

Impact Assessment Report
DROUGHT PRONE AREA DEVELOPMENT PROGRAMME
(DPAP-BATCH IV)

Nalgonda District, Andhra Pradesh



GLOBAL THEME - AGROECOSYSTEMS



**International Crops Research Institute
for the Semi-arid Tropics**

October 2010

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Patancheru 502 324, Andhra Pradesh, India

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We gratefully acknowledge the Commissioner, Department of Rural Development, Government of Andhra Pradesh for providing co-ordination with Project Director, District Water Management Agency (DWMA), Nalgonda; to guide us in selecting watersheds well distributed across the district to capture complete representation of variability of watersheds development for the impact assessment study of DPAP Batch IV watersheds in Nalgonda.

We are thankful for the support and guidance of Project Director, DWMA for providing all support from their project staff for their active participation. We record our profound thanks to Mr. K. Janardhan Reddy, Additional Project Director for his help arranging our tour schedules, contact persons at different watersheds every day during our field visits and to organize village meetings in all watersheds, which was most crucial in our efforts.

Our team acknowledges the useful information shared by Chairmen, Secretaries and DPAP project beneficiaries during focused group discussions (FGD) and field visits.

We profusely thank Dr. William D. Dar, Director General of ICRISAT for his approval to undertake this study and encouragement for a good analysis of the study.

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A. P

ABBREVIATIONS

| | |
|-------------|------------------------------------|
| APD | Assistant Project Director |
| CCT | Continuous Contour Trenches |
| DRDA | District Rural Development Agency |
| DPAP | Drought Prone Area Programme |
| DWMA | District Water Management Agency |
| FGD | Focused Group Discussions |
| GCS | Gully Control Structures |
| IWD | Integrated Watershed Development |
| LBS | Loose Boulder Structures |
| MDT | Mandal Development Team |
| NGO | Non-governmental Organization |
| NRM | Natural Resources Management |
| PD | Project Director |
| PIA | Project Implementing Agency |
| PRA | Participatory Rural Appraisal |
| PT | Percolation Tank |
| RFDs | Rock Filled Dams |
| SF | Social Forestry |
| SHGs | Self-Help Groups |
| SMC | Soil Moisture Conservation |
| SWCS | Soil Water Conservation Structures |
| UGs | User Groups |
| VSS | Vana Samrakshana Samithi |
| WA | Watershed Association |
| WS | Watershed |
| WDC | Watershed Development Committee |
| WDF | Watershed Development Fund |
| WDT | Watershed Development Team |

EXECUTIVE SUMMARY OF IMPACT ASSESSMENT

In Nalgonda district, DPAP – batch IV received funding for development of 75 watersheds in 8 mandals and the project was implemented from 1998-99 to 2005-06 to treat about 40000 ha with watershed development.

1. One of the main objectives of DPAP was to ensure and enhance people's participation in this programme. Community participation was ensured by taking up soil and water conservation activities, construction of water harvesting structures and crop diversification with orchard crops. In watershed villages, even though EPA was not undertaken, villagers were satisfied and appreciative of the impacts due to implementation of watershed works.
2. Although there was ample scope and opportunities to address the issues of women by forming self-help groups (SHGs) involving weaker sections of the society, this aspect was not actively pursued and no micro enterprise/income generating activities were introduced to improve the livelihoods of women SHGs in the selected 20 watersheds.
3. User groups (UGs) were formed in all the twenty watersheds but soil and water conservation activities and construction of water harvesting structures were undertaken by the WCs without much participation of people.
4. In 10 watersheds out of 20 watersheds assessed, water-harvesting structures constructed were generally of good quality and suitably located. Works were not completed in 2 watersheds due to internal disputes in the villages. In 2 watersheds, locations, design criteria and quality of construction of the structures are not appropriate. In other 6 watersheds, locations and quality of construction of some of the structures are not appropriate. However, in these watersheds, for lack of maintenance of the structures for a longer period, some structures were damaged, need immediate attention to repair these structures and remove bushes and siltation to improve efficiency of the water harvesting structures.
5. Farmers in eleven watersheds located in different mandals reported an increase in ground water levels ranging from 0.5 to 1.0 meter generally and in six watersheds water level raise was up to 2 meters, in 2 watersheds raise was more than 2 meters and increased availability of water for irrigation up to February-March months. In eight watersheds, the number of functional wells increased to more than 150 in each watershed, as an indication of water availability.
6. Period of water availability for irrigation extend from November-December months before the watershed development, to end of February-March after the watershed development. This situation favored for double cropping with one or two supplemental irrigations for second crops between January to March every year.
7. In most of the villages there was a clear agreement on availability of drinking water round the year after watershed development project implementation in their area.
8. In some watersheds water storage in percolation tanks providing drinking water for cattle population even during summer months.

9. Crop intensity increased between 150%-200% as the number of bore well those support second crop were more than 100 per village. Due to availability of water for longer period in the season up to end of February-March, crops like paddy, vegetables, groundnut, sunflower and maize as second crop after paddy are grown.
10. Our enquiries revealed that there was considerable interest generated among farmers for sweet lime, acid lime and mango cultivation on seeing the success of watershed farmers planted these orchard crops through DPAP-IV.
11. Farmers have diversified their annual food crops with orchard crops like sweet lime, acid lime and mango and getting a sustainable net income ranging from Rs.20,000 to Rs.40,000 per acre based on growth and age of orchard crops developed through DPAP-IV.
12. Development of common property resources (CPRs) was done in eleven watersheds of the twenty selected watersheds in the project for the impact assessment study. In all the watersheds CPRs were developed similar to the entire watershed with construction of check dams, percolation tanks and formation of field bunding as CPRs land had already been under cultivation by SC/ST farmers with usufruct rights in several watersheds.
13. In the selected twenty watersheds for impact assessment, the migration for employment reduced to almost nil from as high as 15%-50% in some villages, not only due to watershed development and crop productivity increase, but also because of National Rural Employment Guarantee Scheme (NREGS) of the central government.
14. Our analysis of focused group discussions with village communities indicate that only in 25% (5) of the watershed villages farmers expressed affirmatively for withstanding drought effects for one year (risk reduced by 50%) and vulnerable for mainly fodder scarcity as there is no fodder security for large number of goat, sheep and cattle population.
15. Farmers and WC members in almost all watersheds mentioned that if the WDF was made available for repair and maintenance of watershed structures or for construction of much needed new structures, the impact would have been felt very much by the beneficiaries in the watershed.

BACKGROUND

Department of wasteland development under the Ministry of Rural areas and Employment, Government of India, sanctioned the Integrated Wasteland Development Project (DPAP) - Phase IV for Nalgonda district of Andhra Pradesh. The project encompassed treatment of about 40000 ha of cultivable land in 75 watersheds in 8 mandals of Nalgonda district. The objectives of this project were: (1) To integrate land and water conservation and management into the village micro-watershed plans; and (2) To enhance people's participation in the integrated watershed development program at all stages. This project was sanctioned for implementation with a project budget outlay of Rs. 1517.08 lakhs (Table 1) and to accomplish over a period of eight years from 1998-99 to 2005-06.

Table 1. Development activity component-wise expenditure in the project.

| Components of developmental activities | Details of project funding (Rs. in lakhs) | | |
|--|---|-------------------|--------------|
| | Total allocation | Total expenditure | % |
| Community organization and training | NA | 156.02 | 10.28 |
| NRM works | NA | 1201.45 | 79.19 |
| Administrative costs | NA | 155.21 | 10.23 |
| Total | 1517.08 | 1512.68 | 99.71 |

District Rural Development Agency (DRDA) Nalgonda, now designated as District Water Management Agency (DWMA) was assigned the responsibility of providing infrastructure for implementation, management of the project through project implementing agency and financial supervision of the project and received an amount of Rs.1517.08 lakhs grant at 50% contribution each from GOI and government of AP. DRDA-Nalgonda selected government and non-governmental agencies for project implementation during 1998-99 to 2005-06. The details of 75 selected watersheds in respective mandals for treatment is given in Table 2.

Table 2. Details of 75 watersheds covered by DPAP-IV project for treatment in various mandals of Nalgonda.

| S No. | Mandal | No. of villages covered | No. of watersheds |
|--------------|---------------|--------------------------------|--------------------------|
| 1 | Munugode | 7 | 10 |
| 2 | Chandampet | 4 | 6 |
| 3 | Devarakonda | 3 | 8 |
| 4 | Dindi | 6 | 11 |
| 5 | Gurrampodu | 6 | 11 |
| 6 | Noothanakal | 6 | 11 |
| 7 | Atmakur(S) | 4 | 12 |
| 8 | Narayanapur | Forest department | 6 |
| | Total | | 75 |

The project implementation started in the year 1998-99 and works were implemented in 75 watersheds as per approval. The project execution over run due to delay executing works and non-compliance of guidelines in the stipulated period of four years and was extended up to 2005-2006, which was completed in eight years.

Agricultural Situation in Nalgonda

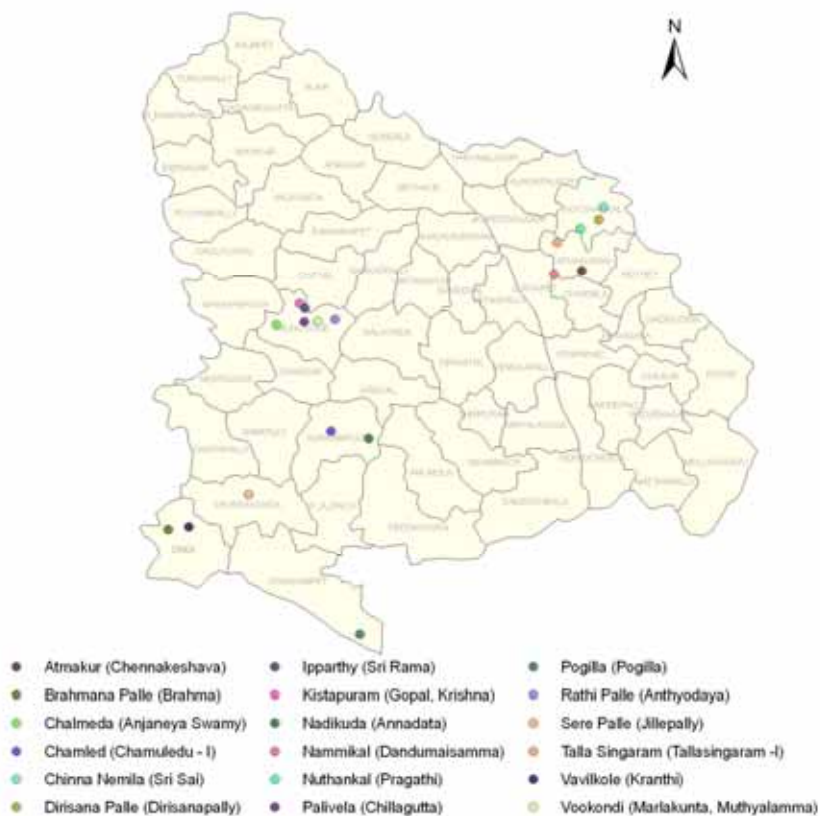
Soils and Land use pattern

In Nalgonda, sandy loams (65%) and black cotton soils (35%) are the major soil types and salt affected soils are also present. Out of 14,24,000 ha of total geographical area of Nalgonda 5.86% area is under forest, 8.27% area is under barren and uncultivable land, 6.81% land put to non agricultural use, 1.72% is cultivable waste, 6.87% area is under permanent pastures and other grazing lands, 0.65% land is under miscellaneous use, 32.54% area is under other fallows, 39.29% area is under net area sown and 47.0% is gross area sown.

Cropping pattern

Paddy, sorghum, cotton, castor, groundnut and pulses are major crops grown in the district. Horticulture orchards of sweet lime, acid lime and mango have come up in about 1,00,000 ha area.

The district map of Nalgonda with mandals and villages / watersheds assessed for impact were marked in map 1.



Map 1. Watersheds assessed for impacts in various mandals of Nalgonda.

Rainfall

Nalgonda district receives a total normal rainfall of 743 mm per annum with 74% of annual rainfall contributes to main cropping season during South-West Monsoon from June to September and North-East monsoon provides 20% of rainfall between October and December months. Drought conditions generally prevail during south-west monsoon season determines the crop production in the season.

Rainfall in the district since crop season 1997-98 until 2009-10, has been erratic and below normal during eight years out of 13 years (Figure 1). Hence, farmers in some watersheds during focused group discussions mentioned about low rainfall that lead to less impact of watershed interventions/development.

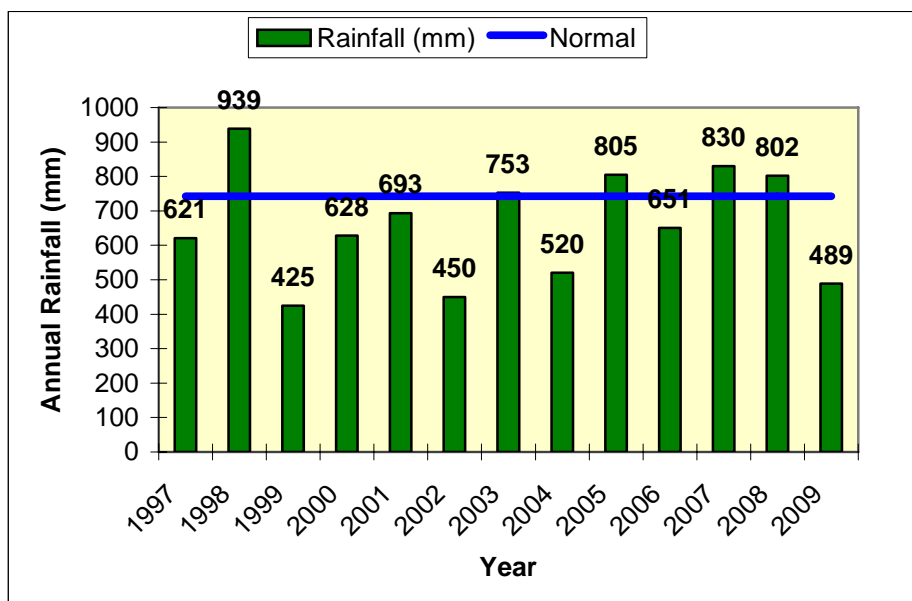


Figure 1. Annual rainfall of Nalgonda district and district normal rainfall.

METHOD OF IMPACT ASSESSMENT

Multi-disciplinary impact assessment team

Dr. S P Wani, Principal Scientist (Watersheds) and Regional Theme Co-ordinator (Asia),
Global Theme-Agroecosystems

Mr. Ch Srinivasa Rao, Sr. Scientific Officer (Soil Science)

Mr. L S Jangawad, Sr. Scientific Officer (Agricultural Engineering)

Mr. V Nageswara Rao, Lead Scientific Officer (Agronomy)

ICRISAT's Global Theme on Agroecosystems, which was responsible for the impact evaluation of the DPAP watershed projects in Nalgonda, consists of scientists from various professional backgrounds: soil science, hydrology and agricultural engineering and agronomy. To undertake the impact assessment of watershed projects, multi-disciplinary team was formed that consisted of (at least) three researchers with different areas of expertise and (at least) one scientific officer who was responsible for the technical inspection and evaluation of the constructed structures in the watershed. To assess the different aspects of watershed development projects, the scientists in each team had scientific expertise in Agronomy and soil science/hydrology, engineering/technical aspects and social aspects/institutions.

As a first step, ICRISAT's Global Theme Agroecosystems discussed the "terms of references" from the Government of India and shared the experiences from previous impact and midterm assessments. The division of tasks was undertaken in a participatory manner

depending on the professional expertise and the local knowledge of the scientists and scientific officers. We had divided tasks of the impact assessment in two parts (1) Focused Group discussions, with participation of the local population, a crucial factor of a successful impact assessment; and (2) Field visits, to ensure verification of watershed structures, their maintenance and assess their use.

DISCUSSIONS WITH DWMA OFFICIALS

ICRISAT undertook the assessment with an open and participatory approach with the staff of the DWMA and village level staff. The involvement of the program staff of the respective watershed projects at various stages of the assessment aimed at enhancing the ownership of the results among the extension personnel.

Impact assessments in watersheds of DPAP-IV, Nalgonda started with the ICRISAT team meeting Mr. K. Janardhan Reddy, Additional Project Director and two of the Assistant Project Directors (APD) of DWMA and their staff under the instruction of Project Director of the District Water Management Agency, Nalgonda.

Meeting with project staff helped us to finalize the list of watershed villages (Table 3) evenly spread across 7 mandals in Nalgonda district (Map 1, Nalgonda district) for impact assessment and scheduled our visit. We requested to make ensure the availability and participation of concerned APDs at FGD in watersheds in their respective mandals and their presence was quite helpful in organizing village meeting and field visits to watershed structures

Table 3. List of selected DPAP-IV watersheds for impact assessment in Nalgonda.

| S. No. | Name of the watershed | Mandal | Name of the PIA |
|--------|-----------------------|-------------|------------------------|
| 1. | Annadata | Gurrampodu | PEPCARDS, Nalgonda |
| 2. | Anjaneya Swamy | Munugode | SISS, Munugode |
| 3 | Anthyodaya | Munugode | SISS, Munugode |
| 4 | Brahma | Dindi | NRASS, Devarakonda |
| 5. | Chamuledu-I | Gurrampodu | PEPCARDS, Nalgonda |
| 6 | Chennakeshava | Aimakur (S) | AMYS, Suryapet |
| 7. | Chillagutta | Munugode | SISS, Munugode |
| 8. | Dandumaisamma | Aimakur (S) | AMYS & DISHA, Suryapet |
| 9 | Dirisanapally | Noothanakal | MOTIVE, Nalgonda |
| 10. | Gopal | Munugode | SISS, Munugode |
| 11. | Jillepally | Devarakonda | ADA (SC), Devarakonda |
| 12. | Kranthi | Dindi | NRASS, Devarakonda |
| 13. | Krishna | Munugode | SISS, Munugode |
| 14. | Marlakunta | Munugode | SISS, Munugode |
| 15. | Muthyalamma | Munugode | SISS, Munugode |
| 16. | Pogilla | Chandampet | JURDC, Nalgonda |
| 17 | Pragathi | Noothanakal | SHEAD, Nalgonda |
| 18 | Sri Rama | Munugode | SISS, Munugode |
| 19 | Sri Sai | Noothanakal | MOTIVE, Nalgonda |
| 20 | Tallasingaram - I | Noothanakal | MOTIVE, Nalgonda |

FOCUSED GROUP DISCUSSIONS

The focused-group-discussions were held with members of the watershed development team, the watershed committee, farmers/beneficiaries and whenever possible with the Gram Panchayat president even. Focused-group-discussions enabled us to elicit valuable information in short time and to include the community in the process. It is important to check, however, the participation of a representative sample of the local population in order to extract meaningful information that helps to draw conclusions of the whole picture. We standardized a comprehensive version of focused group discussion format, which is used for this assessment. ICRISAT ensured the participation of majority local language speakers in the multidisciplinary team and structured the focused-group-discussions according to the guidelines and the specific local context. The meetings focused on the community's knowledge of the watershed program, their personal benefits as well as their assessment of the impacts for the whole community. In villages where women Self-Help-Groups (SHGs)

were formed under the watershed project, a special focus was laid on discussions with the SHG members and the impacts upon women's lives of the watershed project.

The meetings also served as an opportunity to verify the records of the watershed development team wherever available and to discuss aspects such as maintenance of the structures, sustainability and other schemes implemented in the village.

FIELD VISITS

While the focus-group-discussions were held in the village, other member(s) of the team inspected a minimum of two structures considering them as samples of these physical structures such as check-dams, percolation tanks, CCTs, open wells and gully control structures, assessed their quality of construction and selection of location and measured structures on a random basis and assess their potential impacts for number beneficiaries and extent area and on the community well-being. Individual farmers were interviewed for their gains by watershed interventions when they were spotted in the fields nearby the structures wherever possible.

After completing the field visits, the observations were openly shared with the participating program staff. Their comments and feedback were also included in the assessment of the watersheds.

PERIOD OF EVALUATION

Impact assessment of watersheds in Nalgonda was done in 2nd, 3rd and 4th weeks of December 2009 and the actual field visits took place for three weeks in Nalgonda district with the help of project staff of DWMA, Nalgonda.

