

## **Understanding of the Implementation of Watershed Development Project in Imphal West District of Manipur, India**

**Dr. Th. Motilal Singh**

*Agricultural Economist, ICAR-KVK, Imphal West, Manipur, India*

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### **ABSTRACT:**

The implementation of the watershed development project in the Sagolkhong area of Imphal West district of Manipur, India has resulted in the socio-economic changes of the beneficiary farm families. Thus, the impact of this watershed project is mostly found in the livestock sector where both the employment and income generation are given to the rural-unemployed youths and it is marked significant. Also, the overall socio-economic parameters do not change significantly except on some capital formation and farm implements. Among the socio-economic constraints faced by the implementers, participation; innovation; credit facility; land tenureship and topography ranked I; II; III; IV and V respectively. Not only these, feasibility such as lack of time and other implicit problems made them a big hindrance. On the other hand, the socio-economic problems perceived the beneficiaries are non-availability of irrigation water; lack of awareness of the beneficial programs and untimely availability of the subsidy and they stood I; II and III rank respectively.

**KEYWORDS:** Sagolkhong; Imphal West district; land tenureship; Manipur, India

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### **I. INTRODUCTION:**

Farming in their own way for socio-economic development is considered to be an unavoidable aspect of the indigenous people living in different parts of the world. However, the burgeoning challenges due to the impact of global climate changes along with the population pressurization on their farming ecosystem resulted in the stagnant or decreasing agricultural production and productivity trends of food crops in the varied agro-climatic regions of the world. Of the various interventions, watershed approach is considered to be one of the viable options for sustainable development of the various community based farming system. In fact, watershed development is the basis for specific micro-level approach of maintaining the natural resources. The optimal management of these resources with minimal adverse environmental impact is essential not only for sustainable development but also for human survival. So, watershed is an ideal unit calling for multi-disciplinary approach to the natural resource management for ensuring continuous benefit on sustainable basis. It emphasizes the planning of natural resources, specially land, water, vegetations and the socio-economic need of the certain ecosystem and community concerned. The present study was conducted in the Imphal West district of Manipur, India so as to assess the impact of watershed development project on the following objectives:-

### **II. OBJECTIVES:**

1. To study the changes in the Socio-Economic Indicators of the sample Household
2. To assess the changes in the Livestock's populations of farm Households and
3. To analyze the problems and constraints in the implementations of the watershed project in the study area.

### **III. METHODOLOGY:**

The Sagokhong Watershed project was purposively selected for the present investigation. This watershed project was one of the model watershed project sponsored by the Ministry of Agriculture, Govt. of India under Central sponsored project viz., National Watershed Development Project for Rainfed Areas (NWDPPRA) and implemented by the department of Horticulture and Soil Conservation, Govt. of Manipur. For this, a two-stage-stratified random sampling method was used for the selection of three villages and 100 sample households from the watershed areas using proportionate allocation random sampling technique. The study is based on the two types of data vizely "Before and After" the project. A preliminary survey preceded the actual survey by using well-prepared and pre-tested personal interview schedule after discussion with the project authority, watershed development committee of the village and other agricultural and horticultural officials to frame the schedule for farm level enquiry in its proper perspectives so as to gain a firsthand knowledge of the various existing resources and other socio-economic features too. Secondary data were collected from various

reports of the project and published and unpublished record of the Government of Manipur. Statistical tools such as averages, percentages and frequency distribution and t-test were used for the analysis of the data related to the study objectives. Conventional 5 (Five) Point Scale for prioritization of the problems and constraints were also used for the study.

#### **IV. LIMITATIONS OF THE STUDY:**

Data uses for the study is based on the secondary sources of the watershed development authority and the information on the problems and constraints were collected based on the opinion of the beneficiaries. So, the findings of the study may not be generalized with the findings of the other researchers.

#### **V. REVIEW OF LITERATURES:**

FAO 2005 recommended that although watershed management activities have contributed significantly to reducing land degradation and improving the quality of life and livelihood opportunities for many people throughout the world, the real potential of watershed management has yet to be realized. Factors such as outdated approaches, poor project design, inadequate and/or unsustainable financial resources, very short time frames for project interventions and a lack of adequate understanding of the linkages between upland and lowland areas have contributed to under-achievement of watershed interventions. However, during the last decade in particular, new and innovative approaches to watershed management have been developed which have demonstrated better results and show promise of bringing about long term and sustained positive change with respect to environmental, social and economic conditions.

