	East khasi Hills	Pynursla	76.150	2008-2009	2010-2011	-do-
9	Lyndiar FIP	East khasi Hills	Mawkynrew	46.270	2008-2009	2010-2011	-do-
10	Wahkohrah FIP	East khasi Hills	Mawkynrew	47.020	2008-2009	2010-2011	-do-
11	Umblai FIP	East khasi Hills	Pynursla	114.592	2008-2009	2010-2011	-do-
12	Langdiah FIP	East khasi Hills	Mawryngkneng	149.753	2008-2009	2010-2011	-do-
13	Raibnem Siejiong FIP	East khasi Hills	Mawsynram	151.880	2008-2009	2010-2011	-do-
14	Wahumlew FIP	East khasi Hills	Mawkynrew	68.560	2008-2009	2010-2011	-do-
				1145.930			
1	Mawtneng FIP	Ri Bhoi	Umsning	415.634	2008-2009	2010-2011	-do-
2	Sarikhusi FIP	Ri Bhoi	Umsning	230.500	2008-2009	2010-2011	-do-
3	Umtasen FIP	Ri Bhoi	Jirang	60.089	2008-2009	2010-2011	-do-
4	Mawlyngkhung FIP	Ri Bhoi	Umsning	119.980	2008-2009	2010-2011	-do-
5	Mawrathud FIP	Ri Bhoi	Umsning	126.140	2008-2009	2010-2011	-do-
6	Mawlasnai FIP	Ri Bhoi	Umsning	441.000	2008-2009	2010-2011	-do-
				1393.343			
1	Umkhap (Nongmise)	West Khasi Hills	Mawthadrashan	111.09	2007-2008	2010-2011	-do-
2	Risiang FIP	West Khasi Hills	Nongstoin	185.06	2007-2008	2010-2011	-do-
3	Umiing FIP	West Khasi Hills	Mairang	57.82	2007-2008	2010-2011	-do-
4	Wahliewlong FIP	West Khasi Hills	Mawthadraishan	195.440	2008-2009	2010-2011	-do-
				549.410			
1	Phudksew FIP	South West Khasi	Ranikorg	46.48	2007-2008	2010-2011	-do-
				46.48			
1	Priangkhla FIP	East Jaintia Hills	Khliehriat	306.800	2008-2009	2010-2011	-do-
				306.800			
1	Umrngi FIS	West Jaintia Hills	Thadlaskein	98.49	2007-2008	2010-2011	-do-
2	Syrmi FIP	West Jaintia Hills	Thadlaskein	78.000	2008-2009	2010-2011	-do-
3	Wahmynsen FIP	West Jaintia Hills	Thadlaskein	118.760	2008-2009	2010-2011	-do-
4	Barsabang FIS	West Jaintia Hills	Thadlaskein	38.76	2007-2008	2010-2011	-do-
5	Mublai FIS	West Jaintia Hills	Thadlaskein	49.80	2007-2008	2010-2011	-do-
				383.81			
1	Rangmal Badim FIP	East Garo Hills	Samandag	37.432	2008-2009	2010-2011	-do-
				37.432			
1	Soba Jambal FIP	North Garo Hills	Kharkutta	52.951	2008-2009	2010-2011	-do-
				52.951			
1	Belbari FIP	West Garo Hills	Selsella	92.400	2008-2009	2010-2011	-do-
2	Baghmara FIP	West Garo Hills	Selsella	330.258	2008-2009	2010-2011	-do-
				422.658			
1	Kawahagra	South West Garo	Zigzakg	102.410	2008-2009	2010-2011	-do-
2	Egopara	South West Garo	Zigzakg	78.410	2008-2009	2010-2011	-do-
				180.820			

Sl. no.	Name of the schemes	District	Block	Estimated Cost	Year of inclusion	Year of completion	Status
1	2	3	4	5	6	7	8
1	Banajuri FIP	South Garo Hills	Baghmara	38.680	2008-2009	2010-2011	-do-
2	Mahadeo Warina FIP	South Garo Hills	Rongra	54.376	2008-2009	2010-2011	-do-
3	Damachigitchak FIP	South Garo Hills	Baghmara	57.540	2008-2009	2010-2011	-do-
4	Batabari FIP	South Garo Hills	Baghmara	59.570	2008-2009	2010-2011	-do-
				210.17			
	TOTAL			**4729.800**			

Table 3.14: District wise completed Minor Irrigation Scheme under AIBP during 2011-2012

Sl. no.	Name of the schemes	District	Block	Estimated Cost	Year of inclusion	Year of completion	Status
1	**2**	**3**	**4**	**5**	**6**	**7**	**8**
1	Sohbar FIP	East Khasi Hills	Shella	136.590	2008-2009	2011-2012	Operational
2	Thyllaw FIP	East Khasi Hills	Mawsynram	119.970	2008-2009	2011-2012	-do-
3	Shongriang FIP	East Khasi Hills	Mawkynrew	92.034	2010-2011	2011-2012	-do-
4	Nongspung FIP	East Khasi Hills	Mawphlang	122.310	2010-2011	2011-2012	-do-
5	Wahumstait FIP	East Khasi Hills	Mawkynrew	37.910	2010-2011	2011-2012	-do-
6	Ryngkon FIP	East Khasi Hills	Mawkynrew	32.030	2010-2011	2011-2012	-do-
7	Umlynnong FIP	East Khasi Hills	Mawkynrew	57.385	2010-2011	2011-2012	-do-
8	Mawiong Diengpasoh FIP	East Khasi Hills	Mawkynrew	41.688	2010-2011	2011-2012	-do-
				639.916			
1	Nongthymmai Umbun FIP	Ri Bhoi	Umsning	74.805	2010-2011	2011-2012	-do-
				74.805			
1	Patharlyndan FIP	West Khasi Hills	Mairang	52.820	2010-2011	2011-2012	-do-
2	Sangriang FIP	West Khasi Hills	Nongstoin	84.202	2010-2011	2011-2012	-do-
3	Pampor FIP	West Khasi Hills	Nongstoin	33.779	2010-2011	2011-2012	-do-
4	Thaiem FIP	West Khasi Hills	Mawshynrut	62.773	2010-2011	2011-2012	-do-
5	Umthiah Lyngngam FIP	West Khasi Hills	Nongstoin	48.826	2010-2011	2011-2012	-do-
				282.400			
1	Phudkroh Manai FIP	South West Khasi	Ranikor	452.871	2008-2009	2011-2012	-do-
				452.871			
1	Urmanik FIP	East Jaintia Hills	Khliehriat	97.089	2010-2011	2011-2012	-do-
				97.089			
1	Umlidoh-umktieh-Trekidoh	West Jaintia Hills	Resulbelpara	200.00	2008-2009	2011-2012	-do-
2	Mookariang FIP	West Jaintia Hills	Resulbelpara	40.290	2008-2009	2011-2012	-do-
				241.090			
1	Kantragiri FIP	North Garo Hills	Resulbelpara	37.655	2010-2011	2011-2012	-do-
2	Korepara FIP	North Garo Hills	Resulbelpara	26.454	2010-2011	2011-2012	-do-
				64.109			
1	Kalchengpara FIP	West Garo Hills	Selsella	477.22	2007-2008	2011-2012	-do-
2	Watregre FIP	West Garo Hills	Rongram	179.663	2008-2009	2011-2012	-do-
3	Amidengre FIIP	West Garo Hills	Gambagre	268.420	2007-2008	2011-2012	-do-
				925.303			

Sl. no.	Name of the schemes	District	Block	Estimated Cost	Year of inclusion	Year of completion	Status
1	**2**	**3**	**4**	**5**	**6**	**7**	**8**
1	Koligaon FIP	South West Garo	Zigzak	382.030	2008-2009	2011-2012	Operational
2	Ringdee FIP	South West Garo	Betasing	595.630	1999-2000	2011-2012	-do-
				977.660			
1	Gulpani FIP	South Garo Hills	Rongra	187.703	2008-2009	2011-2012	-do-
2	Halwa Atong FIP	South Garo Hills	Rongra	629.640	2008-2009	2011-2012	-do-
3	Mandal FIP	South Garo Hills	Baghmara	52.512	2008-2009	2011-2012	-do-
4	Trikuchit FIP	South Garo Hills	Baghmara	50.407	2008-2009	2011-2012	-do-
5	Pantwar FIP	South Garo Hills	Chokpot	48.905	2010-2011	2011-2012	-do-
6	Dong kreng FIP	South Garo Hills	Baghmara	26.315	2010-2011	2011-2012	-do-
7	Dopagrang FIP	South Garo Hills	Baghmara	69.114	2010-2011	2011-2012	-do-
				1064.596			
	TOTAL			**4819.84**			

The aforesaid Table indicates that total number of irrigation projects implemented by Water Resource department under AIBP programme. The Department has implemented a total of 134 Minor Irrigatio schemes since 1999-2000 to 2011-12 under the AIBP programme in the state. Out of which maximum number of schemes are implemented in East Khasi Hills district (38), followed by South Garo Hills (15), West Jaintia Hills (19), East Garo Hills (20), West Khasi Hills (13), South West Garo Hills (6), North Garo Hills (13), and Ri-Bhoi Hills (12). There are in total 134 monor irrigation projects in the State and all the projects are operational effectively. All the districts in the State varied in number in carrying out the irrigational projects. Therefore, it is visible form the above table that all the irrigational projects are 100% functional in the state.

3.1.3 District wise Command Area and Beneficiaries Covered under AIBP Scheme

The highest number of beneficiaries under the schemes is concentrated in East Khasi Hills (1786), followed by West Garo Hills (1145), West Khasi Hills (909), North Garo Hills (685), West Jaintia Hills (557), Ri-Bhoi (492), South Garo Hills (453), South West Garo Hills (563) and Est Jaintia Hills (82). The water resources department has been able to accomplish an irrigated area of 13361.55 hectares since 1990. Out of this irrigated area, the highest concentration is found in East Khasi Hills with an irrigated area of 2855.48 Ha. followed by West Garo Hills (2054.00 Ha.), West Jaintia Hills (1667.79 Ha.), Ri-Bhori (1456 Ha.), East Jaintia Hills (314.05 Ha.), East Garo Hills (238 Ha.) and West Khasi Hills (819.39 Ha.) respectively.

Table 3.15: District wise Command area and Beneficiaries covered during 1999-2000

Sl. no.	Name of the schemes	District	Block	Command Area (Ha.)	Potential created (Ha.)	No of Beneficiaries
1	2	3	4	5	6	7
1	Pyndenglitha FIP	East Khasi Hills	Mawphlang	146.00	146.00	73
2	Krang Umsier FIP	East Khasi Hills	Mawphlang	79.00	79.00	23
3	Umsaw Nongbri FIP	Ri Bhoi	Umsning	180.00	180.00	101
4	Amlamar FIP	West Jaintia Hills	Amlarem	200.00	200.00	54
5	Matlang Kdonglapatha FIP	West Jaintia Hills	Laskein	134.00	134.00	30
6	Mynkseh FIP	West Jaintia Hills	Laskein	13.00	13.00	21
6	**TOTAL**			**752.00**	**752.00**	**302**

Table 3.16: District wise Command area and Beneficiaries covered during 2000-2001

Sl. no.	Name of the schemes	District	Block	Command Area (Ha.)	Potential created (Ha.)	No of Beneficiaries
1	2	3	4	5	6	7
1	Nongwar FIP	East Khasi Hills	Shella	15.70	15.70	13
2	Mawrasai Shillianfwah FIP	East Khasi Hills	Mawkynrew	84.79	84.79	45
3	Patharsyngkhaw FIP	West Khasi Hills	Mairang	75.72	75.72	20
4	Phudumjer FIP	West Khasi Hills	Mairang	31.00	31.00	14
5	Donglun FIP	East Jaintia Hills	Khliehriat	36.00	36.00	19
6	Mynsar Neng FIP	West Jaintia Hills	Laskein	12.00	12.00	11
7	Mynthet FIP	West Jaintia Hills	Laskein	47.00	47.00	10
8	Madan Rawan FIP	West Jaintia Hills	Laskein	98.40	98.40	31
9	Bamdolloi FIP	West Jaintia Hills	Thadlaskein	33.15	33.15	8
10	Pynthorsong FIP	West Jaintia Hills	Thadlaskein	29.57	29.57	22
11	Myntwa FIP	West Jaintia Hills	Laskein	25.00	25.00	25
12	Nengstock FIP	East Garo Hills	Songsak	40.00	40.00	36
13	Rongak FIP	East Garo Hills	Samanda	20.00	20.00	46
14	Bongbong FIP	North Garo Hills	Rongreng	100.00	100.00	50
15	Dengnakpara FIP	South West Garo	Betasing	198.00	198.00	145
15	**TOTAL**			**846.33**	**846.33**	**495**

Table 3.17: District wise Command area and Beneficiaries covered during 2001-2002

Sl. no.	Name of the schemes	District	Block	Command Area (Ha.)	Potential created (Ha.)	No of Beneficiaries
1	**2**	**3**	**4**	**5**	**6**	**7**
1	Umlew FIP	East khasi Hills	Mylliem	35.64	35.64	35
2	Thangbnai FIP	East khasi Hills	Mawryngkneng	68.13	68.13	42
3	Awanga FIP	East Garo Hills	Rongjeng	153.00	153.00	201
4	Gengnang FIP	North Garo Hills	Resubelpara	105.00	105.00	52
5	Rangsi FIP	North Garo Hills	Resublelpara	72.00	72.00	21
6	Rongbu FIP	North Garo Hills	Rongjeng	150.00	150.00	30
7	Bodo Apal FIP	North Garo Hills	Resubelpara	65.00	65.00	31
8	Rongadathgiri FIP	West Garo Hills	Dadenggiri	60.00	60.00	37
8	**TOTAL**			**708.77**	**708.77**	**449**

Table 3.18: District wise Command area and Beneficiaries covered during 2002-2003

Sl. no.	Name of the schemes	District	Block	Command Area (Ha.)	Potential created (Ha.)	No of Beneficiaries
1	2	3	4	5	6	7
1	Bamundanga FIP	West Garo Hills	Tikrikilla	320.00	320.00	200
1	**TOTAL**			**320.00**	**320.00**	**200**

Table 3.19: District wise Command area and Beneficiaries covered during 2003-2004

Sl. no.	Name of the schemes	District	Block	Command Area (Ha.)	Potential created (Ha.)	No of Beneficiaries
1	2	3	4	5	6	7
1	Lyting Lyngdoh FIP	East Khasi Hills	Pynursla	30.00	30.00	51
2	Chiljhora FIP	North Garo Hills	Resubelpara	115.73	106.00	64
2	**TOTAL**			**129.84**	**129.84**	**115**

Table 3.20: District wise Command area and Beneficiariescovered during 2004-2005

Sl. no.	Name of the schemes	District	Block	Command Area (Ha.)	Potential created (Ha.)	No of Beneficiaries
1	**2**	**3**	**4**	**5**	**6**	**7**
1	Madan Jynru FIP	East khasi Hills	Mawryngkneng	78.84	78.84	20
2	Nekora FIP	South Garo Hills	Rongra	51.00	51.00	45
2	**TOTAL**			**129.84**	**129.84**	**65**

Table 3.21: District wise Command area and Beneficiaries covered during 2005-2006