WATERSHED-WISE IMPACT ASSESSMENT

The details of focused group discussions, assessment of watershed interventions including our observations of soil and water conservation structures (pictures) and watershed-wise impacts on watershed communities were provided here under in the suggested format for all the 20 watersheds assessed during December 2009.

**Impact Assessment Report
Annadata Watershed, DPAP – IV batch,
Gurrampodu Mandal, Nalgonda district, Andhra Pradesh**

1. Details of watershed:

| | |
|--|--------------------------------|
| 1. Name of the Scheme: | DPAP – IV Batch |
| 2. Name of the watershed: | Annadata |
| 3. Names of villages in the Watershed: | Nadikuda |
| 4. Villages/Mandal/District: | Nadikuda/ Gurrampodu/ Nalgonda |
| 5. Name and Address of PIA: | PEPCARDS, Nalgonda |
| 6. Total area of the watershed: | 500 ha (450 ha Treated area) |

2. Land Use Pattern:

| | |
|--------------------------------------|-----|
| i. Arable land (ha) | 320 |
| ii. Non-arable land (ha) | 180 |
| iii. Government/ Community land (ha) | 120 |
| iv. Private land (ha) | 320 |
| v. Treated arable (ha) | 300 |
| vi. Treated non-arable (ha) | 150 |

3. Verification financial and other Record

| | | |
|--|--|----------------------|
| i. Total cost: | Approved: Rs 16.00 Lakh | Spent: Rs 13.50 Lakh |
| ii. Expenditure incurred as per guidelines | Yes | |
| iii. Works executed as per Records | Yes PT (12), CD (3), Bunding (50 ha), horticulture (38 ha), Afforestation (16 ha) | |
| iv. Whether watershed committees (WC) exists | Yes WC comprises of 11 members (1 woman, 10 men); Mr. V Sudhakar Reddy was WA President, Mr. V Yadaiah, was WC Chairman, Mr. M Shanker was WC Secretary. All these members were available for consultation. | |
| v. If exists, activities of the committees | Not functional due to any clear guidelines for utilizing WDF to repair and maintain structures. | |

4. Community participation (how community participation have been ensured and what EPA have been taken up, inputs of details of beneficiaries)

Although EPA was not taken up; construction of 3 check dams, 12 percolation tanks and other conservation works were taken up with the participation of farmers from 6 user groups (UGs) and landless poor from the watershed village.

5. Qualitative Parameters of Impacts

| | | |
|---|---|--|
| 1. Functioning of village level institutions | Satisfactory during project and after as the SHGs increased from six to twenty without any financial help from watershed scheme. | |
| 2. Records of meetings properly updated | Yes | |
| 3. Liaison with scientific institutions established | No, farmers were not given any exposure to productivity enhancement | |
| 4. Watershed Development Fund (WDF) collected?, and its utilization | Yes; collected Rs.58 400 according to guidelines and deposited in Nagarjuna Grameena Bank, Gurrampodu but unspent for maintenance works due to lack of clear guidelines on use from District Authorities. | |
| 5. Self Help Groups | SHGs increased from 6 to 20 after watershed interventions (no support from watershed program) | Revolving fund: Rs. |
| | V.O functioning: | Savings: |
| | Utilization of loans: | Loans were used for buying cattle (milk animals), inputs for agriculture and for establishing petty shops. |
| | Bank linkages established: | Farmers have linkage with SBI and Nagarjuna Grameena Bank for credit and other transactions. |
| 6. Planned CPRs sustainable & equitable development | Afforestation was done in 16 ha of common land | |
| 7. Benefits to weaker sections (women, dalits and landless) | No specific initiatives; engaged for labor work during watershed works. | |

6. Quantitative Parameters of Impacts

| | | | |
|--|--|--------------|-------|
| i. Improvements in water table/water availability | Impact of watershed project has clearly reflected in enhancing the groundwater levels (about 1 m increase) and duration of water availability in wells for agricultural and other purposes in the watershed. There are about 200 functioning wells and bore wells for irrigation and 50 ha additional area brought under irrigation after watershed interventions. | | |
| ii. Additional area under cultivation/horticulture/afforestation | 25 ha additional area brought under cultivation; 38 ha private land with horticulture and 16 ha common land with afforestation. | | |
| iii. Changes in cropping pattern and intensity | Before project sorghum, castor and paddy crops were grown; After watershed implementation, farmers shifted to horticulture, plantations like sweet lime along with annual crops like paddy, cotton and pigeon pea. | | |
| iv. Changes in agricultural productivity | Crops | Yield (q/ha) | |
| | | Before | After |
| | Paddy | 40 | 50 |
| | Cotton | 12 | 15 |
| | Castor | 8 | 12 |
| | Pigeon pea | 5 | 8 |
| v. Changes in fodder & fuel wood availability | Not much improvement. | | |
| vi. Changes in size and character of livestock holdings | Buffaloes number increased by about 80 and milk production increased from 60 to 110 liters per day. | | |
| vii. Status of grazing land & their carrying capacity | Nil | | |

| | |
|--|--|
| viii. Employment generated due to implementation of project | About 115 laborers had employment during project period; on implementation of project increased water availability enhanced additional cropping area and productivity. |
| ix. Change in household category, total, & source- | Around 195 households improved their income through agriculture, dairying and livelihood activities. |
| x. Freedom from Debt and reduction in degree of dependence of money lenders (case studies) | Most of the farmers depend on banks, SHGs and about 15% people still depend on private moneylenders. |
| xi. Reduction in out-migration (case studies) | Migration in search of livelihoods was about 30% before watershed program and almost nil now due to <i>NAREGA</i> . |
| xii. Reduction in drought vulnerability of the watershed | Increased groundwater availability has reduced vulnerability to drought by about 30%. |
| xiii. Detailed case studies of specific farmers impacted by the project | Please see the attachment |
| xiv. Photographs showing work + its impact | Please see the attachment |

7. Learnings and process documentation (how the program could be implemented better; constraints, improvements possible, changes made etc.)

- Repair, maintenance and de-silting of water harvesting structures are essential to get sustainable benefits.
- Recharging of dry open wells near small streams would have given better equity and results.
- De-silting and deepening of village tanks and percolation tanks can improve water harvesting.
- There is a scope for construction of some more percolation tanks, bunding and horticulture plantations.
- Guidelines are needed for using WDF.



Figure 1. Percolation tank at Annadata watershed. Figure 2. Check dam at Annadata watershed.

8. Specific datasets on different impact parameters:

9. Observations and Comments by Evaluators:

- Design criteria of check dams and quality of construction of WHS is not good and not effective in serving the purpose (**Fig. 1 & 2**).
- Water harvesting structures are filled with sediment, bushes and developed leakages resulting in reduced water storage hence the effectiveness of the watershed structures reduced (**Fig.3**).



Figure 3. Damaged apron wall of check dam in Annadata watershed.

- Post-project maintenance was not clearly envisaged as an exit policy in the project, hence proper mechanism should be operationalized to repair and maintain the structures, and to ensure proper utilization of WDF/community contribution, clear guidelines should be in place. Otherwise watershed committee exists, but becomes defunct, as is the case with Annadata watershed.
- Crop productivity enhancement and water use efficiency measures were not emphasized in the project to harness the full benefits of project activities, and increased water availability.
- Technology Resource organizations like academic/research institutions involvement was absent.
- As admitted by farmers in the village, availability of drinking water round the year, supplemental irrigation water for second crop and ground water increase helping growth of orchard crops are the visible qualitative and quantitative impacts due to watershed development.

Success story

- **Many farmers** in the village have diversified their crops to sweet lime with drip irrigation due to watershed interventions and increased groundwater availability to have more secured and sustainable incomes (Fig. 4).



Fig. 4. Diversified sweet lime cultivation in Annadata watershed.

Impact Assessment Report
Anjaneya Swamy Watershed, DPAP – IV batch,
Munugode Mandal, Nalgonda district, Andhra Pradesh

1. Details of watershed:

| | |
|--|------------------------------|
| 1. Name of the Scheme: | DPAP – IV Batch |
| 2. Name of the watershed: | Anjaneya Swamy |
| 3. Names of villages in the Watershed: | Chalmeda |
| 4. Villages/Mandal/District: | Chalmeda/ Munugode/ Nalgonda |
| 5. Name and Address of PIA: | SISS, Munugode |
| 6. Total area of the watershed: | 625 ha (625 ha Treated area) |

2. Land Use Pattern:

| | |
|--------------------------------------|-----|
| i. Arable land (ha) | 500 |
| ii. Non-arable land (ha) | 125 |
| iii. Government/ Community land (ha) | 200 |
| iv. Private land (ha) | 325 |
| v. Treated arable (ha) | 325 |
| vi. Treated non-arable (ha) | 300 |

3. Verification financial and other Records

| | | |
|--|--|---------------------|
| i. Total cost: | Approved: Rs 9.31 Lakh | Spent: Rs 8.09 Lakh |
| ii. Expenditure incurred as per guidelines | Yes | |
| iii. Works executed as per Records | Yes PT (10), CD (4), Farm ponds (40), Bunding (50 ha), horticulture (2 ha), Afforestation (30 ha) | |
| iv. Whether watershed committees (WC) exists | Yes WC comprises of 11 members (2 women, 9 men); Mr. B Sathaiah was WA President, Mr. N Narsimha, was WC Chairman, Mr. Md Liyakath Ali was WC Secretary. All these members were available for consultation. | |
| v. If exists, activities of the committees | Not functional due to any clear guidelines for utilizing WDF to repair and maintain structures. | |

4. Community participation (how community participation have been ensured and what EPA have been taken up, inputs of details of beneficiaries)

Although EPA was not taken up; construction of 4 check dams, 10 percolation tanks, 40 farm ponds and other conservation works were taken up with the participation of farmers from 15 user groups (UGs) and landless poor from the watershed village.

5. Qualitative Parameters of Impacts

| | | |
|---|---|---------------------|
| 1. Functioning of village level institutions | Satisfactory during project and after as the SHGs increased from ten to seventeen without any financial help from watershed scheme. | |
| 2. Records of meetings properly updated | Yes | |
| 3. Liaison with scientific institutions established | No, farmers were not given any exposure to productivity enhancement | |
| 4. Watershed Development Fund (WDF) collected?, and its utilization | Yes; collected Rs.47 405 according to guidelines and deposited in Canara Bank, Kompally but unspent for maintenance works due to lack of clear guidelines on use from District Authorities. | |
| 5. Self Help Groups | SHGs increased from 10 to 17 after watershed interventions (no support from watershed program) | Revolving fund: Rs. |
| V.O functioning: | | Savings: |
| Utilization of loans: | Loans were used for buying cattle (milk animals), inputs for agriculture and other miscellaneous activities. | |
| Bank linkages established: | Farmers have linkage with Nagarjuna Grameena Bank and Canara Bank for credit and other transactions. | |
| 6. Planned CPRs sustainable & equitable development | Afforestation was done in 30 ha of common land and 300 kg of <i>Stylo</i> seeds were distributed to farmers. | |
| 7. Benefits to weaker sections (women, dalits and landless) | No specific initiatives; engaged for labor work during watershed works. | |

6. Quantitative Parameters of Impacts

| | | | |
|--|---|--------------|-------|
| i. Improvements in water table/water availability | Impact of watershed project has reflected in enhancing the groundwater levels (about 0.5 m increase) and duration of water availability in wells for agricultural and other purposes in the watershed. There are about 160 functioning wells and bore wells for irrigation. | | |
| ii. Additional area under cultivation/horticulture/afforestation | 80 ha additional area brought under cultivation; 30 ha common land with afforestation. | | |
| iii. Changes in cropping pattern and intensity | Before project sorghum, castor and paddy crops were grown; After watershed implementation, farmers are growing paddy, cotton and pigeon pea. | | |
| iv. Changes in agricultural productivity | Crops | Yield (q/ha) | |
| | | Before | After |
| | Paddy | 45 | 50 |
| | Cotton | 10 | 13 |
| | Castor | 8 | 10 |
| v. Changes in fodder & fuel wood availability | Not much improvement. | | |
| vi. Changes in size and character of livestock holdings | Buffaloes number increased by about 100 and milk production increased from 80 to 150 liters per day. | | |

| | |
|--|---|
| vii. Status of grazing land & their carrying capacity | Nil |
| viii. Employment generated due to implementation of project | About 70 laborers had employment during project period; on implementation of project increased water availability enhanced additional cropping area and productivity. |
| ix. Change in household category, total, & source- | Around 120 households improved their income through agriculture, dairying and livelihood activities. |
| x. Freedom from Debt and reduction in degree of dependence of money lenders (case studies) | Most of the farmers depend on banks, SHGs and about 10% people still depend on private moneylenders. |
| xi. Reduction in out-migration (case studies) | Migration in search of livelihoods was about 20% before watershed program and almost nil now due to <i>NAREGA</i> . |
| xii. Reduction in drought vulnerability of the watershed | Increased groundwater availability has reduced vulnerability to drought by about 20%. |
| xiii. Detailed case studies of specific farmers impacted by the project | Please see the attachment |
| xiv. Photographs showing work + its impact | Please see the attachment |

7. Learnings and process documentation (how the program could be implemented better; constraints, improvements possible, Changes made etc.)

- Resolving the disputes in the village through discussions and effective implementation of the project could have given better results.
- Repair, maintenance and de-silting of water harvesting structures are essential to get sustainable benefits.
- Recharging of dry open wells near small streams would have given better equity and results.
- De-silting and deepening of village tanks and percolation tanks can improve water harvesting.
- There is lot of scope for construction WHS, bunding and horticulture plantations.
- Guidelines are needed for using WDF.



Figure 1. Percolation tank at Anjaneya Swamy watershed. Figure 2. Check dam at Anjaneya Swamy watershed.

8. Specific datasets on different impact parameters:

9. Observations and Comments by Evaluators:

- Locations of WHS are appropriate but works are not properly completed due to disputes in the village (**Fig. 1 & 2**).
- Check dams were constructed without wing walls and apron and water harvesting structures are filled with sediment, bushes and developed leakages resulting in reduced water storage hence the effectiveness of the watershed structures reduced (**Fig. 2 & 3**).



Figure 3. Check dam filled with sediment in Anjaneya Swamy watershed.

- Post-project maintenance was not clearly envisaged as an exit policy in the project, hence proper mechanism should be operationalized to repair and maintain the structures, and to ensure proper utilization of WDF/community contribution, clear guidelines should be in place.
- Crop productivity enhancement and water use efficiency measures were not emphasized in the project to harness the full benefits of project activities, and increased water availability.
- Technology Resource organizations like academic/research institutions involvement was absent.

- Availability of drinking water round the year, supplemental irrigation water for second crop and ground water increase helping in increasing cropping intensity are the visible qualitative and quantitative impacts due to watershed development.

Success story

- **Many farmers** in the village said that watershed interventions have been helping in increasing the groundwater and cropping intensity is increased. They are growing paddy crop in two seasons (Fig. 4).



Fig. 4. Paddy crop in Anjaneya Swamy watershed, Nalgonda district.

Impact Assessment Report
Anthyodaya Watershed, DPAP – IV batch,
Munugode Mandal, Nalgonda district, Andhra Pradesh

1. Details of watershed:

| | |
|--|--------------------------------|
| 1. Name of the Scheme: | DPAP – IV Batch |
| 2. Name of the watershed: | Anthyodaya |
| 3. Names of villages in the Watershed: | Rathipally |
| 4. Villages/Mandal/District: | Rathipally/ Munugode/ Nalgonda |
| 5. Name and Address of PIA: | SISS, Munugode |
| 6. Total area of the watershed: | |

2. Land Use Pattern:

| | |
|--------------------------------------|--|
| i. Arable land (ha) | |
| ii. Non-arable land (ha) | |
| iii. Government/ Community land (ha) | |
| iv. Private land (ha) | |
| v. Treated arable (ha) | |
| vi. Treated non-arable (ha) | |

3. Verification financial and other Records

| | | |
|--|---|----------------------|
| i. Total cost: | Approved: | Spent: Rs 13.19 Lakh |
| ii. Expenditure incurred as per guidelines | Yes | |
| iii. Works executed as per Records | Yes LBS (20 nos.), PT (3), CD (1), Bunding (200 ha), horticulture (8 ha), afforestation (31 ha) | |
| iv. Whether watershed committees (WC) exists | Yes WC comprises of 10 members (6 women, 4 men); Mr A Ranga Reddy was WA President, Mr P Lingaiah, was WC Chairman, Mr. T Krishna Reddy was WC Secretary. All these members were available for consultation. | |
| v. If exists, activities of the committees | Not functional due to any clear guidelines for utilizing WDF to repair and maintain structures. | |

4. Community participation (how community participation have been ensured and what EPA have been taken up, inputs of details of beneficiaries)

Although EPA was not taken up; construction of 1 check dam, 3 percolation tanks and other conservation works were taken up with the participation of farmers from 20 user groups (UGs) and landless poor from the watershed village.

5. Qualitative Parameters of Impacts

6.

| | | |
|---|---|----------------------------|
| 1. Functioning of village level institutions | Satisfactory during project and after as the SHGs increased from twelve to fifteen without any financial help from watershed scheme. | |
| 2. Records of meetings properly updated | Yes | |
| 3. Liaison with scientific institutions established | No, farmers were not given any exposure to productivity enhancement | |
| 4. Watershed Development Fund (WDF) collected?, and its utilization | Yes; collected Rs.90 000 according to guidelines and deposited in Canara Bank, Munugode but unspent for maintenance works due to lack of clear guidelines on use from District Authorities. | |
| 5. Self Help Groups | SHGs increased from 12 to 15 after watershed interventions (no support from watershed program) | Revolving fund: Rs. 240000 |
| V.O functioning: | | Savings: |
| Utilization of loans: | Loans were given to members for the purchase of cattle, sieving machines, and for shops | |
| Bank linkages established: | Farmers have linkage with Canara Bank, Munugode for credit and other transactions | |
| 6. Planned CPRs sustainable & equitable development | Afforestation was done in 31 ha of common land | |
| 7. Benefits to weaker sections (women, dalits and landless) | No specific initiatives; engaged for labor work during watershed works. | |

7. Quantitative Parameters of Impacts

| | | | |
|--|---|--------------|-------|
| i. Improvements in water table/water availability | Impact of watershed project has clearly reflected in enhancing the groundwater levels (1-2 m increase) and duration of water availability in wells (up to February-March) for agricultural and other purposes in the watershed. There are 200 wells exist in the watershed with an average depth of 150 feet. Before project, the groundwater scenario in watershed was averaged 80 feet deep from ground surface during rainy season and starts to recede sharply from post-rainy season and dried in summer. But post-project scenario is 75 feet deep from ground surface and water is available up to February- March. 10-15 wells, which were totally dead, were rejuvenated. Drinking water situation has improved significantly. Area under irrigation before project was 60 ha and after project is 120 ha. | | |
| ii. Additional area under cultivation/horticulture/afforestation | 40 ha additional area brought under cultivation; 8 ha private land with horticulture; 31 ha common land with afforestation. | | |
| iii. Changes in cropping pattern and intensity | Before project cotton, pigeonpea and castor crops were grown; After watershed implementation, farmers shifted to horticulture, plantations like sweet lime along with other annual crops. | | |
| iv. Changes in agricultural productivity | Crops | Yield (q/ha) | |
| | | Before | After |
| | Cotton | 10 | 12 |
| | Pigeonpea | 7 | 9 |
| | Castor | 8 | 10 |

| | |
|--|--|
| v. Changes in fodder & fuel wood availability | No changes in fodder and fuel wood availability |
| vi. Changes in size and character of livestock holdings | Buffalo numbers and milk production increased |
| vii. Status of grazing land & their carrying capacity | Nil |
| viii. Employment generated due to implementation of project | About 100 laborers had employment during project period; on implementation of project water availability enhanced 50% additional cropping area and productivity. |
| ix. Change in household category, total, & source- | Around 150 households improved their income through agriculture, dairying and livelihood activities. |
| x. Freedom from Debt and reduction in degree of dependence of money lenders (case studies) | Have good credit linkages with banks, micro finance of SHGs also helping and less dependence on private moneylenders. |
| xi. Reduction in out-migration (case studies) | Earlier laborers used to migrate in search of work during off-season. Now no migration from this village. |
| xii. Reduction in drought vulnerability of the watershed | Quantity and duration groundwater availability has increased and about 30-40% benefit due to watershed interventions. |
| xiii. Detailed case studies of specific farmers impacted by the project | Please see the attachment |
| xiv. Photographs showing work + its impact | Please see the attachment |

7. Learnings and process documentation (how the program could be implemented better; constraints, improvements possible, Changes made etc.)