EPA 2008 suggested that many management practices require technical assistance (e.g., Natural Resources Conservation Service [NRCS] engineers, Extension personnel, or private crop management consultants) in design and construction or in management. Lack of such assistance can slow implementation. We should consult with NRCS and other sources of technical assistance to determine future availability and possibly adjust your timetable accordingly. Installation of structural practices, growth of vegetative measures, or adoption of management or behavioral changes might take longer than predicted. We might want to adjust your timetable to reflect this new reality. Cultural or social barriers to the adoption of some practices exist. Some stakeholder groups might avoid participation in government programs. Traditional aesthetic preferences might conflict with development of riparian buffers. If such factors become evident, you might need to increase incentives to landowners or undertake additional I/E efforts.

Bagdi and Rathore (2014) revealed that people's participation in watershed management programmes is an important strategy of government of India for making watershed programmes successful. Participation of local beneficiary farmers is mandatory in planning, implementation and maintenance of watershed development projects as per common guidelines issued by Ministry of Agriculture, Government of India. National Bank for Agriculture and Rural Development (NABARD) has launched holistic watershed development programs on 2<sup>nd</sup> October, 2006 to help farmers in the six distressed districts of Vidarbha region of Maharashtra in India. Therefore, there is a need to know the level of participation by the local people in government sponsored watershed management programs. The study was conducted during 2011 – 2012 in this Vidarbha region of Maharashtra to measure the extent of people's participation in NABARD Supported Holistic Watershed Development Programme (NSHWDP). In this paper a detailed structured three-point-continuum schedule was developed by the investigators regarding various aspects of participation by local people in soil and water conservation for watershed management programme. People's Participation Index (PPI) was also designed to compute the extent of people's participation. Data for this study was gathered through personal interviews from farmers of six selected districts in Vidarbha region of Maharashtra. Findings of this study indicated that the extent of people's participation in planning was 63.7 per cent, in implementation was 57.7 per cent and in maintenance was 75.1 per cent. It shows that the extent of people's participation in NSHWDP in the six distressed districts of Vidarbha region of Maharashtra was moderate during watershed programme planning and implementation phases, whereas, high level of participation was exhibited during maintenance phase.

Symle *et al.* 2014 stated that there will always be tension between "top-down" and "bottom-up" and effective development schemes require a judicious mix of the two. Getting the balance correct so that "bottom-up, demand-driven" approaches to policy implementation are in line with the prevailing policy, regulatory, administrative and other normative frameworks will be inevitably complicated and require iterative, learning-based processes. As a result, one person's "bottom-up, demand-driven" approach can be another's "top-down, supply-driven" approach. Government's programs have specific objectives and will offer a limited set of instruments, using those that are thought to be "the best" for achieving those objectives. Under these circumstances, voluntary participation—arguably an essential ingredient of achieving real and effective demand—may not always be a reflection of actual demand, particularly amongst the rural poor where options and opportunities are limited and the initial choice comes down to opting in or going without. To this challenge,

there is no durable solution. Rather it is one more factor to be recognized and accommodated when designing a demand-driven program with their limited menus of options.

Also, water as a common pool resource remains among the most serious, unresolved issue. There is a broad recognition and understanding of the problems around allocation and scarcity; however, addressing the larger issues of the political economy of water resource allocation is a challenge far beyond the scope of micro-watershed development projects. In that context, it becomes incumbent on all projects and programs to specifically include instruments, processes and mechanisms to ensure that they are not aggravating the problem. Depending on how critical water availability issues are, basic water balance and water accounting tools may suffice for micro-watershed level interventions.

Further, if micro-watershed programs are to effectively contribute toward achieving higher-level objectives at the watershed, sub-basin and/or basin-levels, effective institutional mechanisms will have to be developed for this purpose as well as to measure and monitor outcomes and impacts. While it is a necessary condition to rationalize both the local and state-level organization and coordination, it is arguably more important to make significant progress first in the local planning and implementation frameworks. Doing so provides both the impetus and logic for identifying the practical reforms needed to make the state agencies both accountable and responsible for harmonizing and coordinating their efforts with the other state agencies with whom they have overlapping and/or interdependent mandates. Furthermore, the development and organization of the local framework helps clarify what the roles and responsibilities of the state-level agencies should be—and thus the types of reforms and reorganization required—to promote sustainable use of water resources in a decentralized environment.