Sl. no.	Name of the schemes	District	Block	Command Area (Ha.)	Potential created (Ha.)	No of Beneficiaries
1	**2**	**3**	**4**	**5**	**6**	**7**
1	Lyngkhoi FIP	East khasi Hills	Mawphlanh	240.00	240.00	172
2	Nongtraw FIP	Ri Bhoi	Umsning	180.00	180.00	75
3	Gandual FIP	North Garo Hills	Kharkutta	60.00	60.00	21
4	Galasora FIP	South Garo Hills	Rongra	45.00	45.00	15
4	**TOTAL**			**525.00**	**525.00**	**283**

Table 3.22: District wise Command area and Beneficiaries covered during 2006-2007

Sl. no.	Name of the schemes	District	Block	Command Area (Ha.)	Potential created (Ha.)	No of Beneficiaries
1	2	3	4	5	6	7
1	Amdep FIP	West Jaintia Hills	Amdep FIP	286.48	286.48	115
2	Selsella FIP	West Jaintia Hills	Selsella FIP	192.00	192.00	21
2	**TOTAL**			**478.48**	**478.48**	**136**

Table 3.23: District wise Command area and Beneficiaries covered during 2007-2008

Sl. no.	Name of the schemes	District	Block	Command Area (Ha.)	Potential created (Ha.)	No of Beneficiaries
1	**2**	**3**	**4**	**5**	**6**	**7**
1	Andherkona FIP	West Garo Hills	Selsella	326.00	326.00	132
2	Khanukol FIP	South Garo Hills	Baghmara	118.00	118.00	74
	Total			**444.00**	**444.00**	**206**

Table 3.24: District wise Command area and Beneficiaries covered during 2008-2009

Sl. no.	Name of the schemes	District	Block	Command Area (Ha.)	Potential created (Ha.)	No of Beneficiaries
1	2	3	4	5	6	7
1	Mynrud Moopasor FIP	West Jaintia Hills	Thadlaskein	80.00	80.00	30
2	Rongrong Kharkutta FIP	North Garo Hills	Resubelpara	170.00	170.00	136
3	Renegiri FIP	South Garo Hills	Chokpot	65.00	65.00	33
3	**Total**			**315.00**	**315.00**	**199**

Table 3.25: District wise Command area and Beneficiaries covered during 2009-2010

Sl. no.	Name of the schemes	District	Block	Command Area (Ha.)	Potential created (Ha.)	No of Beneficiaries
1	2	3	4	5	6	7
1	Wah Ryiong FIP	East khasi Hills	Mylliem	52.25	52.25	15
2	Umrangriah FIP	East khasi Hills	Shella	60.90	60.90	8
3	Pomshutia FIP	East khasi Hills	Pymursla	130.00	130.00	37
4	RaidNongkhieng FIP	East khasi Hills	Pymursla	98.00	98.00	50
5	Nonglait FIP	East khasi Hills	Mawsynram	40.35	40.35	13
6	PaitheinMawiong FIP	East khasi Hills	Mawsynram	100.00	100.00	64
7	Rtiang FIP	Ri Bhoi	Umsning	65.00	65.00	20
8	Syad Heh FIP	Ri Bhoi	Umsning	74.00	74.00	12
9	Baklapara FIP	Ri Bhoi	Jirang	120.00	120.00	67
10	Laitkseh FIP	East khasi Hills	Mawthadraish	67.92	67.92	83
11	Lawrapha FIP	West Khasi Hills	Nongstoin	59.72	59.72	15
12	Nongsohma FIP	West Khasi Hills	Mairang	60.44	60.44	32
13	Daram Mangtu FIS	North Garo Hills	Resubelpara	84.00	84.00	82
14	Pakrek FIP	North Garo Hills	Kharkutta	62.00	62.00	23
15	Kharigoan FIP	West Garo Hills	Selsella	141.00	141.00	102
16	Grengngandi FIS	South West Garo	Betasing	47.00	47.00	60
16	**TOTAL**			**1262.58**	**1262.58**	**683**

Table 3.26: District wise Command area and Beneficiaries covered during 2010-2011

Sl. no.	Name of the schemes	District	Block	Command Area (Ha.)	Potential created (Ha.)	No of Beneficiaries
1	2	3	4	5	6	7
1	Pyndengkha FIP	East khasi Hills	Mawphlang	71.60	71.60	101
2	Snoin F.I.S	East khasi Hills	Mawsynram	138.24	138.24	26
3	Wah-Shyiap MIP	East khasi Hills	Mawsynram	77.77	77.77	40
4	Nongsder FIP	East khasi Hills	Pynursla	60.00	60.00	36
5	Iapdkoh FIP	East khasi Hills	Mawryngkneng	42.15	42.15	28
6	Siltham FIP	East khasi Hills	Mawryngkneng	41.50	41.50	45
7	Mawpran FIP	East khasi Hills	Pynursla	70.65	70.65	45
8	Mawkhap FIP	East khasi Hills	Pynursla	120.70	120.70	52
9	Lyndiar FIP	East khasi Hills	Mawkynrew	31.11	31.11	20
10	Wahkohrah FIP	East khasi Hills	Mawkynrew	31.40	31.40	15
11	Umblai FIP	East khasi Hills	Pynursla	112.30	112.30	68
12	Langdiah FIP	East khasi Hills	Mawryngkneng	105.12	105.12	187
13	Raibnem Siejiong FIP	East khasi Hills	Mawsynram	106.92	106.92	66
14	Wahumlew FIP	East khasi Hills	Mawkynrew	46.40	46.40	20
				1055.86	**1055.86**	**749**
1	Mawtneng FIP	Ri Bhoi	Umsning	310.00	310.00	31
2	Sarikhusi FIP	Ri Bhoi	Umsning	156.00	156.00	42
3	Umtasen FIP	Ri Bhoi	Jirang	42.00	42.00	20
4	Mawlyngkhung FIP	Ri Bhoi	Umsning	80.00	80.00	30
5	Mawrathud FIP	Ri Bhoi	Umsning	85.00	85.00	24
6	Mawlasnai FIP	Ri Bhoi	Umsning	294.00	294.00	58
				967.000	**967.000**	**205**
1	Umkhap (Nongmise)	West Khasi Hills	Mawthadrashan	120.00	120.00	67
2	Risiang FIP	West Khasi Hills	Nongstoin	138.87	138.87	33
3	Umiing FIP	West Khasi Hills	Mairang	60.00	60.00	110
4	Wahliewlong FIP	West Khasi Hills	Mawthadraishan	146.20	146.20	385
				465.070	**465.070**	**595**
1	Phudksew FIP	South West Khasi	Ranikorg	62.11	62.11	98
				62.11	**62.11**	**98**
1	Priangkhla FIP	East Jaintia Hills	Khliehriat	213.30	213.30	53
				213.300	**213.300**	**53**
1	Umrngi FIS	West Jaintia Hills	Thadlaskein	99.89	99.89	30
2	Syrmi FIP	West Jaintia Hills	Thadlaskein	57.30	57.30	15
3	Wahmynsen FIP	West Jaintia Hills	Thadlaskein	84.00	84.00	19
4	Barsabang FIS	West Jaintia Hills	Thadlaskein	40.00	40.00	30
5	Mublai FIS	West Jaintia Hills	Thadlaskein	50.00	50.00	12
				331.19	**331.19**	**106**
1	Rangmal Badim FIP	East Garo Hills	Samandag	25.000	25.000	14
				25.000	**25.000**	**14**
1	Soba Jambal FIP	North Garo Hills	Kharkutta	46.00	46.00	35
				46.000	**46.000**	**35**
1	Belbari FIP	West Garo Hills	Selsella	95.00	95.00	193
2	Baghmara FIP	West Garo Hills	Selsella	239.00	239.00	199
				334.000	**334.000**	**392**
1	Kawahagra	South West Garo	Zigzakg	74.00	74.00	47
2	Egopara	South West Garo	Zigzakg	60.00	60.00	68
				134.000	**134.000**	**115**
1	Banajuri FIP	South Garo Hills	Baghmara	26.00	26.00	11

2	Mahadeo Warina FIP	South Garo Hills	Rongra	37.00	37.00	16
3	Damachigitchak FIP	South Garo Hills	Baghmara	48.00	48.00	16
4	Batabari FIP	South Garo Hills	Baghmara	42.00	42.00	10
				153.00	153.00	53
	TOTAL			**3786.530**	**3786.530**	**2415**

Table 3.27: District wise Command area and Beneficiaries covered during 2011-2012

Sl. no.	Name of the schemes	District	Block	Command Area (Ha.)	Potential created (Ha.)	No of Beneficiaries
1	2	3	4	5	6	7
1	Sohbar FIP	East Khasi Hills	Shella	97.00	97.00	36
2	Thyllaw FIP	East Khasi Hills	Mawsynram	109.80	109.80	55
3	Shongriang FIP	East Khasi Hills	Mawkynrew	63.36	63.36	25
4	Nongspung FIP	East Khasi Hills	Mawphlang	85.00	85.00	105
5	Wahumstait FIP	East Khasi Hills	Mawkynrew	26.12	26.12	10
6	Ryngkon FIP	East Khasi Hills	Mawkynrew	23.07	23.07	22
7	Umlynnong FIP	East Khasi Hills	Mawkynrew	39.55	39.55	20
8	Mawiong Diengpasoh FIP	East Khasi Hills	Mawkynrew	28.20	28.20	20
				472.100	**472.100**	**293**
1	Nongthymmai Umbun FIP	Ri Bhoi	Umsning	50.00	50.00	12
				50.00	**50.00**	**12**
1	Patharlyndan FIP	West Khasi Hills	Mairang	42.32	42.32	21
2	Sangriang FIP	West Khasi Hills	Nongstoin	56.50	56.50	116
3	Pampor FIP	West Khasi Hills	Nongstoin	22.62	22.62	16
4	Thaiem FIP	West Khasi Hills	Mawshynrut	46.00	46.00	30
5	Umthiah Lyngngam FIP	West Khasi Hills	Nongstoin	60.00	60.00	50
				227.440	**227.440**	**233**
1	Phudkroh Manai FIP	South West Khasi Hills	Ranikor	400.00	400.00	100
				400.00	**400.00**	**100**
1	Urmanik FIP	East Jaintia Hills	Khliehriat	64.750	64.750	10
				64.750	**64.750**	**10**
1	Umlidoh-umktieh-Trekidoh	West Jaintia Hills	Resulbelpara	155.50	155.50	61
2	Mookariang FIP	West Jaintia Hills	Resulbelpara	30.50	30.50	12
				186.00	**186.00**	**73**
1	Kantragiri FIP	North Garo Hills	Resulbelpara	26.00	26.00	100
2	Korepara FIP	North Garo Hills	Resulbelpara	30.00	30.00	40
				56.000	**56.000**	**140.**
1	Kalchengpara FIP	West Garo Hills	Selsella	478.00	478.00	105
2	Watregre FIP	West Garo Hills	Rongram	120.00	120.00	59
3	Amidengre FIIP	West Garo Hills	Gambagre	275.0	275.0	118
				873.000	**873.000**	**282**
1	Koligaon FIP	South West Garo	Zigzak	275.00	275.00	112
2	Ringdee FIP	South West Garo	Betasing	500.00	500.00	131
				775.000	**775.000**	**243**
1	Gulpani FIP	South Garo Hills	Rongra	126.00	126.00	53
2	Halwa Atong FIP	South Garo Hills	Rongra	425.00	425.00	120
3	Mandal FIP	South Garo Hills	Baghmara	38.00	38.00	8
4	Trikuchit FIP	South Garo Hills	Baghmara	34.00	34.00	14
5	Pantwar FIP	South Garo Hills	Chokpot	33.00	33.00	11
6	Dong kreng FIP	South Garo Hills	Baghmara	20.00	20.00	7

7	Dopagrang FIP	South Garo Hills	Baghmara	47.00	47.00	20
				723.000	**723.000**	**233**
	TOTAL			**3827.29**	**3827.29**	**1619.00**

Soil & Water Conservation Department

3.2 AIBP Scheme under Soil & Water Conservation Department:

The Soil & Water Conservation Department, Meghalaya was set up as the Jhum Control Wing under the Forest Department in the erstwhile composite State of Assam. Subsequently it was given an independent status during 1959-60. As a major Department of the State, the Department has been striving towards the conservation of three most vital natural resources of the state - soil, water and vegetation by implementing various conservation measures.

The following activities are taken up by the Department as its main functions:

(i) Conservation of natural resources like soil, water and vegetation for sustainable development and continuous economic progress and improved livelihood of people.

(ii) To combat destructive agricultural practices of shifting cultivation or Jhumming and preserve, maintain and improve balance in ecology and environment.

(iii) Maximum utilization and conservation of soil, water and vegetation in the catchments area by making judicious use of land according to its capabilities.

With this in perspective, the Department has taken up the challenging task of controlling the depleting natural resources of soil water and vegetation through its various efforts and programmes with the objective of conserving these vital resources.

The major objectives of the Soil and Water Conservation Department are as follows:

- ➢ To dissipate soil and water erosion caused by rainfall;
- ➢ To improve-soil-health and tilth;
- ➢ To enhance soil- moisture regime & water holding capacity in the soil profile;
- ➢ To promote sub-surface/base-flow and ground water recharge;
- ➢ To harvest surface run-off/rain water for protective and productive purposes;
- ➢ To promote per unit area productivity of land-base activity in a sustainable matter;
- ➢ To promote livelihood/gainful employment opportunities.