- Repair, maintenance and de-silting of water harvesting structures are essential to get sustainable benefits.
- Recharging of dry open wells near small streams would have given better equity and results.
- De-silting and deepening of village tanks and percolation tanks can improve water harvesting.
- Marketing facilities for agricultural produce in Munugode would benefit nearby villages.
- Guidelines are needed for using WDF.



Figure 1. Check dam at Anthyodaya watershed. Figure 2. Percolation tank, Anthyodaya watershed.

8. Specific datasets on different impact parameters:

9. Observations and Comments by Evaluators:

- The quality of construction of WHS is good but the location of percolation tanks is not appropriate because of very narrow storage capacity with lengthy bund (Fig. 1 & 2).
- Water harvesting structures are filled with sediment as well as bushes resulting in reduced water storage hence the effectiveness of the watershed structures reduced (Fig.3).



Figure 3. Check dam and percolation tank filled with sediment and bushes, Anthyodaya watershed

- Post-project maintenance was not clearly envisaged as an exit policy in the project, hence proper mechanism should be operationalized to repair and maintain the structures, and to ensure proper utilization of WDF/community contribution, clear guidelines should be in place. Otherwise watershed committee exists, but becomes defunct, as is the case with Anthyodaya watershed.
- Crop productivity enhancement and water use efficiency measures were not emphasized in the project to harness the full benefits of project activities, and increased water availability.
- Technology Resource organizations like academic/research institutions involvement was absent.

- As admitted by farmers in the village, availability of drinking water round the year, supplemental irrigation water for second crop and ground water increase helping growth of orchard crops are the visible qualitative and quantitative impacts due to watershed development.

Success story

- **Mr. Ranga Reddy** has 7 ha land near percolation tank. Before the PT constriction, water availability in the tube well was less. The PT has benefited the farmers by enhancing groundwater level and the duration of availability. He has planted sweet lime in 2 ha land with drip irrigation (Fig. 4) and growing paddy crop in remaining area.



Fig. 4. Sweet lime orchard with drip irrigation.

- **Mr. Chandraiah** owns a field near check dam, and one of the beneficiaries of this check dam satisfactorily admits that groundwater level has increased substantially in the tube well (Fig. 5) due to check dam construction. Before check dam construction he used to grow paddy in 0.5 ha area during rainy season only. Now, he grows paddy crop in 1 ha area during two seasons.



Figure 5. Increased groundwater availability (even in January-February months) enabled farmers to grow good rabi crop (paddy).

**Impact Assessment Report
Brahma Watershed, DPAP – IV batch,
Dindi Mandal, Nalgonda district, Andhra Pradesh**

1. Details of watershed:

| | |
|--|----------------------------------|
| 1. Name of the Scheme: | DPAP – IV Batch |
| 2. Name of the watershed: | Brahma |
| 3. Names of villages in the Watershed: | Brahmanapally |
| 4. Villages/Mandal/District: | Brahmanapally / Dindi / Nalgonda |
| 5. Name and Address of PIA: | NRASS, Devarakonda |
| 6. Total area of the watershed: | 497 ha (497 ha Treated area) |

2. Land Use Pattern:

| | |
|--------------------------------------|-----|
| i. Arable land (ha) | 300 |
| ii. Non-arable land (ha) | 197 |
| iii. Government/ Community land (ha) | 50 |
| iv. Private land (ha) | 392 |
| v. Treated arable (ha) | 300 |
| vi. Treated non-arable (ha) | 197 |

3. Verification financial and other Records

| | | |
|--|---|----------------------|
| i. Total cost: | Approved: Rs 15.00 Lakh | Spent: Rs 15.00 Lakh |
| ii. Expenditure incurred as per guidelines | Yes | |
| iii. Works executed as per Records | Yes PT (5), CD (9), RFD (80), horticulture (2 ha). | |
| iv. Whether watershed committees (WC) exists | Yes WC comprises of 11 members (1 woman, 10 men); Mr. B. Venkat Reddy was WA President, Mr. B Sudheer Reddy, was WC Chairman, Mr. B Raghuma Reddy was WC Secretary. All these members were available for consultation. | |
| v. If exists, activities of the committees | Not functional due to any clear guidelines for utilizing WDF to repair and maintain structures. | |

4. Community participation (how community participation have been ensured and what EPA have been taken up, inputs of details of beneficiaries)

Although EPA was not taken up; construction of 9 check dams, 5 percolation tanks, 80 rock fill dams and other conservation works were taken up with the participation of farmers from 8 user groups (UGs) and landless poor from the watershed village.

5. Qualitative Parameters of Impacts

| | | |
|---|--|--|
| 1. Functioning of village level institutions | Satisfactory during project and after as the SHGs increased from six to thirteen without any financial help from watershed scheme. | |
| 2. Records of meetings properly updated | Yes | |
| 3. Liaison with scientific institutions established | No, farmers were not given any exposure to productivity enhancement | |
| 4. Watershed Development Fund (WDF) collected?, and its utilization | Yes; collected Rs.62 820 according to guidelines and deposited in SBH, Devarakonda but unspent for maintenance works due to lack of clear guidelines on use from District Authorities. | |
| 5. Self Help Groups | SHGs increased from 6 to 13 after watershed interventions (no support from watershed program) | Revolving fund: Rs. |
| | V.O functioning: | Savings: |
| | Utilization of loans: | Loans were used for buying livestock, inputs for agriculture and for purchasing sewing machines. |
| | Bank linkages established: | Farmers have linkage with State Bank of Hyderabad for credit and other transactions. |
| 6. Planned CPRs sustainable & equitable development | No development of CPRs | |
| 7. Benefits to weaker sections (women, dalits and landless) | No specific initiatives; engaged for labor work during watershed works. | |

6. Quantitative Parameters of Impacts

| | | | |
|--|--|--------------|-------|
| i. Improvements in water table/water availability | Impact of watershed project has clearly reflected in enhancing the groundwater levels (about 0.5 m increase) and duration of water availability in wells for agricultural and other purposes in the watershed. There are about 100 functioning bore wells in the watershed for irrigation. | | |
| ii. Additional area under cultivation/horticulture/afforestation | 40 ha additional area brought under cultivation; 2 ha private land with horticulture. | | |
| iii. Changes in cropping pattern and intensity | Before project sorghum, pearl millet, castor and paddy crops were grown; After watershed implementation, farmers shifted to other annual crops like paddy, groundnut, sunflower and pigeon pea. | | |
| iv. Changes in agricultural productivity | Crops | Yield (q/ha) | |
| | | Before | After |
| | Paddy | 46 | 52 |
| | Groundnut | 8 | 12 |
| | Pigeon pea | 6 | 10 |
| v. Changes in fodder & fuel wood availability | Not much improvement. | | |
| vi. Changes in size and character of livestock holdings | Buffaloes number increased by about 100 and milk production increased from 100 to 200 liters per day. | | |
| vii. Status of grazing land & their carrying capacity | Nil | | |

| | |
|--|--|
| viii. Employment generated due to implementation of project | About 100 laborers had employment during project period; on implementation of project increased water availability enhanced additional cropping area and productivity. |
| ix. Change in household category, total, & source- | Around 150 households improved their income through agriculture, dairying and livelihood activities. |
| x. Freedom from Debt and reduction in degree of dependence of money lenders (case studies) | Most of the farmers depend on banks, SHGs and about 15% people still depend on private moneylenders. |
| xi. Reduction in out-migration (case studies) | Migration in search of livelihoods was about 25% before watershed program and almost nil now due to <i>NAREGA</i> . |
| xii. Reduction in drought vulnerability of the watershed | Increased groundwater availability has reduced vulnerability to drought by about 20%. |
| xiii. Detailed case studies of specific farmers impacted by the project | Please see the attachment |
| xiv. Photographs showing work + its impact | Please see the attachment |

7. Learnings and process documentation (how the program could be implemented better; constraints, improvements possible, Changes made etc.)

- Repair, maintenance and de-silting of water harvesting structures are essential to get sustainable benefits.
- Recharging of dry open wells near streams would have given better equity and results.
- De-silting and deepening of village tanks and percolation tanks can improve water harvesting.
- There is a scope for construction of some more WHS and horticulture plantations.
- Guidelines are needed for using WDF.



Figure 1. Percolation tank at Brahma watershed.



Figure 2. Check dam at Brahma watershed.

8. Specific datasets on different impact parameters:

9. Observations and Comments by Evaluators:

- Locations, design criteria and quality of construction of WHS are normal and serving the purpose (Fig. 1 & 2).
- Water harvesting structures are filled with sediment, bushes and developed leakages resulting in reduced water storage hence the effectiveness of the watershed structures reduced (Fig. 2 & 3).



Figure 3. Check dam filled with sand and bushes at Brahma watershed.

- Post-project maintenance was not clearly envisaged as an exit policy in the project, hence proper mechanism should be operationalized to repair and maintain the structures, and to ensure proper utilization of WDF/community contribution, clear guidelines should be in place. Otherwise watershed committee exists, but becomes defunct, as is the case with Brahma watershed.
- Crop productivity enhancement and water use efficiency measures were not emphasized in the project to harness the full benefits of project activities, and increased water availability.
- Technology Resource organizations like academic/research institutions involvement was absent.
- As admitted by farmers in the village, availability of drinking water round the year, supplemental irrigation water for second crop and ground water increase helping in increasing the cropping intensity are the visible qualitative and quantitative impacts due to watershed development.

Success story

- **Many farmers** in the village said that watershed interventions have been helping in increasing the groundwater availability and cropping intensity. Farmers are growing paddy and groundnut crops during post rainy season with irrigation (Fig. 4).



Fig. 4. Groundnut crop in Brahma watershed.

**Impact Assessment Report
Chamuledu-I Watershed, DPAP – IV batch,
Gurrampodu Mandal, Nalgonda district, Andhra Pradesh**

1. Details of watershed:

| | |
|--|----------------------------------|
| 1. Name of the Scheme: | DPAP – IV Batch |
| 2. Name of the watershed: | Chamuledu-I |
| 3. Names of villages in the Watershed: | Chamuledu |
| 4. Villages/Mandal/District: | Chamuledu / Gurrampodu/ Nalgonda |
| 5. Name and Address of PIA: | PEPCARDS, Nalgonda |
| 6. Total area of the watershed: | 520 ha (350 ha Treated area) |

2. Land Use Pattern:

| | |
|--------------------------------------|-----|
| i. Arable land (ha) | 300 |
| ii. Non-arable land (ha) | 120 |
| iii. Government/ Community land (ha) | 50 |
| iv. Private land (ha) | 320 |
| v. Treated arable (ha) | 250 |
| vi. Treated non-arable (ha) | 100 |

3. Verification financial and other Records

| | | |
|--|--|----------------------|
| i. Total cost: | Approved: Rs 16.00 Lakh | Spent: Rs 15.17 Lakh |
| ii. Expenditure incurred as per guidelines | Yes | |
| iii. Works executed as per Records | Yes RFDs (10 nos.), PT (12), CD (2), Bunding (20 ha), horticulture (20 ha) | |
| iv. Whether watershed committees (WC) exists | Yes WC comprises of 11 members (3 women, 8 men); Ms M Muthamma was WA President, Mr P Lingaiah, was WC Chairman, Mr. P Yadaiah was WC Secretary. All these members were available for consultation. | |
| v. If exists, activities of the committees | Not functional due to any clear guidelines for utilizing WDF to repair and maintain structures. | |

4. Community participation (how community participation have been ensured and what EPA have been taken up, inputs of details of beneficiaries)

Although EPA was not taken up; construction of 2 check dams, 12 percolation tanks and other conservation works were taken up with the participation of farmers from 5 user groups (UGs) and landless poor from the watershed village.

5. Qualitative Parameters of Impacts

| | | |
|---|---|---|
| 1. Functioning of village level institutions | Satisfactory during project and after as the SHGs increased from twelve to twenty two without any financial help from watershed scheme. | |
| 2. Records of meetings properly updated | Yes | |
| 3. Liaison with scientific institutions established | No, farmers were not given any exposure to productivity enhancement | |
| 4. Watershed Development Fund (WDF) collected?, and its utilization | Yes; collected Rs.46 000 according to guidelines and deposited in Nagarjuna Grameena Bank, Gurrampodu but unspent for maintenance works due to lack of clear guidelines on use from District Authorities. | |
| 5. Self Help Groups | SHGs increased from 12 to 22 after watershed interventions (no support from watershed program) | Revolving fund: Rs. |
| | V.O functioning: | Savings: |
| | Utilization of loans: | Loans were used for buying cattle (milk animals), sewing machines and for establishing petty shops. |
| | Bank linkages established: | Farmers have linkage with Nagarjuna Grameena Bank for credit and other transactions. |
| 6. Planned CPRs sustainable & equitable development | No CPRs development | |
| 7. Benefits to weaker sections (women, dalits and landless) | No specific initiatives; engaged for labor work during watershed works. | |

6. Quantitative Parameters of Impacts

| | | | |
|--|---|--------------|-------|
| i. Improvements in water table/water availability | Impact of watershed project has clearly reflected in enhancing the groundwater levels (about 1 m increase) and duration of water availability in wells for agricultural and other purposes in the watershed. There are about 50 open wells and 200 bore wells for irrigation and irrigated area has been doubled after watershed interventions. AMR irrigation project canal also helping in improving the groundwater. | | |
| ii. Additional area under cultivation/horticulture/afforestation | 40 ha additional area brought under cultivation; 20 ha private land with horticulture. | | |
| iii. Changes in cropping pattern and intensity | Before project sorghum, castor and paddy crops were grown; After watershed implementation, farmers shifted to horticulture, plantations like sweet lime along with annual crops like paddy, cotton and pigeon pea. | | |
| iv. Changes in agricultural productivity | Crops | Yield (q/ha) | |
| | | Before | After |
| | Paddy | 45 | 55 |
| | Cotton | 12 | 15 |
| | Pigeon pea | 6 | 9 |
| v. Changes in fodder & fuel wood availability | Not much improvement. | | |
| vi. Changes in size and character of livestock holdings | Buffaloes number increased by about 100 and milk production increased from 50 to 100 liters per day. | | |

| | |
|--|--|
| vii. Status of grazing land & their carrying capacity | Nil |
| viii. Employment generated due to implementation of project | About 120 laborers had employment during project period; on implementation of project increased water availability enhanced additional cropping area and productivity. |
| ix. Change in household category, total, & source- | Around 200 households improved their income through agriculture, dairying and livelihood activities. |
| x. Freedom from Debt and reduction in degree of dependence of money lenders (case studies) | Most of the farmers depend on banks, SHGs and about 10% people still depend on private moneylenders. |
| xi. Reduction in out-migration (case studies) | Migration in search of livelihoods was about 40% before watershed program and almost nil now. |
| xii. Reduction in drought vulnerability of the watershed | Increased groundwater availability has reduced vulnerability to drought by about 50%. |
| xiii. Detailed case studies of specific farmers impacted by the project | Please see the attachment |
| xiv. Photographs showing work + its impact | Please see the attachment |

7. Learnings and process documentation (how the program could be implemented better; constraints, improvements possible, Changes made etc.)

- Repair, maintenance and de-silting of water harvesting structures are essential to get sustainable benefits.
- Recharging of dry open wells near small streams would have given better equity and results.
- De-silting and deepening of village tanks and percolation tanks can improve water harvesting.
- There is a scope for construction of more check dams, percolation tanks, bunding and horticulture plantations.
- Guidelines are needed for using WDF.



Figure 1. Percolation tank at Chamuledu watershed. Figure 2. Rock fill dam, Chamuledu watershed.

8. Specific datasets on different impact parameters:

9. Observations and Comments by Evaluators:

- Locations and quality of construction of WHS and rock fill dams are good and serving the purpose (Fig. 1 & 2).
- Water harvesting structures are filled with sediment, bushes and developed leakages resulting in reduced water storage hence the effectiveness of the watershed structures reduced (Fig.3).



Figure 3. Damaged apron wall of check dam (left) and rock fill dam (right) in Chamuledu watershed.

- Post-project maintenance was not clearly envisaged as an exit policy in the project, hence proper mechanism should be operationalized to repair and maintain the structures, and to ensure proper utilization of WDF/community contribution, clear guidelines should be in place. Otherwise watershed committee exists, but becomes defunct, as is the case with Chamuledu watershed.
- Crop productivity enhancement and water use efficiency measures were not emphasized in the project to harness the full benefits of project activities, and increased water availability.
- Technology Resource organizations like academic/research institutions involvement was absent.
- As admitted by farmers in the village, availability of drinking water round the year, supplemental irrigation water for second crop and ground water increase helping growth of orchard crops are the visible qualitative and quantitative impacts due to watershed development.

Success story

- **Many farmers** in the village have diversified their crops to sweet lime with drip irrigation due to watershed interventions and increased groundwater availability to have more secured and sustainable incomes (Fig. 4).



Fig. 4. Diversified sweet lime cultivation with drip irrigation in Chamuledu watershed.

Impact Assessment Report
Chennakeshava Watershed, DPAP – IV batch,
Atmakur (S) Mandal, Nalgonda district, Andhra Pradesh

1. Details of watershed:

| | |
|--|----------------------------------|
| 1. Name of the Scheme: | DPAP – IV Batch |
| 2. Name of the watershed: | Chennakeshava |
| 3. Names of villages in the Watershed: | Atmakur |
| 4. Villages/Mandal/District: | Atmakur / Atmakur (S) / Nalgonda |
| 5. Name and Address of PIA: | AMYS, Suryapet |
| 6. Total area of the watershed: | 542 ha (500 ha Treated area) |

2. Land Use Pattern:

| | |
|--------------------------------------|-----|
| i. Arable land (ha) | 400 |
| ii. Non-arable land (ha) | 140 |
| iii. Government/ Community land (ha) | 20 |
| iv. Private land (ha) | 470 |
| v. Treated arable (ha) | 400 |
| vi. Treated non-arable (ha) | 100 |

3. Verification financial and other Records

| | | |
|--|--|----------------------|
| i. Total cost: | Approved: Rs 16.69 Lakh | Spent: Rs 12.71 Lakh |
| ii. Expenditure incurred as per guidelines | Yes | |
| iii. Works executed as per Records | Yes PT (6), CD (5), Farm ponds (43), RFD (12), Bunding (20 ha), horticulture (14 ha), Afforestation (10 ha) | |
| iv. Whether watershed committees (WC) exists | Yes WC comprises of 11 members (2 women, 9 men); Mr. K Narsi Reddy was WA President, Mr. T Chinna Ranga Reddy, was WC Chairman, Mr. G Krishnaiah was WC Secretary. All these members were available for consultation. | |
| v. If exists, activities of the committees | Not functional due to any clear guidelines for utilizing WDF to repair and maintain structures. | |

4. Community participation (how community participation have been ensured and what EPA have been taken up, inputs of details of beneficiaries)

Although EPA was not taken up; construction of 5 check dams, 6 percolation tanks, 43 farm ponds, 12 RFDs and other conservation works were taken up with the participation of farmers from 7 user groups (UGs) and landless poor from the watershed village.