The projects monitored certain financial aspects—household income, income generating activities, agriculture/livestock/horticulture income—all good practices and extremely important for assessing the likelihood of sustainability. Ultimately profitability and financial viability are also essential to obtaining improvements in natural resources management. Often neglected is the validation of technical/extension messages to ensure they are not placing project participants at financial risk. Such analysis is also critical for evaluating the efficiency of project interventions and approaches, for analyzing policy options, to test assumptions and to validate that the programs benefits outweigh its costs to society. Project support in this particular area would have been critical and potentially very influential on government's overall approach.

Sustainable WSM requires an incentive structure that continues beyond the project period, supported by economic instruments that assign costs and benefits according to public and private goods. At the project formulation and inception stage, all three projects considered post-project maintenance of assets and made provision for this by attempting to ensure that beneficiaries continue to receive a stream of benefits post project. This concern extends beyond project created works and assets to those of sustaining the organizational structures that have a role in ensuring continuity of assets and other project impacts.

All stakeholder groups in the communities and watersheds participated—including vulnerable groups of women, tribals, landless and marginal farmers—and planning sought opportunities in livelihood development and improvement for all, balancing technical objectives with considerations of social inclusion and equity. Natural resources based projects should be undertaken with a focus on developing sustainable livelihood options for the majority, if not all, of the beneficiaries. It is better to focus first on already existing and functioning livelihoods in order to improve their earning potential; followed by developing new opportunities in agriculture, nature-based and allied sectors while also training youth in acquiring market demanded skills and competencies.

Most importantly the transparency and public accountability, especially in regards to works and monies, is the key to smooth implementation and harmonious social relations. CBOs that have continued to function effectively post-project have been those that consistently applied principals of transparency and accountability. Effective conflict resolution mechanisms were also the key to maintain group cohesion and momentum

Floress *et al.* 2015 suggested that successful watershed management and changes in water quality conditions are dependent upon changes in human behaviors. Those tasked with managing watersheds and other natural resources often assume that people are not acting to protect or restore their resources because they lack the necessary knowledge and understanding. However, individual behaviors are impacted by a variety of social, psychological, institutional, and economic factors that need to be understood for successful implementation of watershed management strategies. This paper provides an introduction to the field of human dimensions of watershed management, an overview of social science concepts that have been found to explain water-related behaviors, and how social information can be translated into actionable items in a management plan.

FAO 2017 reviewed the achievements, and also the shortcomings, of 12 watershed management projects technically supported by FAO over the past decade, with a view to learning from experience. Unlike sectoral development approaches, watershed management involves examining the interactions among various natural processes and land uses and managing land, water and the wider ecosystem of the watershed in an integrated way. Watershed management is best carried out as a stepwise multi-stakeholder process. The review

identifies a sequence of steps that watershed management projects or programs should ideally follow. The approach has demonstrated its effectiveness for responding to global challenges of water supply, land restoration, climate change adaptation, disaster risk management and fighting hunger. The study results suggest that future watershed management projects and programs must be implemented over longer time frames, and they require sustained and coordinated investment from the public and private sectors. The review identifies the following areas for moving forward: institutional strengthening for improved watershed governance; watershed monitoring; capitalizing on increased data availability; knowledge sharing and learning; and strategic partnerships for joint action on the ground.

## VI. RESULTS AND DISCUSSION:

### A. *Socio-Economic Indicators of the sample Households in Numbers (Before and After the Project)*

The impact of the Watershed Development Project on the beneficiaries households can be measured in terms of their changes in agriculture, horticulture, fishery, animal husbandry and people' apathy. Apart from all these, there are certain other developments which are of course not the direct outcome of the project but can certainly be associated with the beneficiaries. Also, development is a cyclical process and implementation of the watershed project is supposed to have long term development impact on socio-economic conditions of the farm households. Such parameter estimates may be in terms of improvement in their standard of living as well as increase in spectacular investment or possession of farm implements, machinery and other structures.