The major activities undertaken by the department under AIBP are as follows:

- ➢ Focusing on creation of minor irrigation potential
- ➢ Creation of opportunity for Rural Livelihood (Agriculture and Allied activities)
- ➢ Focusing on generation of Rural Employment

Table 3.28: Details of Irrigation Projects Implemented by Soil and Water Conservation Department

District	Block	Name of the Project	Expenditure Incurred (in Lakhs)	Command Area (in hac.)	Potential Created (in hac.)	Beneficiaries (in nos.)
East Khasi Hills	Mawkynrew	Umtongphar	72.94	120	120	40
	Mawphlang	Wahlyngkut	72.48	320	320	37
	Shella Bholaganj	Sonai Umdan	451.40	1100	1100	174
	Mylliem	Umsaw Umjarasong	269.88	390	390	45
	Mawryngkneng	Litang	320.14	620	620	266
		Sub-total	1186.84	2550	2550	562
West Khasi Hills	Mawkyrwat	Umnamlang	265.49	425	425	364
	Nongstoin	Lower Umleih	573.82	630	630	261
	Mairang	Upper Kynshi	873.86	1210	1210	778
		Sub-total	1713.17	2265	2265	1403
Ri Bhoi	Umsning	Lower Umran	266.44	410	410	129
	Jirang	Mardon Mawtari	327.03	560	560	239
	Umsning	Lower Umshait	425.34	715	715	120
		Sub-total	1018.81	1685	1685	488
East Garo Hills	Songsak	Chame	169.44	230	230	75
	Songsak	Lower Rongap	181.00	300	300	89
	Samanda	Chiso Ganning	140.00	280	280	122
		Sub-total	490.44	810	810	286
West Garo Hills	Betasing	Hatisil	125.51	225	225	100
	Betasing	Amillenga	106.75	238	238	151
	Rongram	Upper Dirik	177.18	400	400	144
	Dadenggre	Upper Gime	401.21	500	500	282
	Dadenggre	Ringgi	272.08	450	450	110
	Selsella	Lower Galwang	296.12	500	500	711
	Gambegre	Rongdi Dalni	121.80	275	275	212
	Dalu	Middle Bandra	111.45	250	250	1504
		Sub-total	1612.10	2838	2383	3214

South Garo Hills	Rongara	Rongru	155.66	210	210	178
	Rongara	Rongsu	260.00	580	580	213
	Chokpot	Balwat	200.00	450	450	208
		Sub-total	615.66	1240	1240	599
Jaintia Hills	Thadlaskein	Sasein	90.87	160	160	106
	Thadlaskein	Upper Myntang	1054.69	1600	1600	530
	Thadlaskein	Litang	200.24	309	309	150
	Thadlaskein	Upper Myntdu	1013.84	1530	1530	212
	Laskein	Upper Umiurem	1347.97	1950	1950	680
	Laskein	Lower Mynsar	1059.30	1625	1625	500
	Saipung	Letein	1289.38	1840	1840	650
		Sub-total	6056.29	9014	9014	2828
TOTAL			**12693.31**	**20402**	**20402**	**9380**

3.2.1 Command area farmers benefited under Soil and water conservation department:

A total of 32 irrigation schemes are underway having a total command area of 20402 Ha. Sanctioned under AIBP at a total cost of Rs. 12693.31 lakhs. Out of total irrigation schemes, West Garo Hills has maximum number (8) of irrigation schemes with a high command area of 2838 Ha., however, Jaintia Hills with its 7 irrigation schemes has the maximum command area which is 9014 hac. West Khasi Hills, East Garo hills and Ri-bhoi has equal number of (3) irrigation schemes with a command area of 2265 Ha, 810 Ha. and 1685 Ha. respectively. Total number of beneficiaries covered by Soil & Water Conservation Department under AIBP program in these districts is 9380 out of which the highest number of beneficiaries is concentrated in West Garo Hills (3214) followed by Jaintia Hills (2828), West Khasi Hills (1403), South Garo hills (599), East Khasi Hills (562), Ri-Bhoi (488) and East Garo Hills (286). The detail of this is reflected in the table above.

Minor Irrigation Projects:

As of now 81 ongoing minor irrigation projects estimating Rs 10,523 lakhs with the covering total area of 8,318 hectares have been taken up under the Accelerated Irrigation Benefit Programme (AIBP) in Meghalaya.

3.2.2 Capital Expenditure, Working Expenses and Gross receipts of Minor Irrigation Projects in Meghalaya

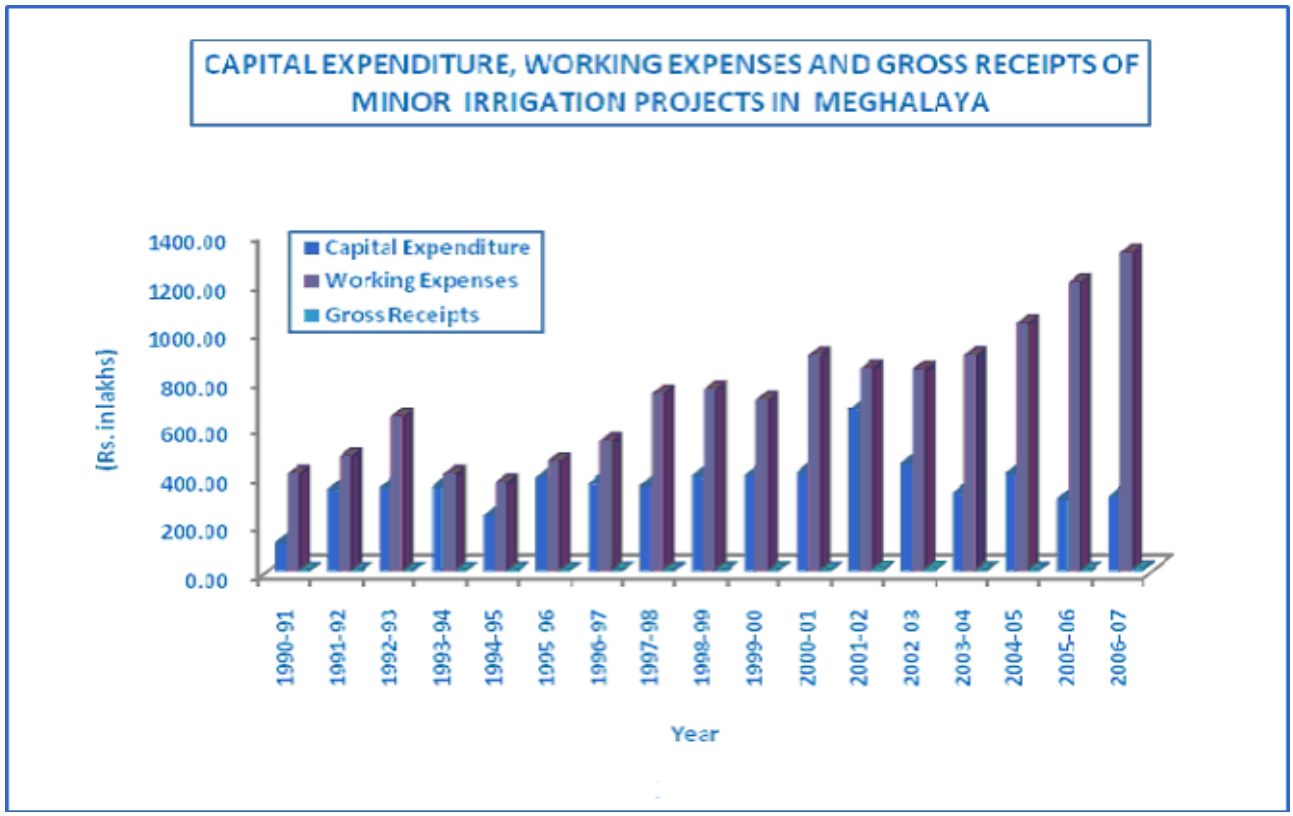


Figure 3: Capital Expenditure, Working Expenses and Gross receipts of Minor Irrigation Projects

The Capital Expenditure for carrying out Minor irrigation projects in the State has been more or less increasing in a consistent manner. During 1990-91 the capital expenditure was Rs.121 lakh which increased to around Rs. 312 lakh during 2006-07. Similarly, Annual Working Expenses for these projects were Rs. 403 lakhs during 1990-91 which increased to around Rs. 1322 lakh 2006-07. However a major portion of Working Expenses was utilized on Direction and Administration amounting more than 5 times of the level from 1990-91 to 2006-07. The Gross Receipt on account of water charges and other economical activities showed a percentage of 0.4% to 1.8% of the Capital Expenditure during 1990-91 to 2006-07.

The overall irrigation schemes in the state have been enormously impacted through the initiatives of both the departments. The AIBP scheme in Meghalaya has not only helped in creating irrigation potential and enhancing rural livelihood (Agriculture and Allied activities), it also had helped in employment generation in rural parts of the state. Majority of population is heavily dependent on farming for its livelihood. Moreover, both the departments made irrigation programmes accessible as well as improve the agricultural production to the extent that it all benefited the local farmers and therefore enhanced their livelihood and income facilities. However, there are various factors continue

to impede the implementation process. In the last decade and a half, unnecessary delays create hurdles in the completion of major, medium and minor irrigation projects under AIBP. Although capital investment has been maintained consistently during the span of AIBP projects, however, improvement in irrigation potential was not meted out proportionately. The major challenges in this include difficulties in creating capacity building, inconsistency in land holding tenure; lack of cooperation from water user associations (WUAs); bad topographies, generating human resources and other 'soft aspects' of the schemes etc.- all these together largely affected the implementation of the scheme in the state.

3.2.3 Potential outcome of check dams for ensuring rural sustainability

- The irrigation projects have helped in checking soil erosion and soil conservation in the State.
- It has helped in increasing the water holding capacity for certain period.
- It allowed for more percolation of the soil leading to increase in mineral concentration, adding to soil fertility and helps in increaseing crop production per unit of the region.
- It helped in controlling erosive velocity of flowing water which further helps in preventing damage of stream bank and cultivable paddy field.
- Due to the check dams constructed in the pocket areas of the State, small and marginal farmers are getting optimum benefits as it ensures regularity of irrigation water for the agricultural activities.
- It also helped in assuring irrigation of the command areas which are located at the upper tale of the projects.

3.3 Impact of the Scheme on agricultural production and productivity, crop wise, area-wise, and year wise 2009-10 to 2012-13

Meghalaya has an abundance of agricultural and horticultural crops. Food grains, oil seeds and fibre crops constitute the major elements of agricultural crops. Food grains constitute the main food item of the entire population. The overall food grain production covers an area of 47.8% of the total crop area in the state during the period 1990-91 to 2000-01. Major food grains contains Cereals— Rice; Wheat; Maize, Gram, Other Cereals and Small Millets; Pulses—Gram, Tur and Other Pulses. Besides, important oilseed crops are also grown in the State. The most important oilseed crops grown in the State are Rape and Mustard, Soyabean, Sesamum, Castor, Groundnut, Linseed etc.

Besides, in Meghalaya a variety of sub-tropical and temperate fruits namely, citrus, spices, pineapple, banana, papaya, guava, jack fruit etc. are grown in large scale. With respect to vegetable sector, it contains a large number of vegetables and the vegetable sector is showing upward trend in the recent years with respect to its area coverage, production and productivity. To this end, the agro-climatic conditions in Meghalaya has been extensively favourable for the cultivation of vegetables. The quality production throughout the year resulting into fetching standard and better prices from the neighbouring states during off-season. Overall, the revenue returns has been relatively higher in vegetable elements than that of cereals. Even the spices in Meghalaya have a natural advantage in its production due to a favourable climatic condition. Prominent spices in the state are turmeric, ginger, chilli, black pepper etc. The research identified that almost all the spices mentioned above with exception to chilli showed a remarkable increased in area, production and productivity over the decades. Following Table reflects the overall trend noticed in the last five years in the area of production and productivity Crop-Wise, Area-wise and Year Wise.

(i) Agriculture Crops Production for the Year 2008-09 to 2012-13 (Food Grains)

Crop/ District	Year	Area (Hectare)	Production (Tonnes)	Yield (Tonnes/Hectare)
Rice: Total (Atumn + Ravi + Winter)				
1.EAST GARO HILLS	2008-09	17542	26342	1.50
	2009-10	17558	26121	1.49
	2010-11	17570	26168	1.49
	2011-12	17588	26156	1.49
	2012-13	17733	34884	1.97
2.EAST JAINTIA HILLS	2008-09	12336	20093	1.63
	2009-10	12345	20148	1.63
	2010-11	12374	21097	1.70
	2011-12	12383	21117	1.71
	2012-13	12390	22793	1.84

3.EAST KHASI HILLS	2008-09	5807	10676	1.84
	2009-10	5801	10693	1.84
	2010-11	5794	10739	1.85
	2011-12	5813	10719	1.84
	2012-13	5825	11721	2.01
4.RI BHOI	2008-09	9606	25685	2.67
	2009-10	9605	25711	2.68
	2010-11	9602	25750	2.68
	2011-12	9529	25538	2.68
	2012-13	9549	27608	2.89
5.SOUTH GARO HILLS	2008-09	8437	10719	1.27
	2009-10	8433	10775	1.28
	2010-11	8438	11477	1.36
	2011-12	8432	12419	1.47
	2012-13	8499	16172	1.90
6.WEST GARO HILLS	2008-09	46526	99321	2.13
	2009-10	46614	99620	2.14
	2010-11	46692	100302	2.15
	2011-12	47305	115294	2.44
	2012-13	47931	140057	2.92
7.WEST KHASI HILLS	2008-09	7791	11026	1.42
	2009-10	7806	11061	1.42
	2010-11	7815	11488	1.47
	2011-12	7825	11488	1.47
	2012-13	7824	12418	1.59

Rice is major food crop of Meghalaya. During 1990-91 to 2000-2001, the State produced an annual average of 135000.50 MT with an average yield of 1290.6 Kg /Ha out of the total crop area of 276932 Ha. Over the last five years, crop wise area, production and productivity had increased to a large extent. During the period of 2008-09, crop wise area coverage, production and productivity was 108045 Hectare, 203862 MT, and 12.46 Ton/Hec respectively which increased to about 109751 Hectare, 265653 MT and 15.12 T/Hec respectively during 2012-2013 period. An increase of 1706 Hectare area coverage with production of 61791 MT has been noticed. The growth rate of rice productivity also showed an increased of 2.66 T/Hec. From the period of 2008-09 to 2012-13, the computed area coverage for rice has been 542518 Ha for an average production of 1103396 MT with an average of 65.86 T/Hec. Therefore, it is visible that over the years rice coverage area, production and productivity has been increased to a large extent with an average growth rate of 65.86 T/Ha. This remarkable increase in area production and productivity is due to the fact that considerable area under rice both in upland and lowland is rain fed. The upland rice is almost synonymous with rain fed rice and is grown on hill slopes under shifting cultivation. It is also grown under rain fed permanent area on terraced hills and flat lands usually bunded and by direct seeded method. Almost all the districts in the State contributes to the highest production of rice in the State. Particularly West Garo

Hills produced the highest amount of rice in the State which is about 554594 MT rice with an average productivity of 65.86 MT/Ha.

Crop/ District	Year	Area (Hectare)	Production (Tonnes)	Yield (Tonnes/Hectare)
Maize (Kharif)/ Whole Year				
1.EAST GARO HILLS	2008-09	1048	1300	1.24
	2009-10	1034	1296	1.25
	2010-11	1040	1290	1.24
	2011-12	1059	1318	1.24
	2012-13	1084	1987	1.83
2.EAST JAINTIA HILLS	2008-09	3026	3575	1.18
	2009-10	3028	3590	1.19
	2010-11	3068	3661	1.19
	2011-12	3071	3664	1.19
	2012-13	3199	5743	1.80
3.EAST KHASI HILLS	2008-09	1995	4661	2.34
	2009-10	2003	4729	2.36
	2010-11	2005	4720	2.35
	2011-12	2008	4730	2.36
	2012-13	2091	6578	3.15
4.RI BHOI	2008-09	1517	3427	2.26
	2009-10	1520	3654	2.40
	2010-11	1518	3420	2.25
	2011-12	1520	3430	2.26
	2012-13	1583	4766	3.01
5.SOUTH GARO HILLS	2008-09	946	1018	1.08
	2009-10	951	1036	1.09
	2010-11	955	1017	1.06
	2011-12	956	1019	1.07
	2012-13	999	1648	1.65
6.WEST GARO HILLS	2008-09	4428	7055	1.59
	2009-10	4446	7022	1.58
	2010-11	4435	6971	1.57
	2011-12	4429	6892	1.56
	2012-13	4623	10323	2.23
7.WEST KHASI HILLS	2008-09	4157	4680	1.13
	2009-10	4227	4840	1.15
	2010-11	4255	5421	1.27
	2011-12	4260	5886	1.38
	2012-13	4436	7687	1.73

Maize is another important agricultural crops of the State. During 1990-91 to 2000-2001, the State produced an annual average of 23150 Metric tons with an average yield of 1341.55 Kg/Ha out of the total crop area of 132420Ha. Over the last five years, crop wise area, production and productivity had

increased to a large extent. During the period of 2008-09, crop wise area coverage, production and productivity was 171175 Hectare, 25716 MT, and 10.82 Ton/Hec respectively which increased to about 18015 Hectare, 38,732 MT and 15.4 T/Hec respectively during 2012-2013 period. An increase of 898 Hectare area coverage with production of 13016 MT has been noticed. The growth rate of rice productivity also showed an increase of 4.58 T/Hec. From the period of 2008-09 to 2012-13, the computed area coverage for rice has been 86940 Ha for an average production of 144054 MT with an average of 59.23 T/Hec. It can be seen that there has been substantial increase in production area and productivity in the state. West Garo Hills contribute the most in Maize production with annual average of 38263 Metric tons occupying an areas of around 22361 Ha.