5. Qualitative Parameters of Impacts

| | | |
|---|--|--|
| 1. Functioning of village level institutions | Satisfactory during project and after as the SHGs increased from ten to sixteen without any financial help from watershed scheme. | |
| 2. Records of meetings properly updated | Yes | |
| 3. Liaison with scientific institutions established | No, farmers were not given any exposure to productivity enhancement | |
| 4. Watershed Development Fund (WDF) collected?, and its utilization | Yes; collected Rs.54 000 according to guidelines and deposited in SBI, Atmakur but unspent for maintenance works due to lack of clear guidelines on use from District Authorities. | |
| 5. Self Help Groups | SHGs increased from 10 to 16 after watershed interventions (no support from watershed program) | Revolving fund: Rs. |
| | V.O functioning: | Savings: |
| | Utilization of loans: | Loans were used for buying cattle (milk animals), inputs for agriculture and for establishing petty shops. |
| | Bank linkages established: | Farmers have linkage with SBI, Atmakur for credit and other transactions. |
| 6. Planned CPRs sustainable & equitable development | Afforestation was done in 10 ha of common land | |
| 7. Benefits to weaker sections (women, dalits and landless) | No specific initiatives; engaged for labor work during watershed works. | |

6. Quantitative Parameters of Impacts

| | | | |
|--|--|--------------|-------|
| i. Improvements in water table/water availability | Impact of watershed project has clearly reflected in enhancing the groundwater levels (about 1 m increase) and duration of water availability in wells for agricultural and other purposes in the watershed. There are about 500 functioning open wells and 1000 bore wells for irrigation and many irrigation tanks existing in the village also contributing to raise in the groundwater levels. | | |
| ii. Additional area under cultivation/horticulture/afforestation | 100 ha additional area brought under cultivation; 14 ha private land with horticulture and 10 ha common land with afforestation. | | |
| iii. Changes in cropping pattern and intensity | Before project sorghum, castor and paddy crops were grown; After watershed implementation, farmers shifted to horticulture plantations like mango along with annual crops like paddy, cotton and pigeon pea. | | |
| iv. Changes in agricultural productivity | Crops | Yield (q/ha) | |
| | | Before | After |
| | Paddy | 45 | 55 |
| | Cotton | 12 | 16 |
| | Pigeon pea | 6 | 9 |
| v. Changes in fodder & fuel wood availability | Not much improvement. | | |
| vi. Changes in size and character of livestock holdings | Buffaloes number increased by about 200 and milk production increased from 200 to 500 liters per day. | | |

| | |
|--|--|
| vii. Status of grazing land & their carrying capacity | Nil |
| viii. Employment generated due to implementation of project | About 150 laborers had employment during project period; on implementation of project increased water availability enhanced additional cropping area and productivity. |
| ix. Change in household category, total, & source- | Around 250 households improved their income through agriculture, dairying and livelihood activities. |
| x. Freedom from Debt and reduction in degree of dependence of money lenders (case studies) | Most of the farmers depend on banks, SHGs and about 10% people still depend on private moneylenders. |
| xi. Reduction in out-migration (case studies) | Migration in search of livelihoods was about 25% before watershed program and almost nil now due to <i>NAREGA</i> . |
| xii. Reduction in drought vulnerability of the watershed | Increased groundwater availability has reduced vulnerability to drought by about 20%. |
| xiii. Detailed case studies of specific farmers impacted by the project | Please see the attachment |
| xiv. Photographs showing work + its impact | Please see the attachment |

7. Learnings and process documentation (how the program could be implemented better; constraints, improvements possible, Changes made etc.)

- Repair, maintenance and de-silting of water harvesting structures are essential to get sustainable benefits.
- There are about 100 defunct open wells in the village and recharging of dry open wells near streams would have given better equity and results.
- De-silting and deepening of village tanks and percolation tanks can improve water harvesting.
- There is a scope for construction of some more WHS and horticulture plantations.
- Guidelines are needed for using WDF.



Figure 1. Percolation tank at Chennakeshava watershed. Figure 2. Farm pond at Chennakeshava watershed.

8. Specific datasets on different impact parameters:

9. Observations and Comments by Evaluators:

- Locations, design criteria and quality of construction of WHS are good and effective in serving the purpose (Fig. 1 & 2).
- Water harvesting structures are filled with sediment, bushes and developed leakages resulting in reduced water storage hence the effectiveness of the watershed structures reduced (Fig.3).



Figure 3. Check dam filled with sediment and bushes in Chennakeshava watershed.

- Post-project maintenance was not clearly envisaged as an exit policy in the project, hence proper mechanism should be operationalized to repair and maintain the structures, and to ensure proper utilization of WDF/community contribution, clear guidelines should be in place. Otherwise watershed committee exists, but becomes defunct, as is the case with Chennakeshava watershed.
- Crop productivity enhancement and water use efficiency measures were not emphasized in the project to harness the full benefits of project activities, and increased water availability.
- Technology Resource organizations like academic/research institutions involvement was absent.
- As admitted by farmers in the village, availability of drinking water round the year, supplemental irrigation water for second crop and ground water increase helping growth of orchard crops are the visible qualitative and quantitative impacts due to watershed development.

Success story

- **Many farmers** in the village have diversified their crops to mango with irrigation due to watershed interventions and increased groundwater availability to have more secured and sustainable incomes (Fig. 4).



Fig. 4. Diversified mango cultivation in Chennakeshava watershed.

**Impact Assessment Report
Chillagutta Watershed, DPAP – IV batch,
Munugode Mandal, Nalgonda district, Andhra Pradesh**

1. Details of watershed:

| | |
|--|-------------------------------|
| 1. Name of the Scheme: | DPAP – IV Batch |
| 2. Name of the watershed: | Chillagutta |
| 3. Names of villages in the Watershed: | Pelivela |
| 4. Villages/Mandal/District: | Pelivela / Munugode/ Nalgonda |
| 5. Name and Address of PIA: | SISS, Munugode |
| 6. Total area of the watershed: | 500 ha |

2. Land Use Pattern:

| | |
|--------------------------------------|--|
| i. Arable land (ha) | |
| ii. Non-arable land (ha) | |
| iii. Government/ Community land (ha) | |
| iv. Private land (ha) | |
| v. Treated arable (ha) | |
| vi. Treated non-arable (ha) | |

3. Verification financial and other Records

| | | |
|--|--|----------------------|
| i. Total cost: | Approved: | Spent: Rs 15.89 Lakh |
| ii. Expenditure incurred as per guidelines | Yes | |
| iii. Works executed as per Records | Yes LBS (4 nos.), PT (12), CD (4), Bunding (15 ha), horticulture (12 ha), afforestation (21 ha) | |
| iv. Whether watershed committees (WC) exists | Yes WC comprises of 10 members (1 women, 9 men); Mr L Linga Reddy was WA President, Mr K Sathi Reddy, was WC Chairman, Mr. N Yadaiah was WC Secretary. All these members were available for consultation. | |
| v. If exists, activities of the committees | Not functional due to any clear guidelines for utilizing WDF to repair and maintain structures. | |

4. Community participation (how community participation have been ensured and what EPA have been taken up, inputs of details of beneficiaries)

Although EPA was not taken up; construction of 4 check dams, 12 percolation tanks and other conservation works were taken up with the participation of farmers from 21 user groups (UGs) and landless poor from the watershed village.

5. Qualitative Parameters of Impacts

| | | |
|---|---|---|
| 1. Functioning of village level institutions | Satisfactory during project and after as the SHGs increased from twelve to twenty seven without any financial help from watershed scheme. | |
| 2. Records of meetings properly updated | Yes | |
| 3. Liaison with scientific institutions established | No, farmers were not given any exposure to productivity enhancement | |
| 4. Watershed Development Fund (WDF) collected?, and its utilization | Yes; collected Rs.1 01 000 according to guidelines and deposited in Canara Bank, Munugode but unspent for maintenance works due to lack of clear guidelines on use from District Authorities. | |
| 5. Self Help Groups | SHGs increased from 12 to 27 after watershed interventions (no support from watershed program) | Revolving fund: Rs. |
| | V.O functioning: | Savings: |
| | Utilization of loans: | |
| | Bank linkages established: | Farmers have linkage with Canara Bank for credit and other transactions |
| 6. Planned CPRs sustainable & equitable development | Afforestation was done in 21 ha of common land | |
| 7. Benefits to weaker sections (women, dalits and landless) | No specific initiatives; engaged for labor work during watershed works. | |

6. Quantitative Parameters of Impacts

| | | | |
|--|--|--------------|-------|
| i. Improvements in water table/water availability | Impact of watershed project has clearly reflected in enhancing the groundwater levels (1-2 m increase) and duration of water availability in wells for agricultural and other purposes in the watershed. Water availability has improved by about 50%. | | |
| ii. Additional area under cultivation/horticulture/afforestation | 80 ha additional area brought under cultivation; 12 ha private land with horticulture; 21 ha common land with afforestation. | | |
| iii. Changes in cropping pattern and intensity | Before project sorghum, millets and castor crops were grown; After watershed implementation, farmers shifted to horticulture, plantations like sweet lime along with annual crops like paddy, cotton and pigeon pea. | | |
| iv. Changes in agricultural productivity | Crops | Yield (q/ha) | |
| | | Before | After |
| | Paddy | 35 | 50 |
| | Cotton | 15 | 20 |
| | Pigeon pea | 5 | 8 |
| v. Changes in fodder & fuel wood availability | Improved fodder and fuel wood availability after watershed activities. | | |
| vi. Changes in size and character of livestock holdings | Buffalo numbers and milk production increased from 30 to 100 liters per day. | | |
| vii. Status of grazing land & their carrying capacity | 4 ha area | | |

| | |
|--|--|
| viii. Employment generated due to implementation of project | About 100 laborers had employment during project period; on implementation of project increased water availability enhanced additional cropping area and productivity. |
| ix. Change in household category, total, & source- | Around 200 households improved their income through agriculture, dairying and livelihood activities. |
| x. Freedom from Debt and reduction in degree of dependence of money lenders (case studies) | Have good credit linkages with banks and less dependence on private moneylenders. |
| xi. Reduction in out-migration (case studies) | Migration in search of livelihoods has been reduced by 50%. |
| xii. Reduction in drought vulnerability of the watershed | Increased groundwater availability has reduced vulnerability to drought by about 50%. |
| xiii. Detailed case studies of specific farmers impacted by the project | Please see the attachment |
| xiv. Photographs showing work + its impact | Please see the attachment |

7. Learnings and process documentation (how the program could be implemented better; constraints, improvements possible, Changes made etc.)

- Repair, maintenance and de-silting of water harvesting structures are essential to get sustainable benefits.
- Recharging of dry open wells near small streams would have given better equity and results.
- De-silting and deepening of village tanks and percolation tanks can improve water harvesting.
- There is a necessity of diversion drain, which can reduce soil erosion considerably.
- Marketing facilities for agricultural produce in Munugode would benefit nearby villages.
- Guidelines are needed for using WDF.



Figure 1. Percolation tank at Chillagutta watershed, Figure 2. Tube well in percolation tank, Chillagutta watershed.

8. Specific datasets on different impact parameters:

9. Observations and Comments by Evaluators:

- The quality of construction of WHS is fair but location of percolation tanks is not appropriate because of very narrow storage capacity with lengthy bund (Fig. 1 & 2).
- Water harvesting structures are filled with sediment as well as bushes resulting in reduced water storage hence the effectiveness of the watershed structures reduced (Fig.3).



Figure 3. Percolation tanks filled with sediment and bushes, Chillagutta watershed

- Post-project maintenance was not clearly envisaged as an exit policy in the project, hence proper mechanism should be operationalized to repair and maintain the structures, and to ensure proper utilization of WDF/community contribution, clear guidelines should be in place. Otherwise watershed committee exists, but becomes defunct, as is the case with Chillagutta watershed.
- Crop productivity enhancement and water use efficiency measures were not emphasized in the project to harness the full benefits of project activities, and increased water availability.
- Technology Resource organizations like academic/research institutions involvement was absent.
- As admitted by farmers in the village, availability of drinking water round the year, supplemental irrigation water for second crop and ground water increase helping growth of orchard crops are the visible qualitative and quantitative impacts due to watershed development.

Success story

- **Mr. Malla Reddy** has 5 ha land near percolation tank. Before the PT constriction, water availability in the tube well was less. The PT has benefited the farmers by enhancing groundwater level and the duration of water availability. He has planted sweet lime in his land with drip irrigation (Fig. 4).



Fig. 4. Improved groundwater availability has increased the area under sweet lime and paddy crops.

Impact Assessment Report
Dandumaisamma Watershed, DPAP – IV batch,
Atmakur (S) Mandal, Nalgonda district, Andhra Pradesh

1. Details of watershed:

| | |
|--|-----------------------------------|
| 1. Name of the Scheme: | DPAP – IV Batch |
| 2. Name of the watershed: | Dandumaisamma |
| 3. Names of villages in the Watershed: | Nemmikal |
| 4. Villages/Mandal/District: | Nemmikal / Atmakur (S) / Nalgonda |
| 5. Name and Address of PIA: | AMYS & DISHA, Suryapet |
| 6. Total area of the watershed: | 531 ha (435 ha Treated area) |

2. Land Use Pattern:

| | |
|--------------------------------------|-----|
| i. Arable land (ha) | 400 |
| ii. Non-arable land (ha) | 131 |
| iii. Government/ Community land (ha) | 50 |
| iv. Private land (ha) | 369 |
| v. Treated arable (ha) | 350 |
| vi. Treated non-arable (ha) | 85 |

3. Verification financial and other Records

| | | |
|--|---|----------------------|
| i. Total cost: | Approved: Rs 16.35 Lakh | Spent: Rs 15.87 Lakh |
| ii. Expenditure incurred as per guidelines | Yes | |
| iii. Works executed as per Records | Yes PT (6), CD (6), Farm ponds (30), Feeder channels (8), Bunding (50 ha), horticulture (15 ha), Afforestation (10 ha) | |
| iv. Whether watershed committees (WC) exists | Yes WC comprises of 11 members (2 women, 9 men); Mr. Y Veeraiah was WA President, Mr. V Venkataiah, was WC Chairman, Mr. B Venkanna was WC Secretary. All these members were available for consultation. | |
| v. If exists, activities of the committees | Not functional due to any clear guidelines for utilizing WDF to repair and maintain structures. | |

4. Community participation (how community participation have been ensured and what EPA have been taken up, inputs of details of beneficiaries)

Although EPA was not taken up; construction of 6 check dams, 6 percolation tanks, 30 farm ponds, 8 feeder channels and other conservation works were taken up with the participation of farmers from 6 user groups (UGs) and landless poor from the watershed village.

5. Qualitative Parameters of Impacts

| | | |
|---|--|--|
| 1. Functioning of village level institutions | Satisfactory during project and after as the SHGs increased from nine to fifteen without any financial help from watershed scheme. | |
| 2. Records of meetings properly updated | Yes | |
| 3. Liaison with scientific institutions established | No, farmers were not given any exposure to productivity enhancement | |
| 4. Watershed Development Fund (WDF) collected?, and its utilization | Yes; collected Rs.80 000 according to guidelines and deposited in Nagarjuna Grameena Bank, Atmakur but unspent for maintenance works due to lack of clear guidelines on use from District Authorities. | |
| 5. Self Help Groups | SHGs increased from 9 to 15 after watershed interventions (no support from watershed program) | Revolving fund: Rs. |
| | V.O functioning: | Savings: |
| | Utilization of loans: | Loans were used for buying cattle (milk animals), inputs for agriculture and for establishing petty shops. |
| | Bank linkages established: | Farmers have linkage with Nagarjuna Grameena Bank for credit and other transactions. |
| 6. Planned CPRs sustainable & equitable development | Afforestation was done in 10 ha of common land | |
| 7. Benefits to weaker sections (women, dalits and landless) | No specific initiatives; engaged for labor work during watershed works. | |

6. Quantitative Parameters of Impacts

| | | | |
|--|--|--------|--------------|
| i. Improvements in water table/water availability | Impact of watershed project has clearly reflected in enhancing the groundwater levels (about 1 m increase) and duration of water availability in wells for agricultural and other purposes in the watershed. There are about 1000 functioning open wells and 500 bore wells for irrigation and many irrigation tanks existing in the village also contributing to raise in the groundwater levels. | | |
| ii. Additional area under cultivation/horticulture/afforestation | 105 ha additional area brought under cultivation; 15 ha private land with horticulture and 10 ha common land with afforestation. | | |
| iii. Changes in cropping pattern and intensity | Before project sorghum, castor and paddy crops were grown; After watershed implementation, farmers shifted to horticulture plantations like mango and sweet lime along with annual crops like paddy, cotton and pigeon pea. | | |
| iv. Changes in agricultural productivity | Crops | | Yield (q/ha) |
| | | Before | After |
| | Paddy | 46 | 54 |
| | Cotton | 12 | 18 |
| | Pigeon pea | 8 | 12 |
| v. Changes in fodder & fuel wood availability | Not much improvement. | | |
| vi. Changes in size and character of livestock holdings | Buffaloes number increased by about 500 and milk production increased from 400 to 1000 liters per day. | | |
| vii. Status of grazing land & their carrying capacity | Nil | | |

| | |
|--|--|
| viii. Employment generated due to implementation of project | About 120 laborers had employment during project period; on implementation of project increased water availability enhanced additional cropping area and productivity. |
| ix. Change in household category, total, & source- | Around 220 households improved their income through agriculture, dairying and livelihood activities. |
| x. Freedom from Debt and reduction in degree of dependence of money lenders (case studies) | Most of the farmers depend on banks, SHGs and about 15% people still depend on private moneylenders. |
| xi. Reduction in out-migration (case studies) | Migration in search of livelihoods was about 25% before watershed program and almost nil now due to <i>NAREGA</i> . |
| xii. Reduction in drought vulnerability of the watershed | Increased groundwater availability has reduced vulnerability to drought by about 20%. |
| xiii. Detailed case studies of specific farmers impacted by the project | Please see the attachment |
| xiv. Photographs showing work + its impact | Please see the attachment |

7. Learnings and process documentation (how the program could be implemented better; constraints, improvements possible, Changes made etc.)

- Repair, maintenance and de-silting of water harvesting structures are essential to get sustainable benefits.
- There are about 200 defunct open wells in the village and recharging of dry open wells near streams would have given better equity and results.
- De-silting and deepening of village tanks and percolation tanks can improve water harvesting.
- There is a scope for construction of some more WHS and horticulture plantations.
- Guidelines are needed for using WDF.



Figure 1. Percolation tank at Dandumaisamma watershed. Figure 2. Check dam at Dandumaisamma watershed.

8. Specific datasets on different impact parameters:

9. Observations and Comments by Evaluators:

- Locations, design criteria and quality of construction of WHS are good and effective in serving the purpose (Fig. 1 & 2).
- Water harvesting structures are filled with sediment, bushes and developed leakages resulting in reduced water storage hence the effectiveness of the watershed structures reduced (Fig.3).



Figure 3. Check dam filled with sediment, bushes and damage on apron at Dandumaisamma watershed.

- Post-project maintenance was not clearly envisaged as an exit policy in the project, hence proper mechanism should be operationalized to repair and maintain the structures, and to ensure proper utilization of WDF/community contribution, clear guidelines should be in place. Otherwise watershed committee exists, but becomes defunct, as is the case with Dandumaisamma watershed.
- Crop productivity enhancement and water use efficiency measures were not emphasized in the project to harness the full benefits of project activities, and increased water availability.
- Technology Resource organizations like academic/research institutions involvement was absent.
- As admitted by farmers in the village, availability of drinking water round the year, supplemental irrigation water for second crop and ground water increase helping growth of orchard crops are the visible qualitative and quantitative impacts due to watershed development.

Success story

Many farmers in the village have diversified their crops to mango and sweet lime with drip irrigation due to watershed interventions and increased groundwater availability to have more secured and sustainable incomes (Fig. 4).



Fig. 4. Diversified mango cultivation in Dandumaisamma watershed.

Impact Assessment Report
Dirisanapally Watershed, DPAP – IV batch,
Noothanakal Mandal, Nalgonda district, Andhra Pradesh

1. Details of watershed:

| | |
|--|---------------------------------------|
| 1. Name of the Scheme: | DPAP – IV Batch |
| 2. Name of the watershed: | Dirisanapally |
| 3. Names of villages in the Watershed: | Dirisanapally |
| 4. Villages/Mandal/District: | Dirisanapally / Noothanakal/ Nalgonda |
| 5. Name and Address of PIA: | MOTIVE, Nalgonda |
| 6. Total area of the watershed: | 490 ha (250 ha Treated area) |

2. Land Use Pattern:

| | |
|--------------------------------------|-----|
| i. Arable land (ha) | 300 |
| ii. Non-arable land (ha) | 190 |
| iii. Government/ Community land (ha) | 100 |
| iv. Private land (ha) | 240 |
| v. Treated arable (ha) | 200 |
| vi. Treated non-arable (ha) | 50 |

3. Verification financial and other Records

| | | |
|--|---|---------------------|
| vi. Total cost: | Approved: Rs 9.56 Lakh | Spent: Rs 3.76 Lakh |
| vii. Expenditure incurred as per guidelines | Yes | |
| viii. Works executed as per Records | Yes PT (1), CD (1), Farm ponds (16), Feeder channels (5), Bunding (1 ha), horticulture (2 ha), Afforestation (3 ha) | |
| ix. Whether watershed committees (WC) exists | Yes WC comprises of 11 members (1 woman, 10 men); Mr. C Badra Reddy was WA President, Mr. G Mansoor, was WC Chairman, Mr. B. Chakradhar was WC Secretary. All these members were available for consultation. | |
| x. If exists, activities of the committees | Not functional due to any clear guidelines for utilizing WDF to repair and maintain structures. | |

4. Community participation (how community participation have been ensured and what EPA have been taken up, inputs of details of beneficiaries)

Although EPA was not taken up; construction of 1 check dam, 1 percolation tank, 16 farm ponds, 5 feeder channels and other conservation works were taken up with the participation of farmers from 8 user groups (UGs) and landless poor from the watershed village.