**Table No 1: Changes in the Socio-Economic Parameters of the sample households**

Sl. No.	Particulars	BP	Ap
1	Puccha House	2	5
2	Tin House	32	36
3	Kuccha House	66	66
4	Cattle Shed	34	34
5	Pig Shed	9	15
6	Plough	20	22
7	Sickle	134	166
8	Spade	284	297
9	Sprayers	5	11
10	Others	144	167
11	Tractor	4	6
12	Power Tiller	0	2
13	Truck	2	4
14	Scooter	12	17
15	T.V.	21	29
16	Cycle	30	47
17	Pressure Cooker	19	39
18	LPG Connections	8	45
19	Bank Account	-	23
20	Sewing Machine	3	45
21	Rice Mill	2	9
22	Other Processing Machines	0	7

BP=Before Project

AP=After Project

The above table reveals the existence of basic amenities like *puccha*, *tin*, *kuccha* houses, cattle and pig sheds etc. which show a marginal increased from before the project except the number of pig sheds wherein there is an increase from 9 to 15 in numbers during the study period. Besides, the numbers of plough, sickle, spade and sprayers have increase from 20, 134, 284 and 5 to 22, 166, 297 and 11 respectively during the study period. The number of tractor and power-tiller has come up from 4 & 0 to 6 and 2 respectively during the pre- and -post period. The number of sewing machines and rice-mill also marginally changes from 3 to 13 and 2 to 9 respectively. In addition, others recreational items like T.V., Scooter have been coming up from 21 & 12 to 29 and 17 respectively. Presence of the Vehicles like trucks in the study areas do not change in the number. However, the number of bicycle has been slightly increased from 30 to 47. Interestingly, the number of bank account holders in the study areas have increased significantly i.e. from 0 to 23 in numbers. Others mini-scale cottage industries processing units are also increased marginally. However the numbers of LPG connection households have increased significantly from 8 to 45 in numbers which is a positive sign in the watershed areas.

Thus the overall socio-economic parameters do not change significantly except on some capital formation and farm implements.

**B. Changes in the Livestock Populations of the Sample Households**

The investigation of the livestock in the study area accounted that the watershed area has benefitted mostly in the livestock components. Cow; Bullock; Goat; Pig and Poultry are the main livestock components found in the study area. The population of improved and local breeds for Bullock and Buffaloes which were as 8, 12, 28, 32 before the project are found to be 7, 13, 26, and 35 after the project. Also, the numbers of improved and local pigs are found to be 8 & 65 and 15 & 32 respectively during the pre- and post period. The numbers of poultry birds have increased from 265 to 2250 for the improved breeds and 950 to 984 for local breeds before and after the project.

**Table No 2: Changes in the Livestock Population of Sample Households in the Watershed Area (in numbers):**

Particulars	BP		AP		Percentage Change	
	Improved	Local	Improved	Local	Improved	Local
Cow	5	62	9	73	80	14.51
Bullock	8	28	12	32	50	14.28
Buffalo	7	26	13	35	85	34.61
Goat	0	8	6	17	600	112.50
Pig	8	15	65	32	712	113.40
Poultry	265	950	2520	984	850	3.50
Total	293	1089	2625	1173	795**	7.77 (NS)

\*\* = 5% level of significance      BP = Before project      AP = After project      NS = Non-significant

Thus, the percentage changes for the existing population of the livestock corresponding to the improved and the local breeds in the Sagolkhong Watershed area are found to be 80 per cent & 14.51 per cent for cow; 50 per cent & 14.28 per cent for bullock; 85 per cent & 34.61 per cent for buffalo; 600 per cent & 112.5 per cent for goat; 712 per cent & 113 per cent for pig and 859 per cent & 3 per cent for poultry respectively. Thus the impact of this watershed project is mostly found in the livestock sector where both the employment and income generation are given to the rural-unemployed youths and it is marked significant.

**C. Socio-Economic Constraints Perceived by the Watershed Beneficiaries**

Implementation of watershed development project in the heterogeneous community implies a lot of problems and constraints to both the implementing agencies and the beneficiaries' households too. Such problems and constraints have been encountered before; during and even after the project period too. A thorough study of such factors will benefit further course of action regarding the watershed development project.

The socio-economic constraints perceived by the respondents are analyzed and scored them on the basis of social; environment; economic; feasibility and other problems and accordingly, participation; innovation; credit facility; land tenureship and topography ranked I;II;III;IV and V respectively. Among the above Constraints, participation stood as one of the major problem accounted with social problems like not-known; not convinced; lack of awareness; laziness and traditional bound agricultural system. Not only these, feasibility such as lack of time and other implicit problems made them a big hindrance.