(ii) Horticulture Crops Production for the Year 2008-09 to 2012-13

Crop/ District	Year	Area (Hectare)	Production (Tonnes)	Yield (Tonnes/Hectare)
Arecanut				
1.EAST GARO HILLS	2008-09	1107	1258	1.14
	2009-10	1140	1295	1.14
	2010-11	1250	1412	1.13
	2011-12	2061	2362	1.15
	2012-13	2142	2539	1.19
2.EAST JAINTIA HILLS	2008-09	1668	2924	1.75
	2009-10	1703	2924	1.72
	2010-11	1706	2462	1.44
	2011-12	1708	2492	1.46
	2012-13	1775	2667	1.50
3.EAST KHASI HILLS	2008-09	4514	4760	1.05
	2009-10	4515	4762	1.05
	2010-11	4516	4729	1.05
	2011-12	4521	4824	1.07
	2012-13	4699	5172	1.10
4.RI BHOI	2008-09	145	90	0.62
	2009-10	149	93	0.62
	2010-11	142	87	0.61
	2011-12	151	93	0.62
	2012-13	164	102	0.62
5.SOUTH GARO HILLS	2008-09	300	410	1.37
	2009-10	320	439	1.37
	2010-11	326	446	1.37
	2011-12	332	475	1.43
	2012-13	344	507	1.47
6.WEST GARO HILLS	2008-09	3685	6847	1.86
	2009-10	4573	8747	1.91

	2010-11	5447	10200	1.87
	2011-12	5448	10308	1.89
	2012-13	5662	11052	1.95
7.WEST KHASI HILLS	2008-09	1213	1111	0.92
	2009-10	1221	1136	0.93
	2010-11	1224	1165	0.95
	2011-12	1227	1197	0.98
	2012-13	1276	1292	1.01

Crop/ District	Year	Area (Hectare)	Production (Tonnes)	Yield (Tonnes/Hectare)
Black pepper				
1.EAST GARO HILLS	2008-09	56	14	0.25
	2009-10	58	16	0.28
	2010-11	62	23	0.37
	2011-12	65	25	0.38
	2012-13	68	33	0.49
2.EAST JAINTIA HILLS	2008-09	34	17	0.50
	2009-10	35	16	0.46
	2010-11	34	16	0.47
	2011-12	35	18	0.51
	2012-13	37	25	0.68
3.EAST KHASI HILLS	2008-09	168	104	0.62
	2009-10	167	105	0.63
	2010-11	165	103	0.62
	2011-12	172	112	0.65
	2012-13	179	151	0.84
4.RI BHOI	2008-09	145	85	0.59
	2009-10	146	87	0.60
	2010-11	144	85	0.59
	2011-12	147	87	0.59
	2012-13	153	118	0.77
5.SOUTH GARO HILLS	2008-09	43	22	0.51
	2009-10	44	21	0.48
	2010-11	45	22	0.49
	2011-12	46	23	0.50
	2012-13	48	31	0.65
6.WEST GARO HILLS	2008-09	336	151	0.45
	2009-10	336	148	0.44
	2010-11	337	150	0.45
	2011-12	341	159	0.47
	2012-13	355	214	0.60
7.WEST KHASI HILLS	2008-09	102	69	0.68
	2009-10	104	68	0.65
	2010-11	102	66	0.65
	2011-12	105	69	0.66
	2012-13	110	93	0.85

Crop/ District	Year	Area (Hectare)	Production (Tonnes)	Yield (Tonnes/Hectare)
Dry chillies				
1.EAST GARO HILLS	**2008-09**	340	204	0.60
	2010-11	348	205	0.59
	2011-12	379	224	0.59
	2012-13	407	252	0.62
2.EAST JAINTIA HILLS	**2008-09**	86	69	0.80
	2010-11	49	39	0.80
	2011-12	50	40	0.80
	2012-13	54	46	0.85
3.EAST KHASI HILLS	**2008-09**	122	216	1.77
	2010-11	111	232	2.09
	2011-12	116	244	2.10
	2012-13	124	275	2.22
4.RI BHOI	**2008-09**	93	145	1.56
	2010-11	90	138	1.53
	2011-12	93	144	1.55
	2012-13	100	163	1.63
5.SOUTH GARO HILLS	**2008-09**	268	164	0.61
	2010-11	261	160	0.61
	2011-12	263	163	0.62
	2012-13	282	183	0.65
6.WEST GARO HILLS	**2008-09**	918	586	0.64
	2010-11	942	596	0.63
	2011-12	943	611	0.65
	2012-13	1013	687	0.68
7.WEST KHASI HILLS	**2008-09**	48	39	0.81
	2010-11	47	45	0.96
	2011-12	49	48	0.98
	2012-13	53	53	1.00

Crop/ District	Year	Area (Hectare)	Production (Tonnes)	Yield (Tonnes/Hectare)
Gram				
1.EAST GARO HILLS	**2008-09**	226	131	0.58
	2009-10	230	134	0.58

	2010-11	220	128	0.58
	2011-12	223	131	0.59
	2012-13	715	670	0.94
2.SOUTH GARO HILLS	**2008-09**	18	11	0.61
	2009-10	19	10	0.53
	2010-11	20	10	0.50
	2011-12	23	12	0.52
	2012-13	68	67	0.99
3.WEST GARO HILLS	**2008-09**	286	188	0.66
	2009-10	312	207	0.66
	2010-11	314	206	0.66
	2011-12	315	209	0.66
	2012-13	1017	1018	1.00

Crop/ District	Year	Area (Hectare)	Production (Tonnes)	Yield (Tonnes/Hectare)
Potato				
1.EAST GARO HILLS	**2008-09**	138	1070	7.75
	2009-10	131	1015	7.75
	2010-11	130	1008	7.75
	2011-12	132	1025	7.77
	2012-13	135	1069	7.92
2.EAST JAINTIA HILLS	**2008-09**	209	1002	4.79
	2009-10	200	912	4.56
	2010-11	187	898	4.80
	2011-12	203	985	4.85
	2012-13	207	1029	4.97
3.EAST KHASI HILLS	**2008-09**	11270	109234	9.69
	2009-10	11290	110575	9.79
	2010-11	11271	110659	9.82
	2011-12	11273	110971	9.84
	2012-13	11543	115851	10.04
4.RI BHOI	**2008-09**	25	154	6.16
	2009-10	28	162	5.79
	2010-11	26	149	5.73
	2011-12	28	168	6.00
	2012-13	29	175	6.03

5.SOUTH GARO HILLS	**2008-09**	56	419	7.48
	2009-10	58	434	7.48
	2010-11	60	426	7.10
	2011-12	63	449	7.13
	2012-13	64	464	7.25
6.WEST GARO HILLS	**2008-09**	532	4145	7.79
	2009-10	535	4055	7.58
	2010-11	538	4182	7.77
	2011-12	543	4248	7.82
	2012-13	555	4430	7.98
7.WEST KHASI HILLS	**2008-09**	5460	45114	8.26
	2009-10	5470	45292	8.28
	2010-11	5473	47325	8.65
	2011-12	5475	47824	8.73
	2012-13	5606	49937	8.91

Vegetables sector is also performing better in the State. There are large array of vegetables both sub-tropical and temperate are abundant in Meghalaya. Some of the important sub-tropical vegetables are cucumber, pumpkins, bitter gourd, beans, brinjal etc. Some of the Temperate vegetables include cabbage, cauliflower, tomato, peas, radish, carrot, beet, etc. There has been an upward trend visible with respect to the area, production and productivity in the vegetable sector. The computed annual growth rate of vegetables for the period 1990-91 to 2000-01 showed a significant positive trend in area and production. The above Table indicates that vegetables like dry chillies, gram, and potato together has shown an increasing trend over the last five years (2008-09 to 2012-13) with an area coverage, production and productivity of 130456 Hectare, 997253 MT and 665.36 T/Hectare respectively. Based on the table, during the period of 2008-09, vegetable sector had an area coverage, production and productivity of 26241 Hectare, 194710 MT, and 139.7 T/Hec respectively which increased to about 29163 Hectare, 218,949 MT and 151.48 T/Hec respectively during 2012-2013 period. An increase of 2922 Hectare area coverage with production of 24239 MT has been noticed.

The state government is therefore taking various steps to accelerate the growth of the vegetable sector by encouraging the farmers to grow vegetables in poly houses and provide them subsidies for such houses. Vegetable production under poly houses is expected to double the productivity. Moreover, various efforts are also being made to extend vegetable cultivation in and around the administrative headquarters to meet the increasing demand for vegetables at these centres.

The agro-climatic conditions in Meghalaya also has been favourable for the cultivation of vegetables throughout the year. This advantage is reflected in good prices fetched by vegetables during the off-season in neighbouring States. On the whole, the revenue returns from vegetables tend to be higher than that from cereals. Moreover, they are grown in homesteads or on gentle slopes near the homesteads, facilitating the farmers to pay full attention to their care and maintenance regime.

With respect to growing variety of spices, Meghalaya has natural advantages. Some of the prominent spices are turmeric, ginger, chilli, black-pepper etc. which are cultivated across the districts. Jaintia Hills (Nongbah-Shangpung)has the highest concentration of turmeric production. The variety of ginger mainly grows in East Garo Hills, West Garo Hills and Ri-Bhoi Districts. Chilli is also a popular spices grown all over the State. While black pepper is grown mainly in the Khasi hills districts of the State, large Cardamom has recently been introduced and is slowly becoming popular with the farmers. The table above indicates that spices and other dry fruits like Arecanut, Black pepper, Cashewnut etc. showed a positive trend in the area, production and productivity for the last five years (2008-09 to 2012-13) from 2008-09 to 2012-2013 which is 26394 Hectare, 45898 MT and 440.18 T/Hectare respectively. From 2008-09 to 2012-2013, the overall production of spices increased to a greater extent. Based on the table, during the period of 2008-09, the spices had an area coverage, production and productivity of 20038 Hectare, 92176 MT, and 84.93 T/Hec respectively which increased to about 33051 Hectare, 125373 MT and 92. 2 T/Hec respectively during 2012-2013 period. An increase of 13013 Hectare area coverage with production of 33197 MT has been noticed.

It can be said that the AIBP scheme has helped a lot in increasing the food production in the state with respect to its area coverage and crop productivity. The farmers also have been opted for any crops whose production that is viable for climatic condition and livelihood sustenance. The abandoned lands are being used for cultivation through the irrigation process which eventually led to improvement in yield production.

3.4 Acceptability of AIBP Scheme

Table 3.29 - Education and Age Profile of sampled beneficiaries in different districts

Sl. No	Districts	Average (Land Holding) (Acres)	Education (%)		Age (%)		
			Literates	Illiterates	Young (up to 30 yrs.)	Middle (31 – 50 yrs.)	Old (51 yrs and above)
1	East Khasi Hills	1.19	5.0	95.0	15.0	75.0	10.0
2	Jaintia Hills	1.47	12.5	87.5	20.0	60.0	20.0
3	Ri Bhoi	0.96	19.0	15.0	15.0	65.0	20.0
4	West Khasi Hills	0.90	10.5	89.5	30.0	65.0	5.0
5	West Garo Hills	2.03	15.8	84.2	21.5	75.0	3.5
6	East Garo Hills	1.59	20.0	80.0	18.0	75.5	6.5
7	South Garo Hills	1.65	15.0	85.0	23.2	70.8	6.0

The beneficiaries of the scheme represent a very diverse profile. Education wise beneficiaries are not much educated. Majority of the respondents are illiterate across the districts and East Khasi Hills is concentrated with highest percentage of illiterates in the state (95%) followed by West Khasi Hills (89.5%), Jaintia Hills (87.5%), South Garo Hills (85%), West Garo Hills (84.2%), and East Garo Hills (80.0%). Majority of the beneficiaries fall in the middle age group and are involved in farming and agricultural activities.

3.5 Social Profile of the Beneficiaries:

The table 3.30 indicates that the beneficiaries mostly constitute the farmers from socially marginalised and vulnerable groups such as SCs STs and others. However, the marginalised groups SCs and STs have benefited most from the project activities across the project zones. This can be attributed to the reason of larger concentration of these groups in remote rural area of the state.

Table 3.30 : Social Profile of the Beneficiaries (%)

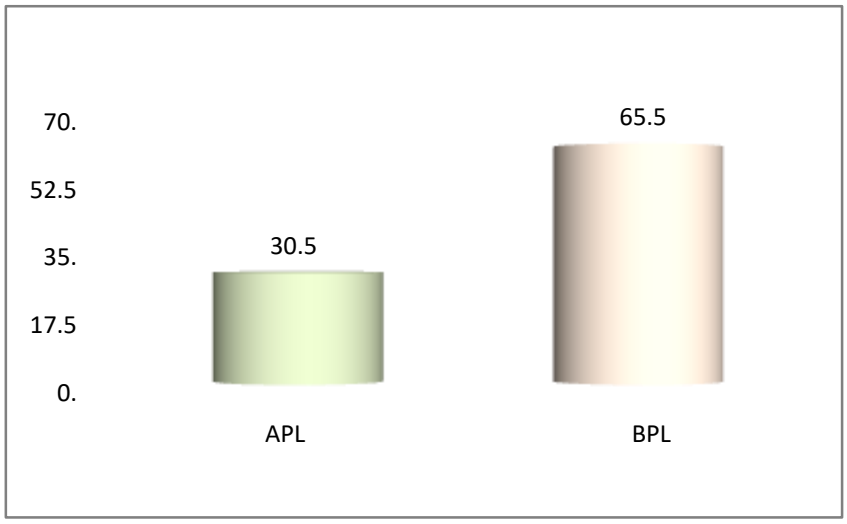
Sl.no.	District Name	SC Households	ST Households	General	Other
1	West Garo Hills	1.75%	88.73%	8.19%	2.34%
2	East Garo Hills	0.31%	99.45%	0.18%	0.06%
3	South Garo Hills	0.48%	97.50%	1.06%	0.96%
4	West Khasi Hills	0.10%	99.27%	0.60%	0.04%
5	Ri-Bhoi	1.23%	92.22%	5.62%	0.92%
6	East Khasi Hills	1.47%	90.26%	5.86%	2.40%
7	Jaintia Hills	0.48%	98.08%	0.69%	0.75%
Total		**1.04%**	**96.36%**	**2.49%**	**1.11%**

According to the above table out of the total sampled beneficiaries, 96.36% of beneficiaries belonged to ST (Scheduled Tribes). Only 1.04% of beneficiaries belonged to SC (Scheduled Caste). The beneficiaries who belonged to General amd other categories were 3.60%.

3.6 Economic Status of Sample Respondents

Beneficiaries in the project area are very poor and do not have much access to the resources. The research finds that 65.5% of the beneficiaries in the project belong to BPL (Below Poverty Line), while 30.5% belonged to APL (Above Poverty Line) category.