5. Qualitative Parameters of Impacts

| | | |
|---|---|--|
| 1. Functioning of village level institutions | Satisfactory during project and after as the SHGs increased from eleven to twenty one without any financial help from watershed scheme. | |
| 2. Records of meetings properly updated | Yes | |
| 3. Liaison with scientific institutions established | No, farmers were not given any exposure to productivity enhancement | |
| 4. Watershed Development Fund (WDF) collected?, and its utilization | Yes; collected Rs.8 410 according to guidelines and deposited in Nagarjuna Grameena Bank, Noothanakal but unspent for maintenance works due to lack of clear guidelines on use from District Authorities. | |
| 5. Self Help Groups | SHGs increased from 11 to 21 after watershed interventions (no support from watershed program) | Revolving fund: Rs. |
| | V.O functioning: | Savings: |
| | Utilization of loans: | Loans were used for buying cattle (milk animals), inputs for agriculture and for establishing petty shops. |
| | Bank linkages established: | Farmers have linkage with Nagarjuna Grameena Bank, Noothanakal for credit and other transactions. |
| 6. Planned CPRs sustainable & equitable development | Afforestation was done in 3 ha of common land | |
| 7. Benefits to weaker sections (women, dalits and landless) | No specific initiatives; engaged for labor work during watershed works. | |

6. Quantitative Parameters of Impacts

| | | | |
|--|---|--------------|-------|
| i. Improvements in water table/water availability | Groundwater availability is good (about 1 m increase) due to irrigation tanks and feeder channels connecting them. There are about 100 functioning open wells and 50 bore wells for irrigation and cropping intensity is increased due to increased groundwater availability. | | |
| ii. Additional area under cultivation/horticulture/afforestation | 15 ha additional area brought under cultivation. | | |
| iii. Changes in cropping pattern and intensity | Before project sorghum, castor and paddy crops were grown; After watershed implementation, farmers shifted to horticulture plantations like mango along with annual crops like paddy, cotton and pigeon pea. | | |
| iv. Changes in agricultural productivity | Crops | Yield (q/ha) | |
| | | Before | After |
| | Paddy | 45 | 50 |
| | Cotton | 10 | 12 |
| | Castor | 8 | 10 |
| | Pigeon pea | 6 | 8 |
| v. Changes in fodder & fuel wood availability | Not much improvement. | | |
| vi. Changes in size and character of livestock holdings | Buffaloes number increased by about 50 and milk production increased from 50 to 100 liters per day. | | |

| | |
|--|--|
| vii. Status of grazing land & their carrying capacity | Nil |
| viii. Employment generated due to implementation of project | About 50 laborers had employment during project period; increased water availability enhanced additional cropping area and productivity. |
| ix. Change in household category, total, & source- | Around 75 households improved their income through agriculture, dairying and livelihood activities. |
| x. Freedom from Debt and reduction in degree of dependence of money lenders (case studies) | Most of the farmers depend on banks, SHGs and about 15% people still depend on private moneylenders. |
| xi. Reduction in out-migration (case studies) | Migration in search of livelihoods was about 50% before watershed program and almost nil now due to <i>NAREGA</i> . |
| xii. Reduction in drought vulnerability of the watershed | Increased groundwater availability has reduced vulnerability to drought by about 20%. |
| xiii. Detailed case studies of specific farmers impacted by the project | Please see the attachment |
| xiv. Photographs showing work + its impact | Please see the attachment |

7. Learnings and process documentation (how the program could be implemented better; constraints, improvements possible, Changes made etc.)

- Resolving the disputes in the village through discussions and effective implementation of the project could have given better results.
- Completion of check dam, maintenance of feeder channels and de-silting of water harvesting structures are essential to get sustainable benefits.
- Recharging of dry open wells near small streams would have given better equity and results.
- De-silting and deepening of village tanks and percolation tanks can improve water harvesting.
- There is lot of scope for construction WHS, bunding and horticulture plantations.
- Guidelines are needed for using WDF.



Figure 1. Percolation tank at Dirisanapally watershed. Figure 2. Check dam at Dirisanapally watershed.

8. Specific datasets on different impact parameters:

9. Observations and Comments by Evaluators:

- Locations of WHS are appropriate but works are not completed due to internal disputes in the village (Fig. 1 & 2).
- Check dam construction was incomplete without wing walls, earthen bunds and apron and no maintenance of feeder channels resulting in reduced effectiveness of the watershed harvesting structures (Fig. 2 & 3).



Figure 3. Incomplete check dam serving no purpose at Dirisanapally watershed.

- Post-project maintenance was not clearly envisaged as an exit policy in the project, hence proper mechanism should be operationalized to repair and maintain the structures, and to ensure proper utilization of WDF/community contribution, clear guidelines should be in place.
- Crop productivity enhancement and water use efficiency measures were not emphasized in the project to harness the full benefits of project activities, and increased water availability.
- Technology Resource organizations like academic/research institutions involvement was absent.

- Availability of drinking water round the year, supplemental irrigation water for second crop and ground water increase helping in increasing cropping intensity are the visible qualitative and quantitative impacts due to water harvesting structures.

Success story

- **Many farmers** in the village said that irrigation tanks are helping in increasing the groundwater levels and increased cropping intensity. They are growing paddy crop in two seasons (Fig. 4).



Fig. 4. Paddy crop in Dirisanapally watershed, Nalgonda district.

Impact Assessment Report
Gopal Watershed, DPAP – IV batch,
Munugode Mandal, Nalgonda district, Andhra Pradesh

1. Details of watershed:

| | |
|--|------------------------------|
| 1. Name of the Scheme: | DPAP – IV Batch |
| 2. Name of the watershed: | Gopal |
| 3. Names of villages in the Watershed: | Kistapur |
| 4. Villages/Mandal/District: | Kistapur/ Munugode/ Nalgonda |
| 5. Name and Address of PIA: | SISS, Munugode |
| 6. Total area of the watershed: | 500 ha |

2. Land Use Pattern:

| | |
|--------------------------------------|--|
| i. Arable land (ha) | |
| ii. Non-arable land (ha) | |
| iii. Government/ Community land (ha) | |
| iv. Private land (ha) | |
| v. Treated arable (ha) | |
| vi. Treated non-arable (ha) | |

3. Verification financial and other Records

| | | |
|--|---|----------------------|
| i. Total cost: | Approved: | Spent: Rs 15.55 Lakh |
| ii. Expenditure incurred as per guidelines | Yes | |
| iii. Works executed as per Records | Yes PT (9), Farm ponds (40 Nos.), CD (5), Bunding (52 ha), Diversion drain (100 m), horticulture (48 ha), afforestation (21 ha) | |
| iv. Whether watershed committees (WC) exists | Yes WC comprises of 10 members (2 women, 8 men); Mr B Gopal was WA President, Mr D Nagi Reddy, was WC Chairman, Mr. M Gopal was WC Secretary. All these members were available for consultation. | |
| v. If exists, activities of the committees | Not functional due to any clear guidelines for utilizing WDF to repair and maintain structures. | |

4. Community participation (how community participation have been ensured and what EPA have been taken up, inputs of details of beneficiaries)

Although EPA was not taken up; construction of 5 check dam, 9 percolation tanks, 40 farm ponds and other conservation works were taken up with the participation of farmers from 20 user groups (UGs) and landless poor from the watershed village.

5. Qualitative Parameters of Impacts

| | | |
|---|---|---|
| 1. Functioning of village level institutions | Satisfactory during project and after as the SHGs increased from twelve to twenty two without any financial help from watershed scheme. | |
| 2. Records of meetings properly updated | Yes | |
| 3. Liaison with scientific institutions established | No, farmers were not given any exposure to productivity enhancement | |
| 4. Watershed Development Fund (WDF) collected?, and its utilization | Yes; collected Rs.1 21 000 according to guidelines and deposited in Canara Bank, Munugode but unspent for maintenance works due to lack of clear guidelines on use from District Authorities. | |
| 5. Self Help Groups | SHGs increased from 12 to 22 after watershed interventions (no support from watershed program) | Revolving fund: Rs. 2 60 000 |
| | V.O functioning: | Savings: 12 00 000 |
| | Utilization of loans: | Loans were given to the members for purchase of buffaloes, sheep, inputs for agriculture, sieving machines, and for shops |
| | Bank linkages established: | Farmers have linkage with Canara Bank, Munugode for credit and other transactions |
| 6. Planned CPRs sustainable & equitable development | Nil | |
| 7. Benefits to weaker sections (women, dalits and landless) | No specific initiatives; engaged for labor work during watershed works. | |

6. Quantitative Parameters of Impacts

| | | | |
|--|---|--------------|-------|
| i. Improvements in water table/water availability | Impact of watershed project has clearly reflected in enhancing the groundwater levels (2-3 m increase) and duration of water availability in wells (doubled) for agricultural and other purposes in the watershed. There are 100 wells exist in the watershed with an average depth of 100 feet. Before project, the groundwater scenario in watershed was averaged 60 feet deep from ground surface during rainy season and starts to recede sharply from post-rainy season and dried in summer. But post-project scenario is 50 feet deep from ground surface and water is available up to February- March. About 15 wells, which were totally dead, were rejuvenated. Drinking water situation has improved significantly. Area under irrigation has been doubled. | | |
| ii. Additional area under cultivation/horticulture/afforestation | 80 ha additional area brought under cultivation; 48 ha private land with horticulture; 21 ha common land with afforestation. | | |
| iii. Changes in cropping pattern and intensity | Before project sorghum, millets, pigeon pea and castor crops were grown; After watershed implementation, farmers shifted to horticulture, plantations like sweet lime along with other annual crops such as groundnut, cotton, paddy and vegetables. | | |
| iv. Changes in agricultural productivity | Crops | Yield (q/ha) | |
| | | Before | After |
| | Cotton | 10 | 18 |
| | Groundnut | 12 | 20 |
| | Paddy | 40 | 55 |

| | |
|--|--|
| v. Changes in fodder & fuel wood availability | No changes in fodder and fuel wood availability |
| vi. Changes in size and character of livestock holdings | Buffaloes number and milk production increased from 50 to 500 liters per day and Mother Dairy is collecting milk from the village everyday. |
| vii. Status of grazing land & their carrying capacity | Improved due to water availability. |
| viii. Employment generated due to implementation of project | About 120 laborers had employment during project period; on implementation of project water availability enhanced 50% additional cropping area and productivity. |
| ix. Change in household category, total, & source- | Around 220 households improved their income through agriculture, dairying and livelihood activities. |
| x. Freedom from Debt and reduction in degree of dependence of money lenders (case studies) | Have good credit linkages with banks, micro finance of SHGs also helping and less dependence on private moneylenders. |
| xi. Reduction in out-migration (case studies) | Earlier 30% of laborers used to migrate in search of work during off-season. Now no migration from this village. |
| xii. Reduction in drought vulnerability of the watershed | Quantity and duration of groundwater availability has increased and about 40-50% benefit due to watershed interventions. |
| xiii. Detailed case studies of specific farmers impacted by the project | Please see the attachment |
| xiv. Photographs showing work + its impact | Please see the attachment |

7. Learnings and process documentation (how the program could be implemented better; constraints, improvements possible, Changes made etc.)

- Repair, maintenance and de-silting of water harvesting structures are essential to get sustainable benefits.
- Recharging of dry open wells near small streams would have given better equity and results.
- De-silting and deepening of village tanks and percolation tanks can improve water harvesting.
- Some more area needs bunding and farmers need support for planting sweet lime orchards.
- Marketing facilities for agricultural produce in Munugode would benefit nearby villages.
- Guidelines are needed for using WDF.



Figure 1. Percolation tank at Gopal watershed, Figure 2. Farm pond, Gopal watershed.

8. Specific datasets on different impact parameters:

9. Observations and Comments by Evaluators:

- Locations and quality of construction of WHS is good and serving the purpose very effectively (Fig. 1 & 2).
- Water harvesting structures are filled with sediment, bushes and developed leakages resulting in reduced water storage hence the effectiveness of the watershed structures reduced (Fig.3).



Figure 3. Percolation tanks filled with sediment and bushes, Gopal watershed

- Post-project maintenance was not clearly envisaged as an exit policy in the project, hence proper mechanism should be operationalized to repair and maintain the structures, and to ensure proper utilization of WDF/community contribution, clear guidelines should be in place. Otherwise watershed committee exists, but becomes defunct, as is the case with Gopal watershed.
- Crop productivity enhancement and water use efficiency measures were not emphasized in the project to harness the full benefits of project activities, and increased water availability.
- Technology Resource organizations like academic/research institutions involvement was absent.

- As admitted by farmers in the village, availability of drinking water round the year, supplemental irrigation water for second crop and ground water increase helping growth of orchard crops are the visible qualitative and quantitative impacts due to watershed development.

Success story

- **Mr. M Gopal** who is one of the beneficiaries of a percolation tank says that it is a good structure and very effective in recharging the groundwater. Nearby open well used to irrigate about 1.5 ha before PT construction and now it is irrigating about 3 ha land with paddy crop and sweet lime orchard (Fig. 4).



Fig. 4. Sweet lime orchard and paddy crops grown by beneficiary farmer

Impact Assessment Report
Jillepally Watershed, DPAP – IV batch,
Devarakonda Mandal, Nalgonda district, Andhra Pradesh

1. Details of watershed:

| | |
|--|-------------------------------------|
| 1. Name of the Scheme: | DPAP – IV Batch |
| 2. Name of the watershed: | Jillepally |
| 3. Names of villages in the Watershed: | Jillepally |
| 4. Villages/Mandal/District: | Jillepally / Devarakonda / Nalgonda |
| 5. Name and Address of PIA: | ADA (SC), Devarakonda |
| 6. Total area of the watershed: | 481 ha (440 ha Treated area) |

2. Land Use Pattern:

| | |
|--------------------------------------|-----|
| i. Arable land (ha) | 300 |
| ii. Non-arable land (ha) | 181 |
| iii. Government/ Community land (ha) | 50 |
| iv. Private land (ha) | 331 |
| v. Treated arable (ha) | 290 |
| vi. Treated non-arable (ha) | 150 |

3. Verification financial and other Records

| | | |
|--|---|----------------------|
| i. Total cost: | Approved: Rs 15.06 Lakh | Spent: Rs 15.04 Lakh |
| ii. Expenditure incurred as per guidelines | Yes | |
| iii. Works executed as per Records | Yes PT (12), CD (6), RFD (60), bunding (100 ha), diversion drain (1), horticulture (22 ha). | |
| iv. Whether watershed committees (WC) exists | Yes WC comprises of 11 members (3 women, 8 men). | |
| v. If exists, activities of the committees | Not functional due to any clear guidelines for utilizing WDF to repair and maintain structures. | |

4. Community participation (how community participation have been ensured and what EPA have been taken up, inputs of details of beneficiaries)

Although EPA was not taken up; construction of 6 check dams, 12 percolation tanks, 60 rock fill dams and other conservation works were taken up with the participation of farmers from 10 user groups (UGs) and landless poor from the watershed village.

5. Qualitative Parameters of Impacts

| | | |
|---|--|--|
| 1. Functioning of village level institutions | Satisfactory during project and after as the SHGs increased from nine to twenty one without any financial help from watershed scheme. | |
| 2. Records of meetings properly updated | Yes | |
| 3. Liaison with scientific institutions established | No, farmers were not given any exposure to productivity enhancement | |
| 4. Watershed Development Fund (WDF) collected?, and its utilization | Yes; collected Rs.95 000 according to guidelines and deposited in Andhra Bank, Devarakonda but unspent for maintenance works due to lack of clear guidelines on use from District Authorities. | |
| 5. Self Help Groups | SHGs increased from 9 to 21 after watershed interventions (no support from watershed program) | Revolving fund: Rs. |
| | V.O functioning: | Savings: |
| | Utilization of loans: | Loans were used for buying livestock, inputs for agriculture and for purchasing sewing machines. |
| | Bank linkages established: | Farmers have linkage with Andhra Bank for credit and other transactions. |
| 6. Planned CPRs sustainable & equitable development | No development of CPRs | |
| 7. Benefits to weaker sections (women, dalits and landless) | No specific initiatives; engaged for labor work during watershed works. | |

6. Quantitative Parameters of Impacts

| | | | |
|--|---|--------------|-------|
| i. Improvements in water table/water availability | Impact of watershed project has clearly reflected in enhancing the groundwater levels (about 0.5 m increase) and duration of water availability in wells for agricultural and other purposes in the watershed. There are about 10 functioning open wells and 50 bore wells in the watershed for irrigation. | | |
| ii. Additional area under cultivation/horticulture/afforestation | 40 ha additional area brought under cultivation; 22 ha private land with horticulture. | | |
| iii. Changes in cropping pattern and intensity | Before project sorghum, castor and paddy crops were grown; After watershed implementation, farmers shifted to horticulture plantations like sweet lime along with other annual crops like paddy, groundnut, cotton and pigeon pea. | | |
| iv. Changes in agricultural productivity | Crops | Yield (q/ha) | |
| | | Before | After |
| | Paddy | 50 | 55 |
| | Groundnut | 12 | 15 |
| | Castor | 8 | 10 |
| | Sorghum | 10 | 12 |
| | Pigeon pea | 6 | 9 |
| v. Changes in fodder & fuel wood availability | Not much improvement. | | |
| vi. Changes in size and character of livestock holdings | Buffaloes number increased by about 100 and milk production increased from 100 to 200 liters per day. | | |
| vii. Status of grazing land & | Nil | | |

| | | |
|-------|---|--|
| | their carrying capacity | |
| viii. | Employment generated due to implementation of project | About 110 laborers had employment during project period; on implementation of project increased water availability enhanced additional cropping area and productivity. |
| ix. | Change in household category, total, & source- | Around 150 households improved their income through agriculture, dairying and livelihood activities. |
| x. | Freedom from Debt and reduction in degree of dependence of money lenders (case studies) | Most of the farmers depend on banks, SHGs and about 15% people still depend on private moneylenders. |
| xi. | Reduction in out-migration (case studies) | Migration in search of livelihoods was about 25% before watershed program and almost nil now due to <i>NAREGA</i> . |
| xii. | Reduction in drought vulnerability of the watershed | Increased groundwater availability has reduced vulnerability to drought by about 25%. |
| xiii. | Detailed case studies of specific farmers impacted by the project | Please see the attachment |
| xiv. | Photographs showing work + its impact | Please see the attachment |

7. Learnings and process documentation (how the program could be implemented better; constraints, improvements possible, Changes made etc.)

- Repair, maintenance and de-silting of water harvesting structures are essential to get sustainable benefits.
- Recharging of dry open wells near streams would have given better equity and results.
- De-silting and deepening of village tanks and percolation tanks can improve water harvesting.
- There is a scope for construction of some more WHS and horticulture plantations.
- Guidelines are needed for using WDF.



Figure 1. Percolation tank at Jillepally watershed.



Figure 2. Check dam at Jillepally watershed.

8. Specific datasets on different impact parameters:

9. Observations and Comments by Evaluators:

- Locations, design criteria and quality of construction of WHS are good and effectively serving the purpose (Fig. 1 & 2).
- Water harvesting structures are filled with sediment, bushes and developed leakages resulting in reduced water storage hence the effectiveness of the watershed structures reduced (Fig. 2 & 3).



Figure 3. Check dam filled with sediment and bushes at Jillepally watershed.

- Post-project maintenance was not clearly envisaged as an exit policy in the project, hence proper mechanism should be operationalized to repair and maintain the structures, and to ensure proper utilization of WDF/community contribution, clear guidelines should be in place. Otherwise watershed committee exists, but becomes defunct, as is the case with Jillepally watershed.
- Crop productivity enhancement and water use efficiency measures were not emphasized in the project to harness the full benefits of project activities, and increased water availability.
- Technology Resource organizations like academic/research institutions involvement was absent.
- As admitted by farmers in the village, availability of drinking water round the year, supplemental irrigation water for second crop and ground water increase helping in the growth of horticulture plantations and cropping intensity are the visible qualitative and quantitative impacts due to watershed development.