**Table No 3: Socio-Economic Constraints Faced by the Implementing Agency**

Problems	Social	Environment	Economic	Feasibility	Others	Cumulative Scores	Ranks
Participation	61	0	0	15	12	347	I
Credit facility	65	0	0	0	0	325	II
Land Tenureship	43	0	0	0	37	252	III
Innovation	17	23	27	35	0	228	IV
Topography	0	35	17	0	0	191	V

Since participation is less, innovation will be automatically very less. Innovative ideas are often influenced by social problems, environmental problems such as delay in monsoon, water scarcity etc. also economic problems like non-availability of money and costly nature of the inputs made them idle throughout the season except on few occasion like monsoon.

Another factor which can be usually uplift or made an impact to the existing farming community is the extension of the credit facility. But it has been revealed that the credit facility is very rare in the areas. The attributing factors may be due to the existing system of land holding which is accounted as social problem because credit system are usually made through land mortgage or through any policy specially with the land authority. However, the land owner is basically the village chief in case of the hilly areas wherein the credit extension is almost impossible or out of the farmer's capability.

Farmers, who are willing to work hard, innovate and expect credit from institutions often becomes helpless due to the prevailing system of land ownership especially in the hilly region. Over and above, the case of land ownership issues and disputes existing among the various tribes of the region made them hard to go out for day to day earning.

Despite of the various constraints, another factor which is so common to the hilly region is the topography. Due to the geographical nature of the land, it has been very cumbersome to adopt any new technology except with certain specific and suitable technology. In fact, environmental and economic factors play a major role even in.

**D. Socio-Economic Problems Perceived by the Watershed Beneficiaries**

The socio-economic problems such as non-availability of irrigation water; lack of technical guidance; lack of awareness of the beneficial programme; lack of suitable technology; untimely availability of subsidy; insufficient fund and biasness etc were ranked based on the practical experience of the farmers and accordingly non-availability of irrigation water; lack of awareness of the beneficial programme and untimely availability of the subsidy stood I; II and III rank respectively.

**Table No 4: Socio-Economic Problems Perceived by the Watershed Beneficiaries**

Problems	Most Important	Important	Somewhat Important	Less Important	Least Important	Cumulative Scores	Ranks
Non-availability of irrigation water	37	30	26	6	0	395	I
Lack of awareness of beneficial programmes	0	29	37	22	10	281	II
Insufficient fund	15	19	17	26	4	258	III
Untimely availability of subsidy	28	18	11	2	1	250	IV
Biasness	14	5	13	4	10	147	V
Lack of suitable technology	0	3	5	35	0	62	VI
Lack of technical guidance	0	0	2	4	34	48	VII

Regarding the non-availability of the irrigation water, it may be noted that the topography of the area being sloppy and most of the rain water have been lost through within short period of time resulted in low water availability. Also, it was expected that the soil and water conservation measures adopted in the area could be helpful in solving the problems of soil and water losses but due to lack of effective implementation of the conservation measures and post management by the beneficiary committee made the problem more severe and led to non-availability of water.

Since the people living in the area have low socio-economic status, they feel and wish something as a gift or as a subsidy/incentive from the Govt. side so that they can implement the same for them in order to uplift the socio-economic condition. In doing so, they often failed to get their expectations and economic status is also not able to change satisfactory.

Also the majority of the farmers in the area get unaware of the beneficial programme. They came to know the importance of the beneficial programme after the project has over. The reason may be due to ignorance, illiteracy, lack of supportive-progressive farmers, limited number of awareness cum training

programme and involvement of good local leaders. But even among the literate person, it has been found that the beneficial programmes are not used, maintained or carried on. The main reason may be due to laziness or traditional bound system and change of occupations etc. Other problems like lack of technical guidance, suitable technology, insufficient fund and biasness are considered as an important socio-economic constraint where the management and policy makers need to give greater emphasis on the planning aspects relating to watershed development in the hilly area of the North-East region must give greater emphasis furthermore.