Figure 3.4: Status of Beneficiaries



3.7 Land Holding Patterns:

Land holding in Meghalaya means operational holding as there is a lack of land ownership system in traditional sense. The land system in the tribal areas of Meghalaya is usually characterized by customary land system, and there has not been any proper survey conducted in the region except in small section in the plains of West Garo Hills district in order to collect records of rights on land. The operational landholding in Meghalaya is predominantly carried out by small and marginal farmers who operate majority of the cropped area along with medium and other small landowners. Common people are not able to access resources much and also lack in control over the land. Based on limited information available in historical writings and government reports, the basic nature and operation of agrarian social structure has been identified. There are two types of land found in the Khasi–Jaintia Hills namely, Ri–Raid land and Ri–Kynti land. While the former is associated with community owned land, the latter refers to the privately–owned land. Besides there are many sub–classes of land under these two broader categories known either by the same name or different names in different areas of

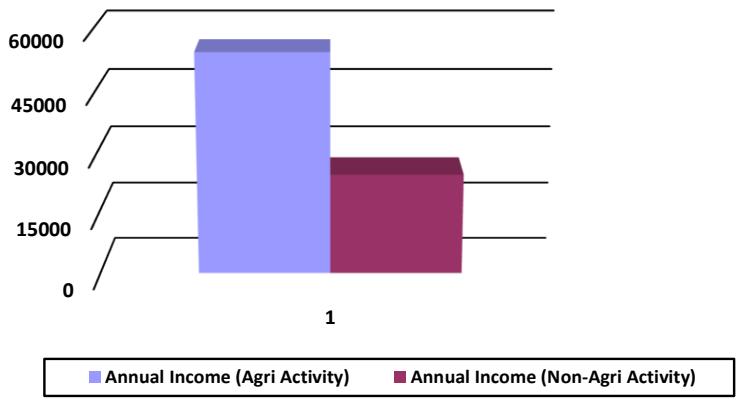
the state. The table below indicates the area and number of operational holdings by different size groups viz. marginal, small, semi-medium and large holdings.

Table 3.31: Average Size of Land Holdings in Different Districts in Meghalaya

Sr. No	District	Individual Holdings	Joint Holdings	Sub Total (Ind.+Joint)	Institutional Holdings	Total Holdings
1	Jaintia Hills	1.47	0.00	1.47	0.00	1.47
2	East Khasi Hills	1.17	0.00	1.17	101.40	1.19
3	West Khasi Hills	0.90	0.00	0.90	0.00	0.90
4	East Garo Hills	1.59	0.00	1.59	1.74	1.59
5	West Garo Hills	2.04	0.00	2.04	0.22	2.03
6	South Garo Hills	1.65	0.00	1.65	0.00	1.65
7	Ri Bhoi	0.96	0.00	0.96	0.00	0.96
	State	1.37	0.00	1.37	1.53	1.37

Analysis of land holding pattern indicates that most average land holding (Individual and Joint) in the State is around 1.37 hac, whereas the institutional land holding in the State is around 1.53 hac. District wise, West Garo Hills constitutes the highest land holdings (2.04) in the State, followed by South Garo Hills (1.65); East Garo Hills (1.59); Jaintia Hills (1.47); East Khasi Hills (1.17); Ri Bhoi (0.96) and West Khasi Hills (0.90). Institutional landholdings in most of the districts are negligible as shown in the above table. The research finds that majority of the beneficiaries are small and marginal farmers. This can be also attributed to the fact that in the undertaken project area most of the farmers belong to the marginalised groups. And most of the beneficiaries involved in the farming are from middle age group, while rests of them are from young age group.

3.8 Average annual income from agriculture and non-agriculture activity



The figure above indicates that the average annual income generated from agriculture related activities amounts to Rs. 55,000/- (approx.), while the annual income from non-agricultural activity amounts to Rs. 25,000/- (approx.). The difference between annual income generated through agri activity and non-agri activity is around 48%.

Table 3.32: Monthly Income of highest earning household member

Sl.no.	District Name	Monthly Income of highest earning household member Total HH < 5000	Monthly Income of highest earning household member Total HH 5000 - 10000	Monthly Income of highest earning household member Total HH > 10000
1	West Garo Hills	83.10%	10.67%	6.23%
2	East Garo Hills	85.60%	9.57%	4.83%
3	South Garo Hills	76.72%	18.51%	4.77%
4	West Khasi Hills	77.48%	16.27%	6.25%
5	Ribhoi	75.59%	17.43%	6.98%
6	East Khasi Hills	68.07%	15.64%	16.28%
7	Jaintia Hills	62.00%	28.94%	9.07%
	Total	74.84%	16.02%	9.14%

3.9 Quality of Assets Created under AIBP

With respect to the quality of assets created under AIBP has been presented in the following table. According to the research, majority of the beneficiaries stated that not much assets have been created under AIBP in the State. The responses of the beneficiaries are uniform across their location around the irrigation projects. For the Water Resource Department, according to 75% beneficiaries, proper maintenance of water outlets is very poor in the State, whereas 25% beneficiaries however, spelled out that AIBP has led to proper maintenance of water outlets. About 85% beneficiaries hold that there is still no proper maintenance of distribution channels in village has been made, and 45% further spelled out about lack of quality in check dams and other constructions in the region. Only 15% farmers gave response in favour of proper maintenance of distribution channels in village and 55% were having positive opinions about quality of check dams and other constructions in the region.

For the Soil and Water Conservation Department, according to 64% beneficiaries, proper maintenance of water outlets is very poor in the State, whereas 36% beneficiaries however, spelled out that AIBP has led to proper maintenance of water outlets. About 70% beneficiaries hold that there is still no proper maintenance of distribution channels in village has been made, and 40% further spelled out about lack of quality in check dams and other constructions in the region. Only 30% farmers gave

response in favour of proper maintenance of distribution channels in village and 60% were having positive opinions about quality of check dams and other constructions in the region.

Table 3.34 - Quality of Assets created (in %)

Sl. no.	Description	Water Resource Deptt.		Soil & Water Conservation Deptt.	
		Yes	No	Yes	No
1	Proper Maintenance of water outlets	25.0	75.0	36.0	64.0
2	Proper maintenance of distribution channels in village	15.0	85.0	30.0	70.0
3	Quality of check dams and other constructions	55.0	45.0	60.0	40.0

3.10 Overall Impact Assessment of AIBP

Irrigation plays a dual role in augmenting agricultural production, first, by bringing more land under cultivation, and second, by increasing the productivity of existing land through continuous water supply. Taking note of the importance of irrigation and the need to have state intervention in providing irrigation infrastructure, many minor irrigation projects have been implemented in Meghalaya with the intention of enhancing the area under cultivation, besides increasing the productivity of existing lands. Irrigation is more and more important from the point of view of the development of the whole world's agricultural economy. The impact of irrigation is all pervading as it leads to change in cropping pattern, increased yield rates and labour utilization and ultimately it brings prosperity to the areas, hence irrigation is regarded as a catalyst for socioeconomic change that sets in nation the productive forces in the agricultural sector.

The overall impact of AIBP scheme in the state in particular agriculture as well as socio-economic development of the farmers has been captured through some of the indicators mentioned in the following table. The Table indicates that majority of the farmers do not see any significant increase in literacy rate and increase in forestation. Overall most of the farmers were agree that there has been an increase in their income, employment opportunities; irrigated area and overall agricultural production due to project activities. Project had any positive impact on prices of agricultural land and it could reduce migration to the cities. The irrigation has many benefits such as changing in cropping patterns, absorption of modern inputs i.e. High Yield Variety seeds, chemical fertilizers, pesticides, etc. it raises gross income and promotes consumption and investment expenditure of farmers. Indirectly the irrigation increases social status, such as education level, knowledge, changes in the attitude of the farmers etc. it also, helps to give push to the growth of tertiary sector. The irrigation is important for

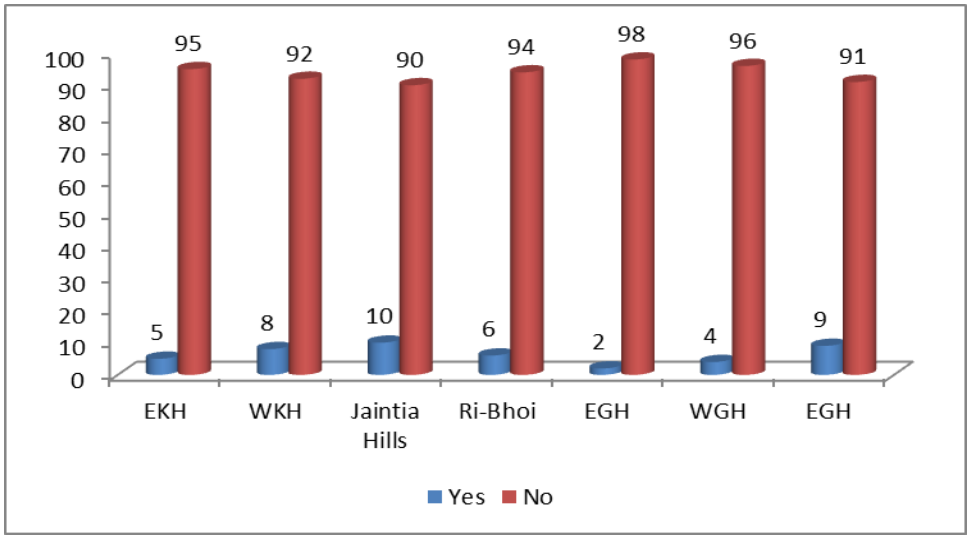
the development in agriculture. The importance of irrigation in agrarian economy is interpreted comprehensively as follows:

- Remove uncertainly of agriculture production.
- Increase in agricultural production.
- Helps for agricultural price stability.
- Increase in marketable surplus.
- Increase in many return on high value cash crops.
- Provides employment opportunities.
- Enable adoption of modern agricultural technology.
- Reduce rural poverty.
- Promotes rural development and Input utilization.

Table 3.35 – Perception about overall impact of AIBP scheme

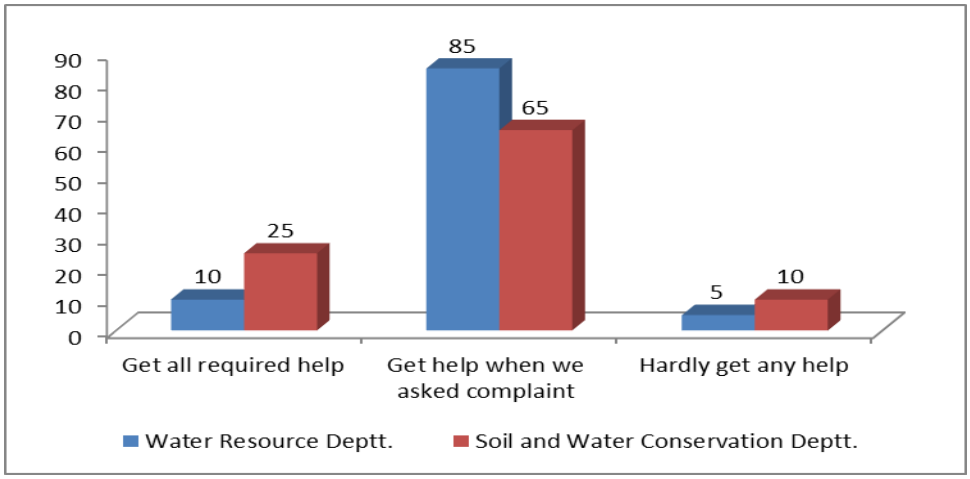
Sl.no.	Description	Yes	No
1	Increase in Literacy rate	20.0	80.0
2	Increase in forestation/number of trees	15.0	85.0
3	Increase in employment opportunities	48.0	52.0
4	Decrease in migration to other cities	40.0	60.0
5	Increase in irrigated area	75.0	25.0
6	Increase in production	47.0	53.0
7	Increase in annual income	65.0	35.0
8	Increase in quality of agriculture production	67.0	33.0

3.12 Formation of Water Users Association (WUA) (in %)



The findings show that that there is not much emphasis on the formation of Water Users Association (WUA) in almost all the districts of the state, inspite of the presence of the same in all the districts. as the participation level is very low in the region. Moreover, most of the beneficiaries are not fully aware of the purpose of formation of WUA. As such there is a need for participatory approach on irrigation management In the state, which can be done through WUA. The formation of a reliable WUA can help in maintenance and renovation of completed Minor Irrigation (MI) schemes in the state. The formation of WUA can also help in bringing more responsibility amongst the farmers, and can help in resolving conflicts related to water distribution, improvement of service through better operation and maintenance etc.

3.13 Opinion towards both departments functioning (in %)



Having asked about beneficiaries' opinion about the functional aspects of the Water Resource Departments, 10% beneficiaries reported that the departments are effective in providing support to the communities and inhabitants in the region and they receive much support from the departments, however, around 85% beneficiaries spelled out that they get help from the departments only when they seek help or when they complain, while 5% stated that they hardly get any help from the departments. On another hand opinion about the functional aspects of the Soil % Water Conservation Departments, 25% beneficiaries reported that the departments are effective in providing support to the communities and inhabitants in the region and they receive much support from the departments, however, around 65% beneficiaries spelled out that they get help from the departments only when they seek help or when they complain, while 10% stated that they hardly get any help from the departments.

3.14 SWOT analysis of Irrigation system based on the basis of Focus Group Discussion amongst the beneficiaries and other personnel involved in the implementation process

Sl. No.	Details	Head-reach (n=20)		Mid-Reach (n=20)		Tail Reach (n=20)		Total (n=60)	
	Strengths	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**
1.	Increased area of cultivation	10	50	7	35	17	85	**34**	**57**
2.	Uniform water distribution	20	100	18	90	17	85	**55**	**92**
3.	Change of cropping pattern	10	50	12	60	14	70	**36**	**60**
4.	Increase in crops production	6	30	10	50	8	40	**24**	**40**
II	**Weaknes**								
1.	Difficulty in Repair and Maintenance	20	50	3	15	5	25	**28**	**46**
2.	More labour requirement	18	90	15	75	12	60	**45**	**75**
3.	Difficulties in transportation	10	50	5	25	3	15	**18**	**30**
4.	Non-suitability to all areas / crops /soil types	15	75	17	85	20	100	**52**	**87**
5.	Lack of technical know - how	10	50	8	40	2	10	**20**	**33**
6.	Fragmentation of land	7	35	10	50	13	65	**30**	**50**
7.	Initial investment	15	75	20	100	20	100	**55**	**92**
III.	**Opportunities**								
1.	Drip irrigation system	7	35	12	60	9	45	**28**	**47**
2.	Availability of subsidy	10	50	14	70	16	80	**40**	**67**
3.	Free water usage	17	85	20	100	13	65	**50**	**83**
4.	HYV crops	10	50	6	30	4	20	**20**	**33**
5.	One time investment	12	60	11	55	7	35	**30**	**50**
IV.	**Threats**								
1.	Non- availability of water throughout the season	7	35	4	20	5	25	**16**	**27**
2.	No provision for maintenance and repairing	5	25	8	40	6	35	**19**	**32**
3.	Land holding system	6	30	10	50	4	20	**20**	**33**
4.	Pest and disease problem	5	25	3	35	2	10	**10**	**17**
5.	High investment	10	50	20	100	20	100	**50**	**83**

Based on various perspectives generated through a Focus Group Discussion amongst the beneficiaries as well as other officials who were involved in the implementation process, a SWOT analysis is presented in the following. All the responses of the people involved in FGD are quantified into percentages and is shown in the following table. The responses varied with respect to the locational position of the beneficiaries around the project area.