Success story

- **Many farmers** in the village have diversified their crops to sweet lime with drip irrigation due to watershed interventions and increased groundwater availability to have more secured and sustainable incomes (Fig. 4).



Fig. 4. Diversified sweet lime cultivation in Jillepally watershed.

**Impact Assessment Report
Kranthi Watershed, DPAP – IV batch,
Dindi Mandal, Nalgonda district, Andhra Pradesh**

1. Details of watershed:

| | |
|--|------------------------------|
| 1. Name of the Scheme: | DPAP – IV Batch |
| 2. Name of the watershed: | Kranthi |
| 3. Names of villages in the Watershed: | Varikol |
| 4. Villages/Mandal/District: | Varikol / Dindi / Nalgonda |
| 5. Name and Address of PIA: | NRASS, Devarakonda |
| 6. Total area of the watershed: | 305 ha (255 ha Treated area) |

2. Land Use Pattern:

| | |
|--------------------------------------|-----|
| i. Arable land (ha) | 205 |
| ii. Non-arable land (ha) | 100 |
| iii. Government/ Community land (ha) | 105 |
| iv. Private land (ha) | 100 |
| v. Treated arable (ha) | 205 |
| vi. Treated non-arable (ha) | 50 |

3. Verification financial and other Records

| | | |
|--|--|---------------------|
| i. Total cost: | Approved: Rs 9.83 Lakh | Spent: Rs 9.83 Lakh |
| ii. Expenditure incurred as per guidelines | Yes | |
| iii. Works executed as per Records | Yes PT (9), CD (2), RFD (50), horticulture (2 ha). | |
| iv. Whether watershed committees (WC) exists | Yes WC comprises of 11 members (1 woman, 10 men); Mr. Suresh Reddy was WA President, Mr. P Chandra Reddy, was WC Chairman, Mr. Anjaiah was WC Secretary. All these members were available for consultation. | |
| v. If exists, activities of the committees | Not functional due to any clear guidelines for utilizing WDF to repair and maintain structures. | |

4. Community participation (how community participation have been ensured and what EPA have been taken up, inputs of details of beneficiaries)

Although EPA was not taken up; construction of 2 check dams, 9 percolation tanks, 50 rock fill dams and other conservation works were taken up with the participation of farmers from 5 user groups (UGs) and landless poor from the watershed village.

5. Qualitative Parameters of Impacts

| | | |
|---|--|---|
| 1. Functioning of village level institutions | Satisfactory during project and after as the SHGs increased from eight to thirteen without any financial help from watershed scheme. | |
| 2. Records of meetings properly updated | Yes | |
| 3. Liaison with scientific institutions established | No, farmers were not given any exposure to productivity enhancement | |
| 4. Watershed Development Fund (WDF) collected?, and its utilization | Yes; collected Rs.52 708 according to guidelines and deposited in Andhra Bank, Devarakonda but unspent for maintenance works due to lack of clear guidelines on use from District Authorities. | |
| 5. Self Help Groups | SHGs increased from 8 to 13 after watershed interventions (no support from watershed program) | Revolving fund: Rs. |
| | V.O functioning: | Savings: |
| | Utilization of loans: | Loans were used for buying cattle, inputs for agriculture and for purchasing sewing machines. |
| | Bank linkages established: | Farmers have linkage with Andhra Bank for credit and other transactions. |
| 6. Planned CPRs sustainable & equitable development | No development of CPRs | |
| 7. Benefits to weaker sections (women, dalits and landless) | No specific initiatives; engaged for labor work during watershed works. | |

4. Quantitative Parameters of Impacts

| | | | |
|--|--|--------------|-------|
| i. Improvements in water table/water availability | Impact of watershed project has clearly reflected in enhancing the groundwater levels (about 0.5 m increase) and duration of water availability in wells for agricultural and other purposes in the watershed. There are about 40 functioning open wells and bore wells in the watershed for irrigation. | | |
| ii. Additional area under cultivation/horticulture/afforestation | 50 ha additional area brought under cultivation; 2 ha private land with horticulture. | | |
| iii. Changes in cropping pattern and intensity | Before project sorghum, pearl millet, castor and paddy crops were grown; After watershed implementation, farmers shifted to other annual crops like paddy, groundnut, sunflower and pigeon pea. | | |
| iv. Changes in agricultural productivity | Crops | Yield (q/ha) | |
| | | Before | After |
| | Paddy | 45 | 50 |
| | Groundnut | 10 | 14 |
| | Castor | 8 | 12 |
| | Pigeon pea | 8 | 12 |
| v. Changes in fodder & fuel wood availability | Not much improvement. | | |
| vi. Changes in size and character of livestock holdings | Buffaloes number increased by about 50 and milk production increased from 50 to 100 liters per day. | | |
| vii. Status of grazing land & their carrying capacity | Nil | | |

| | |
|--|---|
| viii. Employment generated due to implementation of project | About 80 laborers had employment during project period; on implementation of project increased water availability enhanced additional cropping area and productivity. |
| ix. Change in household category, total, & source- | Around 100 households improved their income through agriculture, dairying and livelihood activities. |
| x. Freedom from Debt and reduction in degree of dependence of money lenders (case studies) | Most of the farmers depend on banks, SHGs and about 20% people still depend on private moneylenders. |
| xi. Reduction in out-migration (case studies) | Migration in search of livelihoods was about 15% before watershed program and almost nil now due to <i>NAREGA</i> . |
| xii. Reduction in drought vulnerability of the watershed | Increased groundwater availability has reduced vulnerability to drought by about 15%. |
| xiii. Detailed case studies of specific farmers impacted by the project | Please see the attachment |
| xiv. Photographs showing work + its impact | Please see the attachment |

5. Learnings and process documentation (how the program could be implemented better; constraints, improvements possible, Changes made etc.)

- Repair, maintenance and de-silting of water harvesting structures are essential to get sustainable benefits.
- Recharging of dry open wells near streams would have given better equity and results.
- De-silting and deepening of village tanks and percolation tanks can improve water harvesting.
- There is a scope for construction of some more WHS and horticulture plantations.
- Guidelines are needed for using WDF.



Figure 1. Percolation tank at Kranthi watershed.



Figure 2. Rock fill dam at Kranthi watershed.

8. Specific datasets on different impact parameters:

9. Observations and Comments by Evaluators:

- Locations, design criteria and quality of construction of WHS are good and effective in serving the purpose (**Fig. 1 & 2**).
- Water harvesting structures are filled with sediment, bushes and developed leakages resulting in reduced water storage hence the effectiveness of the watershed structures reduced (**Fig.3**).



Figure 3. Check dam filled with sediment and bushes at Kranthi watershed.

- Post-project maintenance was not clearly envisaged as an exit policy in the project, hence proper mechanism should be operationalized to repair and maintain the structures, and to ensure proper utilization of WDF/community contribution, clear guidelines should be in place. Otherwise watershed committee exists, but becomes defunct, as is the case with Kranthi watershed.
- Crop productivity enhancement and water use efficiency measures were not emphasized in the project to harness the full benefits of project activities, and increased water availability.
- Technology Resource organizations like academic/research institutions involvement was absent.
- As admitted by farmers in the village, availability of drinking water round the year, supplemental irrigation water for second crop and ground water increase helping in increasing the cropping intensity are the visible qualitative and quantitative impacts due to watershed development.

Success story

- **Many farmers** in the village said that watershed interventions have been helping in increasing the groundwater availability and cropping intensity. They are growing paddy crop in two seasons (Fig. 4).



Fig. 4. Paddy crop in Kranthi watershed.

Impact Assessment Report
Krishna Watershed, DPAP – IV batch,
Munugode Mandal, Nalgonda district, Andhra Pradesh

1. Details of watershed:

| | |
|--|------------------------------|
| 1. Name of the Scheme: | DPAP – IV Batch |
| 2. Name of the watershed: | Krishna |
| 3. Names of villages in the Watershed: | Kistapur |
| 4. Villages/Mandal/District: | Kistapur/ Munugode/ Nalgonda |
| 5. Name and Address of PIA: | SISS, Munugode |
| 6. Total area of the watershed: | 500 ha |

2. Land Use Pattern:

| | |
|--------------------------------------|--|
| i. Arable land (ha) | |
| ii. Non-arable land (ha) | |
| iii. Government/ Community land (ha) | |
| iv. Private land (ha) | |
| v. Treated arable (ha) | |
| vi. Treated non-arable (ha) | |

3. Verification financial and other Records

| | | |
|--|---|----------------------|
| i. Total cost: | Approved: | Spent: Rs 13.20 Lakh |
| ii. Expenditure incurred as per guidelines | Yes | |
| iii. Works executed as per Records | Yes PT (8), Farm ponds (100 Nos.), CD (4), Bunding (240 ha), Diversion drain (200 m), horticulture (59 ha), afforestation (5 ha) | |
| iv. Whether watershed committees (WC) exists | Yes WC comprises of 10 members (2 women, 8 men); Mr A Ramesh was WA President, Mr P Sudhakar Reddy, was WC Chairman, Mr. V Yadagiri Reddy was WC Secretary. All these members were available for consultation. | |
| v. If exists, activities of the committees | Not functional due to any clear guidelines for utilizing WDF to repair and maintain structures. | |

4. Community participation (how community participation have been ensured and what EPA have been taken up, inputs of details of beneficiaries)

Although EPA was not taken up; construction of 4 check dam, 8 percolation tanks, 100 farm ponds and other conservation works were taken up with the participation of farmers from 21 user groups (UGs) and landless poor from the watershed village.

5. Qualitative Parameters of Impacts

| | | |
|---|---|---|
| 1. Functioning of village level institutions | Satisfactory during project and after as the SHGs increased from twelve to twenty two without any financial help from watershed scheme. | |
| 2. Records of meetings properly updated | Yes | |
| 3. Liaison with scientific institutions established | No, farmers were not given any exposure to productivity enhancement | |
| 4. Watershed Development Fund (WDF) collected?, and its utilization | Yes; collected Rs.55 000 according to guidelines and deposited in Canara Bank, Munugode but unspent for maintenance works due to lack of clear guidelines on use from District Authorities. | |
| 5. Self Help Groups | SHGs increased from 12 to 22 after watershed interventions (no support from watershed program) | Revolving fund: Rs. 2 60 000 |
| | V.O functioning: | Savings: 12 00 000 |
| | Utilization of loans: | Loans were given to the members for purchase of buffaloes, sheep, inputs for agriculture, sieving machines, and for shops |
| | Bank linkages established: | Farmers have linkage with Canara Bank, Munugode for credit and other transactions |
| 6. Planned CPRs sustainable & equitable development | Nil | |
| 7. Benefits to weaker sections (women, dalits and landless) | No specific initiatives; engaged for labor work during watershed works. | |

6. Quantitative Parameters of Impacts

| | | | |
|--|--|--------------|-------|
| i. Improvements in water table/water availability | Impact of watershed project has clearly reflected in enhancing the groundwater levels (4-5 m increase) and duration of water availability in wells (doubled) for agricultural and other purposes in the watershed. There are 100 wells exist in the watershed with an average depth of 90 feet. Before project, the groundwater scenario in watershed was averaged 60 feet deep from ground surface during rainy season and starts to recede sharply from post-rainy season and dried in summer. But post-project scenario is 45 feet deep from ground surface and water is available up to February- March. About 15 wells, which were totally dead, were rejuvenated. Drinking water situation has improved significantly. Area under irrigation has been doubled. | | |
| ii. Additional area under cultivation/horticulture/afforestation | 85 ha additional area brought under cultivation; 59 ha private land with horticulture; 5 ha common land with afforestation. | | |
| iii. Changes in cropping pattern and intensity | Before project sorghum, millets, pigeon pea and castor crops were grown; After watershed implementation, farmers shifted to horticulture, plantations like sweet lime along with other annual crops such as groundnut, cotton, paddy and vegetables. | | |
| iv. Changes in agricultural productivity | Crops | Yield (q/ha) | |
| | | Before | After |
| | Cotton | 10 | 20 |
| | Groundnut | 15 | 25 |
| | Paddy | 40 | 60 |

| | |
|--|--|
| v. Changes in fodder & fuel wood availability | No changes in fodder and fuel wood availability |
| vi. Changes in size and character of livestock holdings | Buffaloes number and milk production increased from 50 to 500 liters per day and Mother Dairy is collecting milk from the village everyday. |
| vii. Status of grazing land & their carrying capacity | Improved due to water availability. |
| viii. Employment generated due to implementation of project | About 150 laborers had employment during project period; on implementation of project water availability enhanced 50% additional cropping area and productivity. |
| ix. Change in household category, total, & source- | Around 260 households improved their income through agriculture, dairying and livelihood activities. |
| x. Freedom from Debt and reduction in degree of dependence of money lenders (case studies) | Have good credit linkages with banks, micro finance of SHGs also helping and less dependence on private moneylenders. |
| xi. Reduction in out-migration (case studies) | Earlier 30% of laborers used to migrate in search of work during off-season. Now no migration from this village. |
| xii. Reduction in drought vulnerability of the watershed | Quantity and duration of groundwater availability has increased and about 40-50% benefit due to watershed interventions. |
| xiii. Detailed case studies of specific farmers impacted by the project | Please see the attachment |
| xiv. Photographs showing work + its impact | Please see the attachment |

7. Learnings and process documentation (how the program could be implemented better; constraints, improvements possible, Changes made etc.)

- Repair, maintenance and de-silting of water harvesting structures are essential to get sustainable benefits.
- Recharging of dry open wells near small streams would have given better equity and results.
- De-silting and deepening of village tanks and percolation tanks can improve water harvesting.
- Some more area needs bunding and farmers need support for planting sweet lime orchards.
- Marketing facilities for agricultural produce in Munugode would benefit nearby villages.
- Guidelines are needed for using WDF.



Figure 1. Percolation tank at Krishna watershed.

Figure 2. Farm pond, Krishna watershed.

8. Specific datasets on different impact parameters:

9. Observations and Comments by Evaluators:

- Locations and quality of construction of WHS is good and serving the purpose very effectively (Fig. 1 & 2).
- Water harvesting structures are filled with sediment, bushes and developed leakages resulting in reduced water storage hence the effectiveness of the watershed structures reduced (Fig.3).



Figure 3. Percolation tank and spillway filled with sediment and bushes, Krishna watershed

- Post-project maintenance was not clearly envisaged as an exit policy in the project, hence proper mechanism should be operationalized to repair and maintain the structures, and to ensure proper utilization of WDF/community contribution, clear guidelines should be in place. Otherwise watershed committee exists, but becomes defunct, as is the case with Krishna watershed.
- Crop productivity enhancement and water use efficiency measures were not emphasized in the project to harness the full benefits of project activities, and increased water availability.
- Technology Resource organizations like academic/research institutions involvement was absent.
- As admitted by farmers in the village, availability of drinking water round the year, supplemental irrigation water for second crop and ground water increase helping growth of orchard crops are the visible qualitative and quantitative impacts due to watershed development.

Success story

- **Mr. P Sudhakar Reddy** is a big and progressive farmer who is the beneficiary of a percolation tank says that it is a very good structure and very effective in recharging the groundwater. Nearby wells used to irrigate about 2.5 ha area before PT constriction and now they are irrigating about 5 ha land with paddy crop, sweet lime and mango orchards (Fig. 4).

- **Mr. B. Bakka Reddy** owns a field near percolation tank, and one of the beneficiaries of this PT satisfactorily admits that groundwater level has increased substantially in the tube well due to PT construction. Before PT construction he used to grow paddy in 1 ha area during rainy season only. Now, he has planted sweet lime in 2 ha and grows paddy crop in 1 ha during two seasons.



Fig. 4. Beneficiary farmers of percolation tank and sweet lime orchard

**Impact Assessment Report
Marlakunta Watershed, DPAP – IV batch,
Munugode Mandal, Nalgonda district, Andhra Pradesh**

1. Details of watershed:

| | |
|--|------------------------------|
| 1. Name of the Scheme: | DPAP – IV Batch |
| 2. Name of the watershed: | Marlakunta |
| 3. Names of villages in the Watershed: | Vookondi |
| 4. Villages/Mandal/District: | Vookondi/ Munugode/ Nalgonda |
| 5. Name and Address of PIA: | SISS, Munugode |
| 6. Total area of the watershed: | 500 ha |

2. Land Use Pattern:

| | |
|--------------------------------------|--|
| i. Arable land (ha) | |
| ii. Non-arable land (ha) | |
| iii. Government/ Community land (ha) | |
| iv. Private land (ha) | |
| v. Treated arable (ha) | |
| vi. Treated non-arable (ha) | |

3. Verification financial and other Records

| | | |
|--|--|----------------------|
| i. Total cost: | Approved: | Spent: Rs 15.72 Lakh |
| ii. Expenditure incurred as per guidelines | Yes | |
| iii. Works executed as per Records | Yes LBS (60 nos.), PT (6), CD (7), Bunding (16 ha), horticulture (23 ha), afforestation (30 ha) | |
| iv. Whether watershed committees (WC) exists | Yes WC comprises of 10 members (3 women, 7 men); Mr Pandu was WA President, Mr G Shanker Reddy, was WC Chairman, Mr. N Swamy was WC Secretary. All these members were available for consultation. | |
| v. If exists, activities of the committees | Not functional due to any clear guidelines for utilizing WDF to repair and maintain structures. | |

4. Community participation (how community participation have been ensured and what EPA have been taken up, inputs of details of beneficiaries)

Although EPA was not taken up; construction of 7 check dams, 6 percolation tanks and other conservation works were taken up with the participation of farmers from 24 user groups (UGs) and landless poor from the watershed village.

5. Qualitative Parameters of Impacts

| | | |
|---|---|----------------------------|
| 1. Functioning of village level institutions | Satisfactory during project and after as the SHGs increased from twenty to thirty eight without any financial help from watershed scheme. | |
| 2. Records of meetings properly updated | Yes | |
| 3. Liaison with scientific institutions established | No, farmers were not given any exposure to productivity enhancement | |
| 4. Watershed Development Fund (WDF) collected?, and its utilization | Yes; collected Rs.1 10 000 according to guidelines and deposited in Canara Bank, Munugode but unspent for maintenance works due to lack of clear guidelines on use from District Authorities. | |
| 5. Self Help Groups | SHGs increased from 20 to 38 after watershed interventions (no support from watershed program) | Revolving fund: Rs. 260000 |
| V.O functioning: | | Savings:400000 |
| Utilization of loans: | Loans were given to members for the purchase of cattle (milk animals) , sieving machines, and for shops | |
| Bank linkages established: | Farmers have linkage with Nagarjuna Grameena Vikas Bank for credit and other transactions | |
| 6. Planned CPRs sustainable & equitable development | Afforestation was done in 30 ha of common land | |
| 7. Benefits to weaker sections (women, dalits and landless) | No specific initiatives; engaged for labor work during watershed works. | |

6. Quantitative Parameters of Impacts

| | | | |
|--|--|--------------|-------|
| i. Improvements in water table/water availability | Impact of watershed project has clearly reflected in enhancing the groundwater levels (1-2 m increase) and duration of water availability in wells for agricultural and other purposes in the watershed. Drinking water situation has improved by about 50%. | | |
| ii. Additional area under cultivation/horticulture/afforestation | 85 ha additional area brought under cultivation; 23 ha private land with horticulture; 30 ha common land with afforestation. | | |
| iii. Changes in cropping pattern and intensity | Before project sorghum, millets and castor crops were grown; After watershed implementation, farmers shifted to horticulture, plantations like sweet lime along with annual crops like paddy, cotton and pigeon pea. | | |
| iv. Changes in agricultural productivity | Crops | Yield (q/ha) | |
| | | Before | After |
| | Paddy | 45 | 60 |
| | Cotton | 12 | 20 |
| | Pigeon pea | 5 | 10 |
| v. Changes in fodder & fuel wood availability | Improved fodder and fuel wood availability after watershed activities. | | |
| vi. Changes in size and character of livestock holdings | Buffalo numbers and milk production increased from 50 to 200 liters per day and due to increased milk production milk collection center established in the village. | | |
| vii. Status of grazing land & their carrying capacity | Nil | | |

| | |
|--|--|
| viii. Employment generated due to implementation of project | About 150 laborers had employment during project period; on implementation of project increased water availability enhanced additional cropping area and productivity. |
| ix. Change in household category, total, & source- | Around 240 households improved their income through agriculture, dairying and livelihood activities. |
| x. Freedom from Debt and reduction in degree of dependence of money lenders (case studies) | Have good credit linkages with banks and less dependence on private moneylenders. |
| xi. Reduction in out-migration (case studies) | Earlier 30% migration was there. Now no migration of laborers from the village. |
| xii. Reduction in drought vulnerability of the watershed | Increased groundwater availability has reduced vulnerability to drought. |
| xiii. Detailed case studies of specific farmers impacted by the project | Please see the attachment |
| xiv. Photographs showing work + its impact | Please see the attachment |

7. Learnings and process documentation (how the program could be implemented better; constraints, improvements possible, Changes made etc.)