## **VII. POLICY IMPLICATIONS:**

In spite of investing a lot of fund for different components of watershed, there is still a gap which acts as a hindrance in the implementation of the watershed development project. Unless this gap is not narrowed down, the overall effectiveness of the programme will also be retarded. The analysis of the various problems and constraints in the implementation of the project gives an ample room for policy implications. Based on this, some of the policies have highlighted, even though this cannot be the recommended policy for every watershed development project, a generalization on the pros and cons will mostly help the need of the planner and implementers who have been closely associated with watershed management education.

1. Since 50% of the beneficiaries are from the hilly areas where the *Kuki tribes* are settled, the existing form of land tenureship is a very sorry figure for the people of the area. Most of the land in hilly areas of the beneficiary farmers is unable to take much opportunity of the implementing programmes. In the hill regions of Manipur state, tribal peoples are neither the owner of the land nor have the right to use the land whenever they required. They leased-in the land on certain condition only. That is why the implementing agency had faced a lot of problems in various components of the watershed project. They have to negotiate the village *chief/ Khullakpa/ Headmen* for using the land in soil and water conservation measures and even during afforestation programme. So, in order to work better for the watershed development project, the present existing *land tenureship system* should be taken into account. Government intervention can help a lot for alternative means of land ownership.

2. Watershed project must be implemented with the full participation of the local people; they will not know the importance of the project without participation. So, people apathy forms the basis of the watershed development project. Efforts should be made by the project implementing agencies and the watershed development committee so as to attain maximum participation.

3. Most of the implemented technology failed to perform at its best due to the low preference by the beneficiaries. Hence, technology demonstration may be conducted for both the newly introduced and the local indigenous technologies. In fact, the choice of any technology for watershed should be made on cafeteria basis.

4. While selecting the beneficiaries, the project implementing agency often ready to hear the words of near and dear one. To make the project a promising one, effort should be made to minimize biasness as far as possible. Because if biasness happens to exist, the chances of low participation will come into play. As a result of these, the overall objective of the project may not be fulfilled.

5. In order to bring more productive breeds in the watershed areas, the project implementing agency must focus on Artificial Insemination; Castration and introduction of new breeds suited to the local condition. This will help to ensure a better socio-economic condition of the people.

6. Village level small scale or cottage industries have been an important part of the rural economy. However the numbers of small scale industries running in the villages are not marked upto the satisfactory level. Optimum efforts should be made to develop and improve these industries during the execution of the project especially for women.

7. Common Property Resource like community ponds; common grazing fields; social forestry and farm forestry should be encourage so as to divert the economic activities or biotic pressure of the peoples towards watershed resources. In other words, emphasis should be made to minimize the biotic pressure on the degraded features.

8. Effective SHGs with membership's equity must be formed both during the project implementing period and after the project period.

9. As usual, women in the sagolkhong watershed area are found to be engaged in such economic activities. Thus, the need for inclusion of women in watershed development committees or self-help groups is a must.

10. Sometimes watershed area is composed of both homogeneous and heterogeneous community. When such features happen to co-exist, the success of effective implementation of the project is less because there are lots of communities having differences in their ideology. So, watershed project must be developed separately for homogeneous and heterogeneous community.

### VIII. CONCLUSION:

The implementation of the watershed development project in the Sagolkhong area has given an opportunity to the beneficiary farm families in terms of their socio-economic features such as housing, farm implements & machineries and other social capitals. Not only this, the impact of this watershed project is mostly found in the livestock sector where both the employment and income generation are given to the rural-unemployed youths and it is also marked significant. Also, the overall socio-economic parameters do not change significantly except on some capital formation and farm implements. Among the socio-economic constraints, participation stood as one of the major problem accounted with social problems like not-known; not convinced; lack of awareness; laziness and traditional bound agricultural system. Not only these, feasibility such as lack of time and other implicit problems made them a big hindrance. Among the socio-economic problems, non-availability of irrigation water; lack of awareness of the beneficial programs and untimely availability of the subsidy stood I; II and III rank respectively.

Watershed development project is doing for sustainability. In other words, they work for poverty elevation and eco-restoration for future generation. If it is blindly done, without the consent and knowledge of the people residing in the watershed area, the whole investment will be unproductive. So, in order to get the better return from each project, greater emphasis should be made to develop the human resources of the people in the watershed area which will be the key factor in the whole project. Thus, a sound watershed management education is necessary as abroad-base-line treatment.

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