Strengths:

The research finds that there are many areas which are being strengthened by AIBP project in the State namely the cultivation area, uniformity in water distribution, change of cropping pattern, and increase in crops production in the State. The table indicates that irrigation channels are useful in economized use of water followed by uniform water distribution, change of cropping pattern, increased area of cultivation and yield production. While 40% of the respondents indicated yield increase in crops due to this project, 57% hold that it has increased the area of cultivation in the state. Around 60% stated that there has been a change in cropping pattern due to the irrigation system. The majority of respondents however held the view that it has helped in uniform distribution of water in their areas to the most.

Weakness:

The table represents some of the imminent weakness associated with the project. The Table indicates that the initial investment is one of the most difficult aspect of the project followed by non-suitability of all areas/ crops/ soil types that hinder the process of productivity. Regarding the outreach of the project, majority of respondents located in the head zone of the project viewed high labour requirement as the prime weakness followed by non-suitability to all areas / crops / soil types (75%), initial investment (75%), difficulties in repair and maintenance (50%), and fragmentation of land (35%) respectively. Respondents in mid-reach, hold that that initial investment (100%) is a major issue followed by non suitability to all areas/crops/soil types (85%), and high labour requirement (75%), followed by fragmentation of land (50%), lack of technical know-how (40%), and difficulty in repair and maintenance (15%) are some of the major identified weaknesses.

Opportunities:

The Table further reveals that the project leads to bring number of opportunities in the area of improving irrigation system, availability of subsidy, free water usage, increasing HYV crops as well as one time investment in the region. Around 83% respondents held that AIBP project has been mostly beneficial in the region with respect to bringing free water usage for the beneficiaries and also made subsidy available for the beneficiaries in the region (67%). 50% respondents hold that the degree of one time investment also has gone up in the region and drip irrigation system (47%) also has been on the rise.

Threats:

However, there are some natural hurdles that impede the process of development in the region. There is a scarcity of water throughout the season which makes the irrigation system sometimes

inactive. Moreover, prevalence of pest and disease problem and lack of maintenance and repairing of the irrigation projects along with low percentage of land holding system put a threat on the overall growth of the AIBP project in the region. Majority of respondents also held that lack of high investment is also causing much problem to the progress of the ongoing projects.

The overall analysis of SWOT technique used among the change agency system and their perception on micro - irrigation system reveals the following result.

The analysis of SWOT technique shows manifold outcome. The use of optimum water with uniform distribution of water had emerged as major strength associated with micro-irrigation system. The uniformity in water distribution, change of cropping pattern, and increase in crops production have acted as an important strength of the AIBP project in the perception of respondents.

With respect to the imminent challenge, scarcity of water throughout the season which makes the irrigation system sometimes inactive. Moreover, prevalence of pest and disease problem and lack of maintenance and repairing of the irrigation projects along with low percentage of land holding system put a threat on the overall growth of the AIBP project in the region.

Chapter 4: SOCIAL IMPACT AND SUCCESS STORY

Name of Division: Nongtoin S &WC Division

Name of the Project: Lower Umlieh (AIBP)

Name of Work: Water Harvesting Structure

Location: Mawlangkhar Village

Date of Report: 28th July 2013

Introduction: The Lower Umlieh AIBP Project was started in the year 2009 – 10, it is situated at Nogstoin and Mawthadraishan C&RD Block under West Khasi Hills District, Meghalaya. The objective of the project is to provide Water (irrigation) to agricultural area through conveyance system (lead channel) thereby tapping the water sources and conserve it for the lean period.

Name of Work: During the year 2010, a Water Harvesting Structure has been constructed in the land of Shri. Hobar Rani and Smti. Balari Myrthong, with an amount of Rs.6,40,000/- incurred in the construction of Head Dam and Channel, it conserved an impounding water surface area of 0.461 hactre approximately and irrigate up to 4.30 hactre of agricultural land. Paddy, Potato and Vegetable are the main important crops which were cultivated during different season. In addition to irrigation facilities, the land owner utilizes the conserve water by rearing fish for extra income.

Benefit and Value: The structure has the following benefit:

1. It helps the farmer to earn additional income by cultivating high yielding crop with integrated farming system.
2. Encourage additional construction of terraces for the potential area created
3. Extra income from Pisciculture
4. 0.12% increased in yield of paddy in the 1st year.

Beneficiaries:

1. Shri. Hober Rani
2. Smti. Balari Myrthong
3. Shri. Klan Kharsyntiew
4. Smti. Tida Kharsyntiew

Profit and Expenditure: It has been calculated for the First Three Year.

A. INVESTMENT

Sl. no	Item of Expenditure	1st year 2010-11	2nd year 2011-12	3rd year 2012-13	Total
1	Water Harvesting Structure	5,50,780	Nil	Nil	5,50,780
2	Conveyance System C.C Channel and Earthen Channel	89,220	Nil	Nil	89,220
3	Paddy Cultivation @ Rs.10/- per kg in 19.7 qtls/Ha for 4.3 Ha	84,710	84,710	84,710	2,54,130
4	Potato Cultivation @Rs.6.5/- per kg in 82.5 qtls/ Ha for 4.3 Ha	2,30,587.5	2,30,587.5	2,30,587.5	6,91,762.5
5	Vegetable Cultivation @Rs.12,000/- per Ha for 4.3Ha	51,600	51,600	51,600	1,54,800
6	Fingerlings and feed @Rs.6.5/- each for 5000 Nos	32,500	32,500	32,500	97,500
Total					**18,38,192.5**

B. INCOME

Sl. no	**Item of Expenditure**	**1st year 2010-11**	**2nd year 2011-12**	**3rd year 2012-13**	**Total**
1	Paddy @Rs.13.8/- per kg in 19.7 qtls/Ha for 4.3 Ha	1,16,899.8	1,16,899.8	1,16,899.8	3,50,699.4
2	Potato @Rs.10/- per kg in 82.5 qtls/ Ha for 4.3 Ha	3,54,750	3,54,750	3,54,750	10,64,250
3	Vegetable @Rs.27,500/- per ha for 4.3 Ha	88,000	88,000	88,000	2,64,000
4	Fish @Rs.120/- per kg for 714 kg	85,680	85,680	85,680	2,57,040
Total					**19,35,989.4**
Net income A-B = Rs.97,796.70					

GOOD PRACTICES UNDER TURA SOIL & WATER CONSERVATION (T) DIVISION, WEST GARO HILLS.

1. Title of the Practice: - IRRIGATION DAM ACROSS RINGGI RIVER & CHANNEL, DADENGGRE, WEST GARO HILLS, MEGHALAYA UNDER AIBP SCHEME.

2. Implemented by -Tura Soil & Water Conservation (Territorial) Division, West Garo Hills, Meghalaya.

3) AREA OF IMPLEMENTATION (LOCATION):

The Soil & Water Conservation Department, Tura Territorial Division constructed the Irrigation Dam across Ringgi river in the year 2009-10. The Dam is situated under Dadenggre C &R D Block 39 Km. away from Tura, the district Headquarter of West Garo Hills District. It lies between 25°42'32"-25°43'16" North latitude & 90°11'25"- 90°11'45" East Longitude. The construction of irrigation dam and channel was implemented under Accelerated Irrigation Benefits Programme (AIBP), Funded by Ministry of Water Resources, Govt. of India.

4) **PRE AND POST PROJECT:**

Before the intervention of the project cultivable command area was 56.00 Ha only. After the intervention of the project the irrigation dam, Aqueduct & Channels are constructed and the additional cultivable command area (CCA) increases upto 158.00 ha. i.e. total 214.00 ha. of CCA farmers are able to cultivate with assured irrigation facility.

5) **WORKS IMPLEMENTED:**

The following works have so far been implemented in the area-

a) Construction of Irrigation Dam
b) Aqueduct
c) Channels (Earthen & CC)

6) **UNIQUENESS OF PRACTICE:**

The Population of the area mainly depends on Agriculture for their livelihood. The People of the area are very active and laborious. The principal crop of this area is paddy. Due to Irregular and uneven distribution of rainfall, the crops of the locality suffers from short fall of water. The Irregular rainfall can't meet up the timely requirement of water for the crops. Construction of this dam made water available to supply timely to the crops by providing irrigation facilities and farmers are able to increase the yield of different crops. Hence, the project is considered to be very unique and relevant to their livelihood.

7) **BENEFITS ACCRUED (TANGIBLE AND INTANGIBLE):**

i) Surface runoff water has been tapped for irrigation to the vast cultivable area.

ii) Farmers are now able to improve existing cropping pattern with assured irrigation.

iii) Storing surface runoff for ground water recharge.

iv) Irrigation water passes through rubber plantation by earthen channels helps in moisture availability to the plantation.

v) Irrigation water is tapped without affecting the Eco-system of the river.

8) COST EFFECTIVE AND CITIZEN FRIENDLINESS:

The Project is deemed cost effective and citizen friendly because in the pre-project scenario farmers were not able to cultivate for a vast area. Due to intervention of this project, cultivable area became huge and they are able to practice double cropping in the area. In the Pre-project scenario, farmers were able to cultivate 56 ha. of land yielding about 20 Qtls/Ha and after providing the irrigation facility, the area for cultivation has been increased to 214.00 ha and the yield of crop has gone upto 35 Qtls/Ha during the last two years.

9) SUSTAINABILITY:

Since sustainability after the completion of the project is very vital for ensuring the continued flow of benefits to the people and for future generations, Water User Association (WUA) has been formed in this regard to look into appropriate measures and interventions for sustainability of the project.

10) LESSONS LEARNT:

Due to the presence of this dam, irrigation benefit awareness has been created in the minds of the people of the area and the district. It has also shown that variety of benefits such as increase of production through double cropping, livelihood, aesthetic view etc. can be reaped from one developmental activity since the irrigation water is available whole throughout the year.

11) REPLICABILITY:

The scope of replicating the project is very high as there are many such water sources along with cultivable land available in the district that can be developed to provide irrigation facilities to increase Agriculture production and allied sectors.

12) OUTPUTS AND OUTCOMES:

The outputs and outcomes which can be expected from the project are as follows:

OUTPUTS:

- A total area of 214 ha has been brought under assured irrigation.
- A total of 110 nos. of Household beneficiaries have been benefited.

OUTCOMES:

- Assured irrigation throughout year.
- Yield of agriculture crops enhanced due to increase of cropping intensity.
- Better water channelization system has been evolved.
- Improved income levels of the farmers.

PHOTOGRAPHS SHOWING EARTHEN & CC IRRIGATION CHANNEL


PADDY FIELDS


PHOTOGRAPHS SHOWING CC IRRIGATION CHANNEL ALONGSIDE RUBBER PLANTATION


PHOTOGRAPHS SHOWING AQUEDUCT & CC CHANNEL

GOOD PRACTICES ON ACCELERATED IRRIGATION BENEFIT PROGRAMME (AIBP), EAST GARO HILLS, MEGHALAYA.

Accelerated Irrigation Benefit Programme (AIBP) is a programme specially initiated by the Government of India in 1996 to provide financial assistance to the states to complete various ongoing multipurpose and irrigation projects in the country. The scheme aimed to create irrigation potential of the projects and thereby to extend irrigation sources to more areas. It was subsequently extended to cover surface water minor irrigation projects in special category states such as in North East and thus the inception of AIBP in Meghalaya started in the year 1999-2000.

The department of Soil & Water Conservation has taken up and successfully implemented 3 nos. of AIBP Projects with a total cost of 490.44201 lakh in the erstwhile undivided East Garo Hills District covering an area of 810 hectares and benefiting 286 households. These 3 projects are (1) Lower Rongap River Valley Project, (2) ChisoGaningRiver Valley Project and (3) Chame River Valley Project.

Few out of several successful activities/good practices under this programme are briefly highlighted along with photographs as follows: -


R.C.C. Dam and C.C.Irrigation Channel at KeraMikgilsimgre across Nengjrek stream under Lower Rongap River Valley Project (AIBP)

Name of Beneficiaries: (1) Shri GinjaSangma (2) Shri SengeramSangma& Others.


R.C.C. Dam and C.C.Irrigation Channel across Chiso stream at ChisoGaning under ChisoGaning River Valley Project (AIBP)

Name of Beneficiaries: Village Community.

Boulder Sausage Protection wall along Simsang River at ChisoGaning under ChisoGaning River Valley Project (AIBP)

Name of Beneficiaries: Village Community.

Conservation Pond with C.C. Core wall across Debon Stream at AkarokSonggital under Chame River Valley Project (AIBP).

Name of Beneficiaries: Shri LingdohMarak.


R.C.C. Dam and C.C. Channel across Damku Stream at AkarokSonggital under Chame River Valley Project (AIBP).

Name of Beneficiaries:

1. Shri RakmanSangma
2. Shri PrethysonSangma
3. Shri WillicksonMomin

It may be worth mentioning that with the implementation of AIBP in the district, there is significant improvement in the development of minor irrigation, leading to enhanced agricultural growth and improved economic status of the farmers.The programme has been successful in building up water infrastructure and has helped indirectly in optimizing soil moisture regime and checking soil erosion in the project areas.

NAME OF THE PROJECT: Lower Umshait Accelerated Irrigation Benefit Programme

LOCATION: Umkynsir,Umpyrtha and Pathardharo of Jirang C&RD Block

NAME OF ACTIVITY:

SL. NO	ITEMS	PHYSICAL TARGET	FINANCIAL TARGET
1	RCC Head Water Dam	34 Nos	56.49212
2	CC Head Water Dam/CC Check Dam	71 Nos	68.03359
3	Earthen Channel/CC Corewall	40 Nos	58.74959
4	CC Channel/Earthen Channel	24 Nos	11.98860
5	Protection Wall	123 Nos	230.08096
	TOTAL		**425.34486**

DESCRIPTION OF THE ACTIVITY:

Meghalaya (The abode of clouds) is dotted with a number of small valleys fed by streams and rivers. Most of these valleys are brought under cultivation and are the source of livelihood of many farmers. However, the high intensity rainfall followed by flash floods causes severe stream bank erosion in these valleys resulting in loss of cultivated and cultivable land thereby causing severe strain on the valuable land resources of the State. Moreover lack of proper conservation and management of water is another factor contributing to the intensity of the problem which would have otherwise been a boon to the farmers had water resources been properly harnessed.

The Department of Soil & Water Conservation in Meghalaya is making its best effort to tackle the problem of Soil erosion and water management in some of the valleys. However due to paucity of fund under the State Plan Budget, the Department is proposing River Valley Projects from the Ministry of Water Resources,Government of India like Accelerated Irrigation Benefit Programme primarily to ensure availability of irrigation water to existing and newly developed wet terraces besides protecting the command areas from erosion and conserving water at the foothills where ever possible.

Lower Umshait AIBP is about 60 km away from Nongpoh the District headquarter of Ri-Bhoi and comprises of 3 nos of villages named below which depend on Umshait valley for their livelihood through Agriculture and its allied Activities.

(1) Umkynsir (2) Umpyrtha (3)Pathardharo.