- Repair, maintenance and de-silting of water harvesting structures are essential to get sustainable benefits as most of them are damaged and not serving the purpose.
- Recharging of dry open wells near small streams would have given better equity and results.
- De-silting and deepening of village tanks and percolation tanks can improve water harvesting.
- Marketing facilities for agricultural produce in Munugode would benefit nearby villages.
- Guidelines are needed for using WDF.



Figure 1. Check dam at Marlakunta watershed, Figure 2. Percolation tank, Marlakunta watershed.

8. Specific datasets on different impact parameters:

9. Observations and Comments by Evaluators:

- The quality of construction of WHS is fair but locations of the structures are not appropriate because of less storage capacity and more investment per unit of water stored (**Fig. 1 & 2**).

- Water harvesting structures are filled with sediment as well as bushes resulting in reduced water storage hence the effectiveness of the watershed structures reduced (**Fig.3**).



Figure 3. Check dam and percolation tank filled with sediment and bushes, Marlakunta watershed

- Post-project maintenance was not clearly envisaged as an exit policy in the project, hence proper mechanism should be operationalized to repair and maintain the structures, and to ensure proper utilization of WDF/community contribution, clear guidelines should be in place. Otherwise watershed committee exists, but becomes defunct, as is the case with Marlakunta watershed.
- Crop productivity enhancement and water use efficiency measures were not emphasized in the project to harness the full benefits of project activities, and increased water availability.
- Technology Resource organizations like academic/research institutions involvement was absent.
- As admitted by farmers in the village, availability of drinking water round the year, supplemental irrigation water for second crop and ground water increase helping growth of orchard crops are the visible qualitative and quantitative impacts due to watershed development.

Success story

- **Mr. Nimmal Swamy** has 2 ha land near percolation tank. Before the PT construction, water availability in the tube well was less. The PT has benefited the farmers by enhancing groundwater level and the duration of availability by about 40%. Before PT construction he used to grow paddy in 0.6 ha area during rainy season. Now, he grows paddy crop in 1.2 ha area during two seasons (Fig. 4).



Fig. 4. Improved groundwater availability has increased the area under paddy crop.

Impact Assessment Report
Muthyalamma Watershed, DPAP – IV batch,
Munugode Mandal, Nalgonda district, Andhra Pradesh

1. Details of watershed:

| | |
|--|------------------------------|
| 1. Name of the Scheme: | DPAP – IV Batch |
| 2. Name of the watershed: | Muthyalamma |
| 3. Names of villages in the Watershed: | Vookondi |
| 4. Villages/Mandal/District: | Vookondi/ Munugode/ Nalgonda |
| 5. Name and Address of PIA: | SISS, Munugode |
| 6. Total area of the watershed: | 520 ha (450 ha Treated area) |

2. Land Use Pattern:

| | |
|--------------------------------------|-----|
| i. Arable land (ha) | 300 |
| ii. Non-arable land (ha) | 120 |
| iii. Government/ Community land (ha) | 100 |
| iv. Private land (ha) | 370 |
| v. Treated arable (ha) | 300 |
| vi. Treated non-arable (ha) | 150 |

3. Verification financial and other Records

| | | |
|--|---|----------------------|
| i. Total cost: | Approved: Rs 16.59 Lakh | Spent: Rs 16.50 Lakh |
| ii. Expenditure incurred as per guidelines | Yes | |
| iii. Works executed as per Records | Yes LBS (20 nos.), PT (11), CD (9), Bunding (84 ha), horticulture (25 ha), afforestation (32 ha) | |
| iv. Whether watershed committees (WC) exists | Yes WC comprises of 11 members (3 women, 8 men); Mr Satyam was WA President, Mr J Ramulu, was WC Chairman, Mr. B Yadagiri was WC Secretary. All these members were available for consultation. | |
| v. If exists, activities of the committees | Not functional due to any clear guidelines for utilizing WDF to repair and maintain structures. | |

4. Community participation (how community participation have been ensured and what EPA have been taken up, inputs of details of beneficiaries)

Although EPA was not taken up; construction of 9 check dams, 11 percolation tanks and other conservation works were taken up with the participation of farmers from 20 user groups (UGs) and landless poor from the watershed village.

5. Qualitative Parameters of Impacts

| | | |
|---|---|---|
| 1. Functioning of village level institutions | Satisfactory during project and after as the SHGs increased from ten to twenty four without any financial help from watershed scheme. | |
| 2. Records of meetings properly updated | Yes | |
| 3. Liaison with scientific institutions established | No, farmers were not given any exposure to productivity enhancement | |
| 4. Watershed Development Fund (WDF) collected?, and its utilization | Yes; collected Rs.1 07 000 according to guidelines and deposited in Canara Bank, Munugode but unspent for maintenance works due to lack of clear guidelines on use from District Authorities. | |
| 5. Self Help Groups | SHGs increased from 10 to 24 after watershed interventions (no support from watershed program) | Revolving fund: Rs. 50 000 |
| | V.O functioning: | Savings: |
| | Utilization of loans: | Loans were given to members for the purchase of cattle (milk animals) , sieving machines, and for shops |
| | Bank linkages established: | Farmers have linkage with Nagarjuna Grameena Vikas Bank and Canara bank for credit and other transactions |
| 6. Planned CPRs sustainable & equitable development | Afforestation was done in 32 ha of common land | |
| 7. Benefits to weaker sections (women, dalits and landless) | No specific initiatives; engaged for labor work during watershed works. | |

6. Quantitative Parameters of Impacts

| | | | |
|--|--|--------------|-------|
| i. Improvements in water table/water availability | Impact of watershed project has clearly reflected in enhancing the groundwater levels (1-1.5 m increase) and duration of water availability in wells for agricultural and other purposes in the watershed. Drinking water situation has improved by about 50%. | | |
| ii. Additional area under cultivation/horticulture/afforestation | 85 ha additional area brought under cultivation; 25 ha private land with horticulture; 32 ha common land with afforestation. | | |
| iii. Changes in cropping pattern and intensity | Before project sorghum, millets and castor crops were grown; After watershed implementation, farmers shifted to horticulture, plantations like sweet lime along with annual crops like paddy, cotton and pigeon pea. | | |
| iv. Changes in agricultural productivity | Crops | Yield (q/ha) | |
| | | Before | After |
| | Paddy | 40 | 50 |
| | Cotton | 10 | 15 |
| | Pigeon pea | 5 | 9 |
| v. Changes in fodder & fuel wood availability | Improved fodder and fuel wood availability after watershed activities. | | |
| vi. Changes in size and character of livestock holdings | Buffalo numbers increased by 100 and milk production increased from 100 to 300 liters per day and due to increased milk production milk collection center established in the village. | | |
| vii. Status of grazing land & their carrying capacity | Nil | | |

| | |
|--|--|
| viii. Employment generated due to implementation of project | About 120 laborers had employment during project period; on implementation of project increased water availability enhanced additional cropping area and productivity. |
| ix. Change in household category, total, & source- | Around 210 households improved their income through agriculture, dairying and livelihood activities. |
| x. Freedom from Debt and reduction in degree of dependence of money lenders (case studies) | Have good credit linkages with banks and less dependence on private moneylenders. |
| xi. Reduction in out-migration (case studies) | Earlier 30% migration was there. Now no migration of laborers from the village. |
| xii. Reduction in drought vulnerability of the watershed | Increased groundwater availability has reduced vulnerability to drought. |
| xiii. Detailed case studies of specific farmers impacted by the project | Please see the attachment |
| xiv. Photographs showing work + its impact | Please see the attachment |

7. Learnings and process documentation (how the program could be implemented better; constraints, improvements possible, Changes made etc.)

- Repair, maintenance and de-silting of water harvesting structures are essential to get sustainable benefits as most of them are damaged and not serving the purpose.
- Recharging of dry open wells near small streams would have given better equity and results.
- De-silting and deepening of village tanks and percolation tanks can improve water harvesting.
- Marketing facilities for agricultural produce in Munugode would benefit nearby villages.
- Guidelines are needed for using WDF.



Figure 1. Checkdam, Muthyalamma watershed, Figure 2. Percolation tank, Muthyalamma watershed.

8. Specific datasets on different impact parameters:

9. Observations and Comments by Evaluators:

- The quality of construction of WHS is fair but locations of the structures are not appropriate because of less storage capacity and more investment per unit of water stored (**Fig. 1 & 2**).
- Water harvesting structures are filled with sediment as well as bushes resulting in reduced water storage hence the effectiveness of the watershed structures reduced (**Fig.3**).



Figure 3. Check dam and percolation tank filled with sediment and bushes, Muthyalamma watershed

- Post-project maintenance was not clearly envisaged as an exit policy in the project, hence proper mechanism should be operationalized to repair and maintain the structures, and to ensure proper utilization of WDF/community contribution, clear guidelines should be in place. Otherwise watershed committee exists, but becomes defunct, as is the case with Muthyalamma watershed.
- Crop productivity enhancement and water use efficiency measures were not emphasized in the project to harness the full benefits of project activities, and increased water availability.
- Technology Resource organizations like academic/research institutions involvement was absent.
- As admitted by farmers in the village, availability of drinking water round the year, supplemental irrigation water for second crop and ground water increase helping growth of orchard crops are the visible qualitative and quantitative impacts due to watershed development.

Success story

- **Mr. Yadagiri** has 2 ha land near percolation tank. Before the PT constriction, water availability in the open well was less. The PT has benefited the farmers by enhancing groundwater level and the duration of availability by about 40%. Before PT construction he used to grow paddy in 0.8 ha area during rainy season. Now, he grows paddy crop in 1.5 ha area during two seasons (Fig. 4).



Fig. 4. Improved groundwater availability has increased the area under paddy crop.

**Impact Assessment Report
Pogilla Watershed, DPAP – IV batch,
Chandampet Mandal, Nalgonda district, Andhra Pradesh**

1. Details of watershed:

| | |
|--|---------------------------------|
| 1. Name of the Scheme: | DPAP – IV Batch |
| 2. Name of the watershed: | Pogilla |
| 3. Names of villages in the Watershed: | Pogilla |
| 4. Villages/Mandal/District: | Pogilla / Chandampet / Nalgonda |
| 5. Name and Address of PIA: | JURDC, Nalgonda |
| 6. Total area of the watershed: | 490 ha (340 ha Treated area) |

2. Land Use Pattern:

| | |
|--------------------------------------|-----|
| i. Arable land (ha) | 300 |
| ii. Non-arable land (ha) | 190 |
| iii. Government/ Community land (ha) | 105 |
| iv. Private land (ha) | 285 |
| v. Treated arable (ha) | 290 |
| vi. Treated non-arable (ha) | 50 |

3. Verification financial and other Records

| | | |
|--|---|----------------------|
| i. Total cost: | Approved: Rs 15.17 Lakh | Spent: Rs 15.17 Lakh |
| ii. Expenditure incurred as per guidelines | Yes | |
| iii. Works executed as per Records | Yes PT (16), CD (21), Farm pond (1), RFD (20), Diversion drain (1), Stone bunding (20). | |
| iv. Whether watershed committees (WC) exists | Yes WC comprises of 11 members (2 women, 9 men); Mr. Ramaiah was WA President, Mr. Venkataiah, was WC Chairman, Mr. Anjaiah was WC Secretary. All these members were available for consultation. | |
| v. If exists, activities of the committees | Not functional due to any clear guidelines for utilizing WDF to repair and maintain structures. | |

4. Community participation (how community participation have been ensured and what EPA have been taken up, inputs of details of beneficiaries)

Although EPA was not taken up; construction of 21 check dams, 16 percolation tanks, 20 rock fill dams and other conservation works were taken up with the participation of farmers from 9 user groups (UGs) and landless poor from the watershed village.

5. Qualitative Parameters of Impacts

| | | |
|---|---|--|
| 1. Functioning of village level institutions | Satisfactory during project and after as the SHGs increased from eight to thirteen without any financial help from watershed scheme. | |
| 2. Records of meetings properly updated | Yes | |
| 3. Liaison with scientific institutions established | No, farmers were not given any exposure to productivity enhancement | |
| 4. Watershed Development Fund (WDF) collected?, and its utilization | Yes; collected Rs.75 000 according to guidelines and deposited in SBH, Chandampet but unspent for maintenance works due to lack of clear guidelines on use from District Authorities. | |
| 5. Self Help Groups | SHGs increased from 8 to 13 after watershed interventions (no support from watershed program) | Revolving fund: Rs. |
| | V.O functioning: | Savings: |
| | Utilization of loans: | Loans were used for buying livestock, inputs for agriculture and for purchasing sewing machines. |
| | Bank linkages established: | Farmers have linkage with State Bank of Hyderabad for credit and other transactions. |
| 6. Planned CPRs sustainable & equitable development | No development of CPRs | |
| 7. Benefits to weaker sections (women, dalits and landless) | No specific initiatives; engaged for labor work during watershed works. | |

6. Quantitative Parameters of Impacts

| | | | |
|--|--|--------|-------|
| i. Improvements in water table/water availability | Impact of watershed project is not much in enhancing the groundwater levels as the construction sites are having impermeable rocks. | | |
| ii. Additional area under cultivation/horticulture/afforestation | 20 ha additional area brought under cultivation. | | |
| iii. Changes in cropping pattern and intensity | Before watershed project sorghum, pigeon pea, castor and paddy crops were grown; After watershed implementation also same crops are being grown. | | |
| iv. Changes in agricultural productivity | Yield (q/ha) | | |
| | Crops | Before | After |
| | Paddy | 46 | 52 |
| | Sorghum | 10 | 12 |
| | Castor | 8 | 10 |
| | Pigeon pea | 6 | 9 |
| v. Changes in fodder & fuel wood availability | Not much improvement. | | |
| vi. Changes in size and character of livestock holdings | Buffaloes number increased by about 50 and milk production increased from 100 to 150 liters per day. | | |
| vii. Status of grazing land & their carrying capacity | Nil | | |
| viii. Employment generated due to implementation of project | About 80 laborers had employment during project period. | | |

| | |
|--|---|
| ix. Change in household category, total, & source- | Around 100 households improved their income through agriculture, dairying and livelihood activities. |
| x. Freedom from Debt and reduction in degree of dependence of money lenders (case studies) | Most of the farmers depend on banks, SHGs and about 25% people still depend on private moneylenders. |
| xi. Reduction in out-migration (case studies) | Migration in search of livelihoods was about 50% before watershed program and almost nil now due to <i>NAREGA</i> . |
| xii. Reduction in drought vulnerability of the watershed | No reduction in drought vulnerability due to watershed interventions. |
| xiii. Detailed case studies of specific farmers impacted by the project | No successful case study in the watershed. |
| xiv. Photographs showing work + its impact | Please see the attachment |

7. Learnings and process documentation (how the program could be implemented better; constraints, improvements possible, Changes made etc.)

- Repair, maintenance and de-silting of water harvesting structures are essential to harvest runoff water.
- Recharging of dry open wells would have given better equity and results.
- De-silting and deepening of village tanks and percolation tanks can improve water harvesting.
- There is a scope for construction of some more WHS and dry land horticulture plantations.
- Guidelines are needed for using WDF.



Figure 1. Check dam at Pogilla watershed.



Figure 2. Rock fill dam at Pogilla watershed.

8. Specific datasets on different impact parameters:

9. Observations and Comments by Evaluators:

- Design criteria and quality of construction of WHS are good but not much effective in serving the purpose as the sites are having impermeable rocks. (Fig. 1 & 2).

- Water harvesting structures are filled with sediment, bushes and developed leakages resulting in reduced water storage hence the effectiveness of the watershed structures reduced (**Fig. 3**).



Figure 3. Check dam filled with sediment and bushes at Pogilla watershed.

- Post-project maintenance was not clearly envisaged as an exit policy in the project, hence proper mechanism should be operationalized to repair and maintain the structures, and to ensure proper utilization of WDF/community contribution, clear guidelines should be in place. Otherwise watershed committee exists, but becomes defunct, as is the case with Pogilla watershed.
- Crop productivity enhancement and water use efficiency measures were not emphasized in the project to harness the full benefits of project activities, and increased water availability.
- Technology Resource organizations like academic/research institutions involvement was absent.

**Impact Assessment Report
Pragathi Watershed, DPAP – IV batch,
Noothanakal Mandal, Nalgonda district, Andhra Pradesh**

1. Details of watershed:

| | |
|--|-----------------------------------|
| 1. Name of the Scheme: | DPAP – IV Batch |
| 2. Name of the watershed: | Pragathi |
| 3. Names of villages in the Watershed: | Nuthanakal |
| 4. Villages/Mandal/District: | Nuthanakal/ Noothanakal/ Nalgonda |
| 5. Name and Address of PIA: | SHEAD, Nalgonda |
| 6. Total area of the watershed: | 527 ha (400 ha Treated area) |

2. Land Use Pattern:

| | |
|--------------------------------------|-----|
| i. Arable land (ha) | 400 |
| ii. Non-arable land (ha) | 127 |
| iii. Government/ Community land (ha) | 20 |
| iv. Private land (ha) | 457 |
| v. Treated arable (ha) | 350 |
| vi. Treated non-arable (ha) | 50 |

3. Verification financial and other Records

| | | |
|--|--|----------------------|
| i. Total cost: | Approved: Rs 17.95 Lakh | Spent: Rs 15.53 Lakh |
| ii. Expenditure incurred as per guidelines | Yes | |
| iii. Works executed as per Records | Yes PT (9), CD (3), Farm ponds (12), RFD (60), Feeder channels (1), Bunding (80 ha), horticulture (3 ha) | |
| iv. Whether watershed committees (WC) exists | Yes WC comprises of 11 members (2 women and 9 men); Mr. V Arjun Reddy was WA President, Mr. Y Pulla Reddy, was WC Chairman, Mr. U Venkat Reddy was WC Secretary. All these members were available for consultation. | |
| v. If exists, activities of the committees | Not functional due to any clear guidelines for utilizing WDF to repair and maintain structures. | |

4. Community participation (how community participation have been ensured and what EPA have been taken up, inputs of details of beneficiaries)

Although EPA was not taken up; construction of 3 check dams, 9 percolation tanks, 12 farm ponds, 60 RFDs and other conservation works were taken up with the participation of farmers from 10 user groups (UGs) and landless poor from the watershed village.