APPROACH:

A participatory approach has been adopted in the implementation of the project by involving the communities of the benefitting villages, Prior to the implementation of different soil & Water conservation activities in this Project, the Soil and Water Conservation Division, Nongpoh constituted two types of committees for participatory approach and for the smooth implementation of the scheme.

1. **Project level Committee**: This is an apex body consisting of members representing all the 3 nos of villages under Lower Umshait valley. The representative are either sordars or secretary of respective villages. The main functioning of this committee are as under:

- To co-ordinate and liaise with the Soil and Water Conservation Department as well as the village level committees.

- To ensure smooth implementation of the Project
- To give necessary completion Report with an undertaking to maintain the assets created under the Project.

2**. Village Level Committee**: This committee is fully responsible for selecting the beneficiaries in their respective villages for the construction of the structures sanctioned for the village as projected in the Project report. This committee also managed the employment generated during implementation. This committee also co-ordinate regularly with the department specially in terms of site selection, technical guidance during construction etc.

3. The Project Level Committee met many times in the Dorbar Halls of the benefitting villages to ensure smooth functioning of the Project. Minor deviations of certain activities of the scheme to suit local conditions are either decided at the Project Level Committee or the respective committee where deviation is necessary supported by documented resolutions.

MONITORING AND EVALUATION:

The Project has been monitored and evaluated by high ranking Officers of the Department and other Central Government officials deputed by the Ministry of Water Resources.

Quality of civil work undertaken by the beneficiaries under the guidance of the Soil and Water Conservation Department has been observed to be good and materials used (stones, cements etc) has also been found to be good quality. Strict quality control earthwork and materials and actual execution is being ensured by the Department.

All beneficiaries contacted during the field visits were full of praise for the help/assistance received from the Department for undertaking various activities in the Project Area.The list of such beneficiaries are appended in Appendix I-III.

LOWER UMSHAIT AIBP PROJECT IMPLEMENTATION COMMITTEE:

Chairman ____ Shri Esman Lyngdoh (Umkynsir)
Secretary ____ Shri Joily Lyngdoh (Pathardharo)

Members:

1-	Shri Romes Sangkli	_____	Umkynsier
2-	Shri Esless Sohkhwai	_____	Umkynsier
3-	Shri Opanroi Sangkli	_____	Umpyrtha
4-	Shri Bianmroi Nongrum	_____	Umpyrtha
5-	Shri Opas Lapang	_____	Pathardharo
6-	Shri Order Makri	_____	Pathardharo
7-	Shri Joily Lyngdoh	_____	Pathardharo
8-	Shri Elass Makri-	_____	Umkynsier
9-	Shri Esman Lyngdoh	_____	Umkynsier
10-	Shri Eskai Marbaniang	_____	Umpyrtha

BENEFITTED AREA: Out of the total geographical area of 2450 Ha of the Project;the Department together with the Project Level Committee has brought 715 Ha under different soil and water conservation measures listed as under covering 327 nos of households with a total investment cost of Rs.425.34 Lakh spanning over a Project period of 3 years.

Success Stodry under Water Resource Department

YEAR OF PROJECT COMMENCEMENT: 2009-2012

MANDAYS GENERATED DURING CONSTRUCTION: 68,055 Mandays

AMOUNT IN RUPEES: 425,34,486 Lakh

OBJECTIVES: To accelerate Irrigation Benefits to Command Areas wherever possible and The Department as spelled out in the guideline of the Project have institutionalized three Water User Associations viz, Umkynsir Water User Association, Umpyrtha Water User Association and Pathardharo Water User Association to maintain the assets created within their respective area of operation besides resolving conflicts amongst stakeholders of water for sustainable outputs.

Name of the Project :-	**RangmalBadim FIP**
Total cost :	Rs.37.432lakhs
Gross command area (GCA):	25.00Ha.
Culturable command area (CCA):	25.00Ha.
Net Irrigated Area :	40 Ha.
Gross Irrigated Area :	24 Ha.
Potential Created :	24 Ha.
Potential Utilised :	24 Ha.
Year of commencement :	2009-2010
Year of completion :	2010-2011
Beneficiaries :	14 Families
Name of source :	Darim stream
Span of headwork :	11.00 m
Total length of canal :Lined =	Nil
Unlined =	100m
Total =	100m

RangmalBadim Flow Irrigation Project was implemented successfully by the East Garo Hills Irrigation Division and is located at a distance of about 3km, away from Williamnagar under SamandaDevelopment Block of East Garo Hills District of Meghalaya. A Barrage of 11m span was constructed across the Darim stream with two out-let on both the sides of the barrage to command an area of 25Ha. on the R.H.S. and L.H.S. respectively. The project was commissioned in the year 2009-10 with a total cost of 37.432 lakhs and a gross irrigated area of 24.00 Ha. under its command. The total culturable command area of the project is 25 Ha. which belongs to 14 no. of families of the area.

Head-work of RangmalBadim FIP

Earthen Canal ofRangmalBadim FIP

Prior to the implementation of the project, the cultivation of crop was being practiced under rain-fed condition only. The rainfall in the state is generally capricious in its incidence and variable in amount

due to which sometimes the farmers had to suffer hardships because of the fluctuating crop yield/ha. as the cultivation of crop was affected due to the unavailability of water during the time when optimum moisture was required for the crops. But now with the implementation of RangmalBadim Flow Irrigation Project successfully, the farmers can enjoy assured irrigation which contributes to the stable crop yield/ha. At present with the implementation of the project the farmers could go for more than one crop a year.

The beneficiaries under the command of the project have now formed an Association in the name of WUA (Water Users Association of RangmalBadim FIS) and registered under the Meghalaya Societies Registration Act-XII of 1983. It is expected that if the Association and the Department goes hand in hand and if every effort is made to make the best use of the available water, it will be possible to reach a high level of continuous productionin years to come.

SUCCESS STORY OF SARIKHUSI F.I.P.

Sarikhusi Flow Irrigation Project is derived from the name of the village itself i.e. Sarikhusi village, which is about 5.00 km away from the district headquarter, Nongpoh under Umling C&RD Block, Ri Bhoi District. Sarikhusi F.I.P. was sanctioned during 2008–09 vide sanction letter No. IRRI(SCH)20/2008/158 dated Shillong the 30th March 2009 for an estimated amount of `. 2,30,50,000.00 (Rupees Two crore thirty lakh fifty thousand) only. The date of commencement of the project was on July 2009 and it was completed on June 2012. The project has a command area of 156.00 hectares benefitting about 42 families of Sarikhusi, Borgang and Mawsyntai villages. The project is functioning very well and the local farmers have benefitted to a great extend where they have been cultivating both Kharif and Rabi crops since the completion of the project. Water for irrigation purpose was tapped from the Umtngam stream by constructing an Intake Point spanning 8.00m across the stream and conveyed to the command area by RCC lined canal for a length of 4210.00m. Before this project was taken up the livelihoods of the farmers depends solely on the rain gods and were cultivating only Paddy and Maize during the Kharif season and due to the unavailability of assured irrigation water, the farmers never cultivated any crops during the Rabi season. However with the irrigation infrastructure in place and assured irrigation water throughout the year the farmers are now practicing multi cropping by planting Paddy, Maize and Mustard during the Kharif season and Potato, Tomato and Cabbage during the Rabi season.

Sarikhusi F.I.P. has helped and encouraged the farmers to take up multi cropping, which in turn has contributed a lot in uplifting the socio economic condition of the farmers.

Intake point of Sarikhushi FIP

During ploughing the paddy field of Sarikhushi FIP

Photograph showing Standing crops fed by irrigation canal under Sarikhushi FIP

Photograph showing Standing crops fed by irrigation canal under Sarikhushi FIP

LAWRAPHA FLOW IRRIGATION PROJECT

Lawrapha Flow Irrigation Project is located at Lawrapha village about 16.00 km from Nongstoin irrigating 59.72 Ha during Kharif and 12.00Ha during Rabi of command area and benefitting 33 families .The farmers benefited from this project are from Lawrapha, Shohphria ,Sohwanthiang and Umlieh Villages. The Project was sanctioned under AIBPduring 2007-2008 and completed during 2009-2010.

Umlieh Headwork Lawrapha

Command Area

1. Location: Mawthadraishan C&RD Block (25°30'41" N 91°22'01" E)
2. Command Area: 59.72
3. Kharif: 52 Ha
4. Rabi: 12 Ha
5. Cropping Pattern:
   Kharif (Paddy): Rabi (Pottato& Vegetables)
6. Beneficiaries: 33 families
7. Estimated Amount: 81.06 lakh
8. Headwork:Umlieh Head Work (Span=14.00m)
9. Conveyance
   1. 150mm G.I Pipe = 2200.00m
   2. 80mm G.I Pipe=700.00m
   3. CC Field channel: 250.0 ***Field Channel***

Outlet

Prior to the construction of the project, the farmers have to depend for the water requirement of crops wholly on rainfall, and thus the crop production is very less. But after construction of the project, it has been seen that water is available even during dry season and the farmers can grow Rabi crops such as vegetables etc and therefore their economic condition have been uplifted.Afterconstruction of the Project the command area targeted has been brought under assured irrigation and it is seen that the economic condition of the farmers has greatly improved.

AMDEP FLOW IRRIGATION PROJECT

Amdep FIP is situated in between Padu and Khonglah village under Amlarem C&RD Block at about 50 Kms away in the south west of Jowai, the headquater of West Jaintia Hills district in the state of Meghalaya. The sailent features of the projects are as follows:

1.	Coomand Area	:	295.00 Ha
2.	Nos. Of Beneficiaries	:	115 families
3.	Cost of the project	:	Rs. 155.89 lakhs
4.	Name of the source	:	Amdeep Stream
5.	Span of headwork/ intake point	:	17.00m
6.	Length of conveyance system	:	Pipeline =15.20 Km
7.	Year of Commencment	:	2001-02
8.	Year of Completion	:	2005-06
9.	Cropping Pattern	:	Horticulture/ Plantataion crops viz. Betel leaf, arecanut, orange, pine apple, etc.

The project was sanctioned in the year 2000-01 under the Accelerated lrrigation Benefits Programme (AIBP),a programme which was launched by the Government of India in the State of Meghalaya in the year 1999-2000. The purpose of inclusion of schemes under AIBP was to speed up their completion and to remedy the inadequate funding by the State Government, which had led to increasing spillover liabilities from year to year and the funding pattern of Center: State was on a 90:10 basis . The command area of Amdep FIP like those of most' irrigation projects which are located in the border areas of the State falls in very steep terrain. The undulating topography made accessibility to the project site and carriage of construction materials not only exorbitant in cost, but also time consuming and cumbersome. However, in spite of all the hardships being encountered, the Department could manage to successfully complete the construction of the project, based on the farmers' representation.

Before the construction of the project, the farmers could hardly cultivate for an area of 102 Ha. Only in scattered plots and getting very low yield from the cultivation of the horticulture crops mentioned above. After the construction of the project, the farmers have been provided with assured irrigation facilities and have extended their cultivation/plantation on a large scale, covering the created potential of 286.00 Ha since 9.00 Ha. Is non cultivable area. The yield/ha. Has also increased considerably after irrigation , although the exact increase is yet to be ascertained.

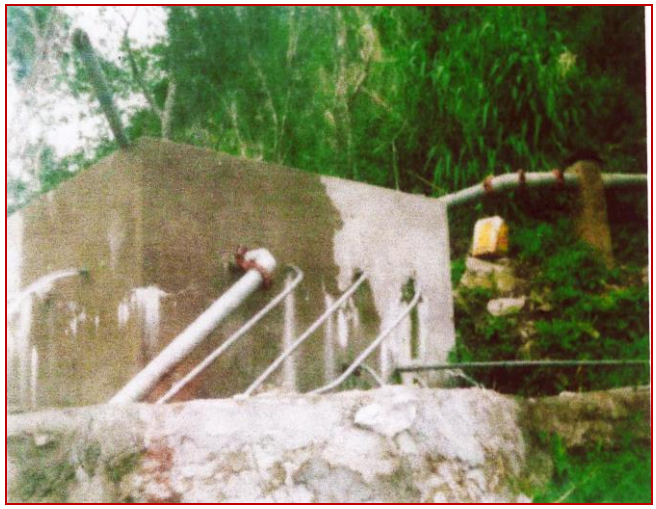
Since the value of horticultural (perennial) crops is very high compared to seasonal crops like paddy, the returns/benefits are high compared to seasonal crops like paddy. These crops once planted yield fruits year after year and in the case of betel leaf, the leaves can be plucked more than once in a year and with assured irrigation , even in winter. This is precisely the reason for the high Benefit Cost ratio for horticulture (irrigation) projects and in this particular case the BCR worked out came to 17.61:1

The need for participation of farmers in maintenance and operation of the completed projects is also being felt, so as to inculcate in them a sense of responsibility and ownership and to relieve the burden of sole maintenance responsibility on the Govt. In case of Amdep FIP, a Water Users" Association (WUA) has been formed and already registered under the Meghalaya Registration of Societies' Act, so that Participatory lrrigation Management(PIM) which is still a new concept in the State can be implemented and water rates can be collected.

Even so, the farmers of Amdep WUA are having a contributing role to play in the distributay system of the project. In addition to the distributaries provided by the Department, the farmers are practicing the indigenous drip irrigation method by using bamboo splits of varied sizes and at required spacings to draw water from the distribution tanks and convey it right at the roots of the plants for optimum utilization.

With the completion of the project, the economic status of the farmers has been improved to a fairly considerable extent as they are already hard working people living such a difficult geographical area of the State.

HEADWORK OF AMDEP FIP



MAIN RESERVOIR OF AMDEP FIP

MAIN PIPELINE PASSING THROUGH THICK JUNGLE AND STEEP HILL SLOPE OF AMDEP FIP

Chapter 5: Conclusions and Suggestions

Meghalaya is predominantly an agricultural state with about 80% of its population depending entirely on agriculture and allied activities for their livelihood. Nearly 10% of its geographical area is under cultivation. The state with its highly diversified topography, altitude and climatic conditions enormously offer scope for cultivation of a wide variety of agricultural crops. The state produces a variety of agricultural crops such as food grains, commercial crops, horticultural crops, etc. Of the total agricultural land in Meghalaya, 62% is used for food grains, 25% for cash crops, 9% for horticultural crops and the rest 4% is used for raising miscellaneous crops. There are also challenges arising due to recent droughts, floods in some parts of the state. With a growing population and rising need of a fast developing state and indications for climate change and non availability of water for irrigation throughout the year put a strain on the resources of the State. Therefore all these issues and problems need to be resolved in the coming years. There is a need for a sustainable and concrete planning for the overall development and management of water resources in the state.

Based on empirical research and direct interaction with the respondents, departmental staff and village heads, AMC Research Group has drawn the following conclusion and recommendations.

Conclusions:

1) The irrigation potential created up to March 2012 is 40,308 Hectares, which is about 18.49% of the identified irrigation potential of 2.18 lakh Hectares. The anticipated achievement in irrigation coverage during 2012-13 is 5,400 Hectares.
2) The Water Resource department is specifically focusing on the integrated water resources management, basin planning, water quality, monitoring and management, awareness and capacity building.
3) The AIBP scheme has helped in creating irrigation potential, leading to generating rural employment and supported rural Livelihood (Agriculture and Allied activities). Majority of population in the State are active in agricultural activities for sustaining livelihood. Departments' efforts of bringing out effective outcome of irrigation also has helped in improving the agricultural productivity as well as enhanced the income possibilities and opportunities for farmers in the state.
4) The irrigation achievement of the state during 2005 to 2009 was around 10,269 hac, whereas, during 2010 to 2013 it is around 16,566 hac-therefore, a significant increase of around 62% was noticed in irrigation production under AIBP.

5) The Water Resource Department has implemented 134 schemes under the AIBP programme in the state. Out of which maximum number of schemes are implemented in East Khasi Hills district.The Water Resources Department irrigated 20402 Ha. hectares in three years from 2010 to 2012-13.

6) The Soil and Water Conservation Department has implemented 32 minor irrigation projects under AIBP Scheme up to 31st March 2012. It is to be noted that Meghalaya Water Resources Development Agency and District Water Resources Councils have been established to ensure convergence of investment and development initiatives in the water sector

7) The AIBP scheme in Meghalaya has enormously helped in creating irrigation potential. Both the departments made irrigation programmes accessible as well as improve the agricultural production to the extent that it all benefited the local farmers and therefore enhanced their livelihood and income facilities. The irrigation potential created under AIBP scheme during 2010-11 covers only 16% of the overall irrigation potential in Meghalaya. This further increased to about 18.49% - an increase of 2.49%. The anticipated irrigation potential for the year 2012-2013 is expected to be around 5400 hectares whereas for 2013-2014 it is stipulated to be 5940 hectares. Initiatives and attempts are taken to give irrigation a thrust to increase the coverage of the potential area. At present, 81 minor irrigation schemes are underway which are estimated around Rs. 10, 523 lakhs with a covering area of 8,318 hectares.

8) The total number of families benefitted under the AIBP programme is around 16,547, out of which majority of them belong to East Khasi Hills and West Garo Hills district.

9) The major portion of command area falls under West Garo Hills, East Khasi Hills, whereas the least command area falls under South Garo Hills, East Garo Hills and West Khasi Hills. The West Khasi hills is one of the biggest district in Meghalaya, however, the command area coverage for this district is very less. Reasons may lie in various factors like frequent mining, quarrying in the coverage area and existing climatic condition leading to damaging the quality of soil and its fertility.

10) Analysis of land holding pattern indicates that most average land holding (Individual and Joint) in the State is around 1.37 hac, whereas the institutional land holding in the State is around 1.53 hac. District wise, West Garo Hills constitutes the highest land holdings (2.04) in the State, followed by South Garo Hills (1.65); East Garo Hills (1.59); Jaintia Hills (1.47); East Khasi Hills (1.17); Ri Bhoi (0.96) and West Khasi Hills (0.90).

11) The research finds that majority of the beneficiaries involved in the farming are small and marginal farmers and most of the beneficiaries involved in the farming are from middle age group.

12) The average annual income from agriculture related activity accounts to Rs. 55, 000/- (approx.), while the annual income from non-agricultural activity accounts to Rs. 25, 000/- (approx.). There is difference of around 48%.
13) The findings show that that there is not much emphasis given on the formation of Water Users Association (WUA) in almost all the districts of the state, inspite of the presence of the same in all the districts. The participation level is also very low in the region. Moreover, most of the beneficiaries are not fully aware of the purpose of formation of WUA.
14) The check dams constructed in the pocket areas benefit the small/marginal farmers in getting the maximum assured irrigation water.
15) According to the research, majority of the beneficiaries stated that not much assets have been created under AIBP in the State. The responses of the beneficiaries are uniform across their location around the irrigation projects.
16) The major constraints that impede the implementation process in the State are lack of fund for monitoring, lack of motivation among staff, lack of supervision facility, lack of proper coordination between concerned departments, delay in releasing funds for monsoon season etc. There is also no provision existing for repairing and maintenance of work particularly the conveyance system.

Suggestions:

1. Sufficient budget should be spent on creating capacity building which eventually may impact the socio economic development in the state.
2. High priority should be given to converging the irrigation system with the traditional method of cultivation in the state so that the productivity of crops get increased to a larger extent.
3. High priority should be given to proper alignment of all the canal system with main, medium and minor canals along with an appropriate slope. High quality technical work is therefore an essential requirement. Besides, the concerned engineers and contractors of irrigation system should be provided with training to deliver quality work.
4. There should be a need for restructuring the WUA as the findings show that there is not much emphasis given on the formation of Water Users Association (WUA) in almost all the districts of the state, inspite of the presence of the same in all the districts and the participation level is very low in the region. Therefore a participatory approach on irrigation management should be taken up in which proper operational guidelines are provided to carry out the process. It can also help in bringing more responsibility amongst the farmers, and can help in resolving conflicts related to water distribution, improvement of service through better operation and maintenance etc. To

this end, training in the basic technical components of canal system and in the methods of monitoring technical work should be take up. Moreover, WUA should be given a management and supervisory role, so that wastage of water can be prevented and equity in distribution of canal water can be ensured. WUA also should be assigned with power to monitor the construction and repair work of canals and can modify the norms for improving the canal system. Besides, field level irrigation officials should be provided with financial power and responsibilities so that they can implement corrective measures in time to save the canal from further damage.

5. Safety and security of the field staff like sub-engineer and field personnel of both the departments should be ensured and they should be efficiently able to supervise the canal operation in odd hours. This will prevent the wastage of water resulting from damage to canal during peak irrigation season.
6. Priority should be given to develop proper coordination between concerned departments and the respective officials related to irrigation, agriculture, revenue and land development department so that an effective delivery mechanism is initiated. To this end, a committee consisting of representatives from the relevant departments can be formed, to look at the holistic development of the command area.
7. A policy should be in place to make farmers adopting appropriate cropping pattern that could fetch optimum use of water. A balanced ratio should be made between high, medium and low water consuming crops, which may substantially maximize the benefits of canal water by evenly using the water distribution and at the same time protect the cultivated land from water logging and also keep the land fertile throughout. Farmers should be restrained from disproportionately growing high water consuming crops and should be fined for doing so. Producing high water consuming crops makes the land water logged to a large extent making it eventually saline and unsuitable for cultivation. Therefore, a balanced cropping pattern should be introduced and adopted in the state.
8. AIBP programme usually provides funds for construction of main canal, distributaries, laterals and sub laterals. There is much constrain regarding funding for Field Irrigation Canal (FIC) net works. The networking between the main canal and all its distributaries do not meet much of the requirement towards the wet potential and therefore FIC network needs to be put in place. As such it would be better, if AIBP assistance is extended even for construction of FIC net works so that the networking between main canal and FIC could be more effective and useful and wet potential could be achieved.
9. There has been a substantial amount of broken filed channels and water leak problem existing in almost all the districts. This is due to the reason that there is lack of funds available to operate

and maintain the irrigation system. Moreover, lack of field staff, monitoring and non-functioning of water user associations also intensify the situation. Therefore, sufficient funds should be available for operation and maintenance of the canal system. More field staffs should be deployed so as to monitor and operate the entire process.

10. There should be a periodical reassessment system put in place for checking the ground water potential on a scientific basis. This may help in checking the quality of ground water available and environment and economic viability of its extraction. Exploitation of ground water should be kept in check and regulated so as not to exceed the recharging possibilities,
11. Ground water recharge projects should be developed and implemented for improving both the quality and availability of ground water resource. Integrated and coordinated development of surface water and ground water resources and their conjunctive use should also be envisaged right from the project planning stage and should form an integral part of the project implementation.
12. The major constraints that impede the implementation process in the State are lack of fund for monitoring, lack of motivation among staff, lack of supervision facility, lack of proper coordination between concerned departments, delay in releasing funds for monsoon season etc. There is also no provision existing for repairing and maintenance of work particularly the conveyance system. Therefore all these issues should be addressed and resolved with appropriate measures.
13. Surface irrigation potential in Meghalaya needs to be explored as topographical conditions don not favour exploitation of ground water for irrigation in the state. In view of high rainfall and fragile top soil, an integrated program for water development and soil management is considered necessary. The program should have appropriate institutional mechanism and should mobilize adequate funds to equitably spread the benefits of irrigation.

Annexure

RCC DAM (CHISO GANNING),EAST GARO HILLS, SAMANDA

RETAING WALL(SASEIN),JAINTIA HILLS, THADLASKEIN

RCC DAM CUM CHANNEL (UPPER UMIUREM), JAINTIA HILLS, LASKEIN

RCC IRRIGATION DAM (RINGGI),WEST GARO HILLS, DADENGGRE

RCC IRRIGATION DAM (LOWER GALWANG), WEST GARO HILLS, SELSELLA

RCC HEAD WATER DAM (BALWAT), SOUTH GARO HILLS, CHOKPOT

CC IRRIGATION DAM (UPPER GIME), WEST GARO HILLS, DADENGGRE

Water Harvesting, Foot Bridge and Washing Place at Muthlong village under Upper Umiurem AIBP, West Jaintia Hills

Water Harvesting Structure at Langtor Upper Kynshi Catchment - I AIBP, West Khasi Hills

Water Harvesting Pond at Langstihrim Upper Kynshi Catchment - I AIBP, West Khasi Hills, Mairang Block

Chame AIBP Water Conservation cum Farm Pond across Okma stream at Akarok Songgital, East Garo Hills

Boulder Sausage Protection wall along Chame stream of existing Paddy Field at Chame Watershed under AIBP, East Garo Hills, Songsak Block

Evaluation of Accelerated Irrigation Benefits Program (AIBP)

(Sponsored by: Directorate of Programme Implementation & Evaluation, Government of Meghalaya)

Information Schedule (State/District)

District: _____ Name of the implementing Agency: _____

Name and Designation of the Respondents:

1. Details of projects completed (since inceptions till 2011-12)

Financial Year	Name of the projects/Scheme	Nos. of Beneficiaries	Activities Undertaken	Financial Expenditure incurred	Project Status

2. Details of allocation of fund under Irrigation (AIBP) projects (since inceptions till 2011-12)

Financial Year	Total Plan Expenditure	%expenditure Incurred

3. Details of Irrigation projects implemented (since inceptions till 2011-12)

Name of Scheme	Estimated Cost	Location	District	Nos. of beneficiaries	Command Area (in Ha.)	Potential Created

4. Details of operational and Non Operational irrigation projects. since inceptions till 2011-12)

Name of Scheme	Status	Reasons for non-operational	Nos. of beneficiaries	Command Area (in Ha.)

5. In your opinion, what are the potential outcomes of the check dam for ensuring rural sustainable livelihood in the state?

6. Is there been any increased in the crop productivity fro river valley/ bottom land?
   If yes, what steps have been taken to increase the crop productivity?
   If no, state the reasons.

7. What is the status of improvement of crop production in abandoned/ cultivated land?

8. What steps were taken for restoration of cultivatable land offered by mining and quarrying?

9. Major focus area under AIBP Scheme?

10. Did you face any constraints which implementation of the scheme? If yes, explain?

11. Did you face any constraints while implementation of the scheme? If yes, explain?

12. Give some suggestions in terms of further improvement of the scheme?

Investigators comments based on their field observation and interaction with the beneficiaries

Evaluation of Accelerated Irrigation Benefits Program (AIBP)

(Sponsored by: Directorate of Programme Implementation & Evaluation, Government of Meghalaya)

Beneficiary Schedule (Soil & Water Conservation/Water Resource Department)

District Name_____ Block Name_____Village Name _____

Basic Information

1. Name of the Beneficiary : _____

2. Address: _____

_____

3. Qualification: 1. Illiterate 2. Literate 3. Primary 4. Middle School 5. Matriculate
6. Intermediate 7. Technically Qualified 8. Graduate & Above

4. Religion : 1. Hindu 2. Muslim 3. Christian 4. Others (Plz. Specify)

5. Category : 1. Gen 2. OBC 3. SC 4. ST 5. Others

6. Category of Family : 1. APL 2. BPL

7. Age of Beneficiary: (in yrs)

8. Sex : 1. Male 2.Female

10. Average Land Holding: _____ (in acres.) 11. Annual Income: Rs. _____

12. Annual Income (Agriculture Related Activity): Rs _____

13. Size of Family: Total : _____ Male: _____ Female: _____

14. Current Principal Occupation: please tick the appropriate

( ) Agriculture wage earner	( ) Non-agriculture/unskilled wage earner	( ) Marginal Farmer
( ) Live Stock, Forestry, etc.	( ) Mining & Quarrying	( ) Household Industry
( ) Building/Road Construction	( ) Trade and commerce	( ) Transport & communication
( ) Traditional Artisan	( ) Service (eg. Washerman)	( ) Tailoring

15. Whether Disable? 1. Yes 2. No

16. Land Holding Detail:

Detail	**Area (in acres)**	
Non-Agricultural land		
Barren land		
Agricultural land	**Irrigated**	**Unirrigated**
Owned		
Leased-in		
Leased-out		

17. Alternate Source of Irrigation for the land: Type of well: a) Shallow b) Open well c) Bore well

Water Lifting Device: a) Power b) Manual c) Others (Specify)

18. Ownership: a) Owned b) Neighbours c) Community

19. How often requirement becomes necessary to seek alternative water resource:

a) Always b) Very Often c) Occasionally d) Rarely

20. Water Rates payment detail: Periodicity of payment: Season wise / Monthly / Installments

21. Cropping pattern by you in last five years:

Years	Name of the crop	Areas (in acres)	No. Watering	Alternate source of water	Total yield (Quintal)	Total value	Growth (Negative/positive)
2012-13							
2011-12							
2010-11							
2009-10							
2008-09							

Awareness, Opinion & feedback

1. How do you know about the AIBP Scheme?

1. Though local newspaper/TV/AIR 2. Through Extension officers 3. Village council
5. NGO 6.DRDA 7. Other Beneficiaries 8. Friends/ Neighbour/Public figure/Members of local bodies
9. Others (Specify)……

2. What kind of benefit you got under the AIBP Scheme? Is it helped in improvement in your family income?

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3. Are you aware of any other schemes implemented by the Water Resource Department and Soil & Water Conservation Department?

1. Yes 2. No

4. Are you facing any kind of problem in getting benefit under this scheme? Do you think this scheme can help in improving agriculture productivity in your state?

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5. Is there any kind of awareness programme carried out by Water Resource Department and Soil & Water Conservation Department? 1. Yes 2. No
(If yes, explain

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6. What kind of support you expect from the Soil and Water Conservation Department for increasing the productivity?

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8. How do you rate the behavior of departmental staff, when you visit their office for any discussion?

1. Good, 2. Bad 3. Can't say

9. Have you formed or a member of any water user's organization or any other such farmer's cooperative group?

1. Yes 2. No

(If yes what is the role of your organization?

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10. What are the reasons for cultivated area remaining un-irrigated (completed or partially)?

a) Due to absence of irrigational channels b) Scarcity of water c) Uncertainty about supply

d) Conflicts with fellow

11. How does the irrigation department communicate to you about water release?

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12. What is your opinion on the functioning of the department?

a) We get all help required b) We get help only when we ask/complain

c) We get help depending on particular person d) We hardly get any help

e) Any other reason: Specify _____

13. Is there any rain water harvesting method adopted in your village? Kindly explain?

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14. According to you what needs to be done for restoration of cultivable land affected by mining and quarrying?

<u>Investigators comments based on their field observation and interaction with the beneficiaries</u>