5. Qualitative Parameters of Impacts

| | | |
|---|--|---------------------|
| 1. Functioning of village level institutions | Satisfactory during project and after as the SHGs increased from twelve to twenty without any financial help from watershed scheme. | |
| 2. Records of meetings properly updated | Yes | |
| 3. Liaison with scientific institutions established | No, farmers were not given any exposure to productivity enhancement | |
| 4. Watershed Development Fund (WDF) collected?, and its utilization | Yes; collected Rs.43 000 according to guidelines and deposited in Nagarjuna Grameena Bank, Noothanakal but unspent for maintenance works due to lack of clear guidelines on use from District Authorities. | |
| 5. Self Help Groups | SHGs increased from 12 to 20 after watershed interventions (no support from watershed program) | Revolving fund: Rs. |
| V.O functioning: | | Savings: |
| Utilization of loans: | Loans were used for buying cattle (milk animals), inputs for agriculture and for establishing petty shops. | |
| Bank linkages established: | Farmers have linkage with Nagarjuna Grameena Bank, Noothanakal for credit and other transactions. | |
| 6. Planned CPRs sustainable & equitable development | Nil | |
| 7. Benefits to weaker sections (women, dalits and landless) | No specific initiatives; engaged for labor work during watershed works. | |

6. Quantitative Parameters of Impacts

| | | | |
|--|---|--------------|-------|
| i. Improvements in water table/water availability | Impact of watershed project has clearly reflected in enhancing the groundwater levels (about 1.0 m increase) and duration of water availability in wells for agricultural and other purposes in the watershed. There are about 150 functioning open wells and 50 bore wells for irrigation and cropping intensity is increased after watershed interventions. | | |
| ii. Additional area under cultivation/horticulture/afforestation | 18 ha additional area brought under cultivation; 3 ha private land with horticulture and 1 ha common land with afforestation. | | |
| iii. Changes in cropping pattern and intensity | Before project sorghum, castor and paddy crops were grown; After watershed implementation, farmers shifted to horticulture plantations along with annual crops like paddy, cotton and pigeon pea. | | |
| iv. Changes in agricultural productivity | Crops | Yield (q/ha) | |
| | | Before | After |
| | Paddy | 46 | 54 |
| | Cotton | 12 | 15 |
| | Castor | 8 | 11 |
| | Pigeon pea | 5 | 8 |
| v. Changes in fodder & fuel wood availability | Not much improvement. | | |
| vi. Changes in size and character of livestock holdings | Buffaloes number increased by about 120 and milk production increased from 100 to 300 liters per day. | | |

| | |
|--|--|
| vii. Status of grazing land & their carrying capacity | Nil |
| viii. Employment generated due to implementation of project | About 150 laborers had employment during project period; on implementation of project increased water availability enhanced additional cropping area and productivity. |
| ix. Change in household category, total, & source- | Around 250 households improved their income through agriculture, dairying and livelihood activities. |
| x. Freedom from Debt and reduction in degree of dependence of money lenders (case studies) | Most of the farmers depend on banks, SHGs and about 20% people still depend on private moneylenders. |
| xi. Reduction in out-migration (case studies) | Migration in search of livelihoods was about 25% before watershed program and almost nil now due to <i>NAREGA</i> . |
| xii. Reduction in drought vulnerability of the watershed | Increased groundwater availability has reduced vulnerability to drought by about 20%. |
| xiii. Detailed case studies of specific farmers impacted by the project | Please see the attachment |
| xiv. Photographs showing work + its impact | Please see the attachment |

7. Learnings and process documentation (how the program could be implemented better; constraints, improvements possible, Changes made etc.)

- Repair, maintenance and de-silting of water harvesting structures are essential to get sustainable benefits.
- Recharging of dry open wells near small streams would have given better results.
- De-silting and deepening of village tanks and percolation tanks can improve water harvesting.
- There is a scope for construction of some more WHS and horticulture plantations.
- Guidelines are needed for using WDF.



Figure 1. Percolation tank at Pragathi watershed.



Figure 2. Check dam at Pragathi watershed.

8. Specific datasets on different impact parameters:

9. Observations and Comments by Evaluators:

- Locations and design criteria of WHS are good but quality of construction of some of the percolation tanks is not good. Even though they are serving the purpose to some extent (**Fig. 1 & 2**).
- Water harvesting structures are filled with sediment, bushes and developed leakages resulting in reduced water storage hence the effectiveness of the watershed structures reduced (**Fig.3**).



Figure 3. Damaged percolation tank at Pragathi watershed.

- Post-project maintenance was not clearly envisaged as an exit policy in the project, hence proper mechanism should be operationalized to repair and maintain the structures, and to ensure proper utilization of WDF/community contribution, clear guidelines should be in place. Otherwise watershed committee exists, but becomes defunct, as is the case with Pragathi watershed.
- Crop productivity enhancement and water use efficiency measures were not emphasized in the project to harness the full benefits of project activities, and increased water availability.
- Technology Resource organizations like academic/research institutions involvement was absent.
- As admitted by farmers in the village, availability of drinking water round the year, supplemental irrigation water for second crop and ground water increase helping growth of orchard crops and cropping intensity are the visible qualitative and quantitative impacts due to watershed development.

Success story

- **Many farmers** in the village said that watershed interventions have been helping in increasing the groundwater availability and cropping intensity. They are growing paddy crop in two seasons (Fig. 4).



Fig. 4. Paddy crop in Pragathi watershed, Nalgonda district.

Impact Assessment Report
Sri Rama Watershed, DPAP – IV batch,
Munugode Mandal, Nalgonda district, Andhra Pradesh

1. Details of watershed:

| | |
|--|-------------------------------|
| 1. Name of the Scheme: | DPAP – IV Batch |
| 2. Name of the watershed: | Sri Rama |
| 3. Names of villages in the Watershed: | Ipparthy |
| 4. Villages/Mandal/District: | Ipparthy / Munugode/ Nalgonda |
| 5. Name and Address of PIA: | SISS, Munugode |
| 6. Total area of the watershed: | 500 ha |

2. Land Use Pattern:

| | |
|--------------------------------------|--|
| i. Arable land (ha) | |
| ii. Non-arable land (ha) | |
| iii. Government/ Community land (ha) | |
| iv. Private land (ha) | |
| v. Treated arable (ha) | |
| vi. Treated non-arable (ha) | |

3. Verification financial and other Records

| | | |
|--|---|----------------------|
| i. Total cost: | Approved: | Spent: Rs 17.30 Lakh |
| ii. Expenditure incurred as per guidelines | Yes | |
| iii. Works executed as per Records | Yes LBS (100 nos.), PT (6), CD (2), Bunding (400 ha), horticulture (56 ha), afforestation (5 ha) | |
| iv. Whether watershed committees (WC) exists | Yes WC comprises of 10 members (2 women, 8 men); Mr D Narsimma was WA President, Mr D Mallaiah, was WC Chairman, Mr. B Lingaiah was WC Secretary. All these members were available for consultation. | |
| v. If exists, activities of the committees | Not functional due to any clear guidelines for utilizing WDF to repair and maintain structures. | |

4. Community participation (how community participation have been ensured and what EPA have been taken up, inputs of details of beneficiaries)

Although EPA was not taken up; construction of 2 check dams, 6 percolation tanks and other conservation works were taken up with the participation of farmers from 18 user groups (UGs) and landless poor from the watershed village.

5. Qualitative Parameters of Impacts

| | | |
|---|---|---|
| 1. Functioning of village level institutions | Satisfactory during project and after as the SHGs increased from twelve to twenty six without any financial help from watershed scheme. | |
| 2. Records of meetings properly updated | Yes | |
| 3. Liaison with scientific institutions established | No, farmers were not given any exposure to productivity enhancement | |
| 4. Watershed Development Fund (WDF) collected?, and its utilization | Yes; collected Rs.76 000 according to guidelines and deposited in Canara Bank, Munugode but unspent for maintenance works due to lack of clear guidelines on use from District Authorities. | |
| 5. Self Help Groups | SHGs increased from 12 to 26 after watershed interventions (no support from watershed program) | Revolving fund: Rs. 2 60 000 |
| | V.O functioning: | Savings: |
| | Utilization of loans: | Loans were used for buying cattle (milk animals), sewing machines and for establishing petty shops. |
| | Bank linkages established: | Farmers have linkage with Canara Bank and Grameena Bank for credit and other transactions. |
| 6. Planned CPRs sustainable & equitable development | Afforestation was done in 5 ha of common land | |
| 7. Benefits to weaker sections (women, dalits and landless) | No specific initiatives; engaged for labor work during watershed works. | |

6. Quantitative Parameters of Impacts

| | | | |
|--|---|--------------|-------|
| i. Improvements in water table/water availability | Impact of watershed project has clearly reflected in enhancing the groundwater levels (about 1 m increase) and duration of water availability in wells for agricultural and other purposes in the watershed. Irrigated area has been doubled after watershed interventions. | | |
| ii. Additional area under cultivation/horticulture/afforestation | 80 ha additional area brought under cultivation; 56 ha private land with horticulture; 5 ha common land with afforestation. | | |
| iii. Changes in cropping pattern and intensity | Before project sorghum, millets and paddy crops were grown; After watershed implementation, farmers shifted to horticulture, plantations like sweet lime along with annual crops like paddy, cotton and pigeon pea. | | |
| iv. Changes in agricultural productivity | Crops | Yield (q/ha) | |
| | | Before | After |
| | Paddy | 40 | 53 |
| | Cotton | 13 | 16 |
| | Pigeon pea | 5 | 7 |
| v. Changes in fodder & fuel wood availability | Considerable Improvement (100%) of fodder and fuel wood availability after watershed activities. | | |
| vi. Changes in size and character of livestock holdings | Buffaloes number increased to about 150 and milk production increased from 20 to 200 liters per day. | | |
| vii. Status of grazing land & their carrying capacity | Nil | | |

| | |
|--|--|
| viii. Employment generated due to implementation of project | About 200 laborers had employment during project period; on implementation of project increased water availability enhanced additional cropping area and productivity. |
| ix. Change in household category, total, & source- | Around 320 households improved their income through agriculture, dairying and livelihood activities. |
| x. Freedom from Debt and reduction in degree of dependence of money lenders (case studies) | Most of the farmers depend on banks, SHGs and about 10% people still depend on private moneylenders. |
| xi. Reduction in out-migration (case studies) | Migration in search of livelihoods was about 50% before watershed program and almost nil now. |
| xii. Reduction in drought vulnerability of the watershed | Increased groundwater availability has reduced vulnerability to drought by about 50%. |
| xiii. Detailed case studies of specific farmers impacted by the project | Please see the attachment |
| xiv. Photographs showing work + its impact | Please see the attachment |

7. Learnings and process documentation (how the program could be implemented better; constraints, improvements possible, Changes made etc.)

- Repair, maintenance and de-silting of water harvesting structures are essential to get sustainable benefits.
- Recharging of dry open wells near small streams would have given better equity and results.
- De-silting and deepening of village tanks and percolation tanks can improve water harvesting.
- There is a scope for construction of more check dams, percolation tanks and bunding.
- Marketing facilities for agricultural produce in Munugode would benefit nearby villages.
- Guidelines are needed for using WDF.



Figure 1. Percolation tank at Sri Rama watershed, Figure 2. Tube well in percolation tank, Sri Rama watershed.

8. Specific datasets on different impact parameters:

9. Observations and Comments by Evaluators:

- The quality of construction of some of the WHS is poor and the location of WHS is not at all appropriate because of narrow storage capacity with lengthy bund (Fig. 1 & 2).
- Some of the nearby farmers are not happy and damaged the structures as they were submerging their fields and not serving the purpose (Fig.3).



Figure 3. Damaged check dam (left) constructed on a field bund and outlet of a percolation tank (right) constructed at far away place in cultivated field in Sri Rama watershed, Nalgonda Dist.

- Post-project maintenance was not clearly envisaged as an exit policy in the project, hence proper mechanism should be operationalized to repair and maintain the structures, and to ensure proper utilization of WDF/community contribution, clear guidelines should be in place. Otherwise watershed committee exists, but becomes defunct, as is the case with Sri Rama watershed.
- Crop productivity enhancement and water use efficiency measures were not emphasized in the project to harness the full benefits of project activities, and increased water availability.
- Technology Resource organizations like academic/research institutions involvement was absent.
- As admitted by farmers in the village, availability of drinking water round the year, supplemental irrigation water for second crop and ground water increase helping growth of orchard crops are the visible qualitative and quantitative impacts due to watershed development.

Success story

Many farmers (Mr. Parashuram, Lingaiah, Srinu etc) in the village have diversified their crops to sweet lime (total 56 ha) due to watershed interventions and increased groundwater availability to have more secured and sust



Fig. 4. Diversified sweet lime cultivation with drip irrigation in Sri Rama watershed.

Impact Assessment Report
Sri Sai Watershed, DPAP – IV batch,
Noothanakal Mandal, Nalgonda district, Andhra Pradesh

1. Details of watershed:

| | |
|--|--------------------------------------|
| 1. Name of the Scheme: | DPAP – IV Batch |
| 2. Name of the watershed: | Sri Sai |
| 3. Names of villages in the Watershed: | Chinnanemilla |
| 4. Villages/Mandal/District: | Chinnanemilla/ Noothanakal/ Nalgonda |
| 5. Name and Address of PIA: | MOTIVE, Nalgonda |
| 6. Total area of the watershed: | 490 ha (400 ha Treated area) |

2. Land Use Pattern:

| | |
|--------------------------------------|-----|
| i. Arable land (ha) | 390 |
| ii. Non-arable land (ha) | 100 |
| iii. Government/ Community land (ha) | 50 |
| iv. Private land (ha) | 370 |
| v. Treated arable (ha) | 300 |
| vi. Treated non-arable (ha) | 100 |

3. Verification financial and other Records

| | | |
|--|--|----------------------|
| i. Total cost: | Approved: Rs 21.13 Lakh | Spent: Rs 19.25 Lakh |
| ii. Expenditure incurred as per guidelines | Yes | |
| iii. Works executed as per Records | Yes PT (3), CD (9), Farm ponds (16), RFD (6), Bunding (110 ha), horticulture (4 ha), Afforestation (20 ha) | |
| iv. Whether watershed committees (WC) exists | Yes WC comprises of 11 members (2 women, 9 men); Mr. N Janardhan was WA President, Mr. Y Nagaiah, was WC Chairman, Mr. R Saidulu was WC Secretary. All these members were available for consultation. | |
| v. If exists, activities of the committees | Not functional due to any clear guidelines for utilizing WDF to repair and maintain structures. | |

4. Community participation (how community participation have been ensured and what EPA have been taken up, inputs of details of beneficiaries)

Although EPA was not taken up; construction of 9 check dams, 3 percolation tanks, 16 farm ponds, 6 RFDs and other conservation works were taken up with the participation of farmers from 15 user groups (UGs) and landless poor from the watershed village.

5. Qualitative Parameters of Impacts

| | | |
|---|--|--|
| 1. Functioning of village level institutions | Satisfactory during project and after as the SHGs increased from ten to twenty one without any financial help from watershed scheme. | |
| 2. Records of meetings properly updated | Yes | |
| 3. Liaison with scientific institutions established | No, farmers were not given any exposure to productivity enhancement | |
| 4. Watershed Development Fund (WDF) collected?, and its utilization | Yes; collected Rs.86 156 according to guidelines and deposited in Nagarjuna Grameena Bank, Noothanakal but unspent for maintenance works due to lack of clear guidelines on use from District Authorities. | |
| 5. Self Help Groups | SHGs increased from 10 to 21 after watershed interventions (no support from watershed program) | Revolving fund: Rs. |
| | V.O functioning: | Savings: |
| | Utilization of loans: | Loans were used for buying cattle (milk animals), inputs for agriculture and for establishing petty shops. |
| | Bank linkages established: | Farmers have linkage with Nagarjuna Grameena Bank, Noothanakal for credit and other transactions. |
| 6. Planned CPRs sustainable & equitable development | Afforestation was done in 20 ha of common land | |
| 7. Benefits to weaker sections (women, dalits and landless) | No specific initiatives; engaged for labor work during watershed works. | |

6. Quantitative Parameters of Impacts

| | | | |
|--|--|--------------|-------|
| i. Improvements in water table/water availability | Impact of watershed project has clearly reflected in enhancing the groundwater levels (about 2 m increase) and duration of water availability in wells for agricultural and other purposes in the watershed. There are about 100 functioning open wells and 100 bore wells for irrigation and cropping intensity is increased after watershed interventions. | | |
| ii. Additional area under cultivation/horticulture/afforestation | 22 ha additional area brought under cultivation; 20 ha common land with afforestation. | | |
| iii. Changes in cropping pattern and intensity | Before project sorghum, castor and paddy crops were grown; After watershed implementation, farmers shifted to horticulture plantations like mango along with annual crops like paddy, cotton, maize and pigeon pea. | | |
| iv. Changes in agricultural productivity | Crops | Yield (q/ha) | |
| | | Before | After |
| | Paddy | 45 | 55 |
| | Cotton | 12 | 15 |
| | Castor | 8 | 12 |
| | Pigeon pea | 5 | 8 |
| v. Changes in fodder & fuel wood availability | Not much improvement. | | |
| vi. Changes in size and character of livestock holdings | Buffaloes number increased by about 100 and milk production increased from 100 to 200 liters per day. | | |
| vii. Status of grazing land & their carrying capacity | Nil | | |

| | |
|--|--|
| viii. Employment generated due to implementation of project | About 112 laborers had employment during project period; on implementation of project increased water availability enhanced additional cropping area and productivity. |
| ix. Change in household category, total, & source- | Around 152 households improved their income through agriculture, dairying and livelihood activities. |
| x. Freedom from Debt and reduction in degree of dependence of money lenders (case studies) | Most of the farmers depend on banks, SHGs and about 10% people still depend on private moneylenders. |
| xi. Reduction in out-migration (case studies) | Migration in search of livelihoods was about 15% before watershed program and almost nil now due to <i>NAREGA</i> . |
| xii. Reduction in drought vulnerability of the watershed | Increased groundwater availability has reduced vulnerability to drought by about 25%. |
| xiii. Detailed case studies of specific farmers impacted by the project | Please see the attachment |
| xiv. Photographs showing work + its impact | Please see the attachment |

7. Learnings and process documentation (how the program could be implemented better; constraints, improvements possible, Changes made etc.)

- Repair, maintenance and de-silting of water harvesting structures are essential to get sustainable benefits.
- Recharging of dry open wells near small streams would have given better equity and results.
- De-silting and deepening of village tanks and percolation tanks can improve water harvesting.
- There is a scope for construction of some more percolation tanks, bunding and horticulture plantations.
- Guidelines are needed for using WDF.



Figure 1. Percolation tank at Sri Sai watershed.



Figure 2. Check dam at Sri Sai watershed.

8. Specific datasets on different impact parameters:

9. Observations and Comments by Evaluators:

- Locations, design criteria and quality of construction of WHS are good and very effective in serving the purpose (Fig. 1 & 2).
- Water harvesting structures are filled with sediment, bushes and developed leakages resulting in reduced water storage hence the effectiveness of the watershed structures reduced (Fig.3).



Figure 3. Check dam filled with sediment and bushes at Sri Sai watershed.

- Post-project maintenance was not clearly envisaged as an exit policy in the project, hence proper mechanism should be operationalized to repair and maintain the structures, and to ensure proper utilization of WDF/community contribution, clear guidelines should be in place. Otherwise watershed committee exists, but becomes defunct, as is the case with Sri Sai watershed.
- Crop productivity enhancement and water use efficiency measures were not emphasized in the project to harness the full benefits of project activities, and increased water availability.
- Technology Resource organizations like academic/research institutions involvement was absent.
- As admitted by farmers in the village, availability of drinking water round the year, supplemental irrigation water for second crop and ground water increase helping growth of orchard crops and cropping intensity are the visible qualitative and quantitative impacts due to watershed development.

Success story

- **Some farmers** in the village have diversified their crops to mango with irrigation due to watershed interventions and increased groundwater availability to have more secured and sustainable incomes (Fig. 4).



Fig. 4. Diversified mango cultivation in Sri Sai watershed.

Impact Assessment Report
Tallasingaram - I Watershed, DPAP – IV batch,
Noothanakal Mandal, Nalgonda district, Andhra Pradesh

1. Details of watershed:

| | |
|--|---------------------------------------|
| 1. Name of the Scheme: | DPAP – IV Batch |
| 2. Name of the watershed: | Tallasingaram - I |
| 3. Names of villages in the Watershed: | Tallasingaram |
| 4. Villages/Mandal/District: | Tallasingaram / Noothanakal/ Nalgonda |
| 5. Name and Address of PIA: | MOTIVE, Nalgonda |
| 6. Total area of the watershed: | 620 ha (525 ha Treated area) |

2. Land Use Pattern:

| | |
|--------------------------------------|-----|
| i. Arable land (ha) | 400 |
| ii. Non-arable land (ha) | 220 |
| iii. Government/ Community land (ha) | 0 |
| iv. Private land (ha) | 600 |
| v. Treated arable (ha) | 400 |
| vi. Treated non-arable (ha) | 125 |

3. Verification financial and other Records

| | | |
|--|--|----------------------|
| i. Total cost: | Approved: Rs 18.18 Lakh | Spent: Rs 18.16 Lakh |
| ii. Expenditure incurred as per guidelines | Yes | |
| iii. Works executed as per Records | Yes PT (5), CD (9), Farm ponds (16), RFD (6), Feeder channels (8), Bunding (11 ha), horticulture (10 ha), Afforestation (10 ha) | |
| iv. Whether watershed committees (WC) exists | Yes WC comprises of 11 members (11 men); Mr. G Lingaiah was WA President, Mr. J Lingaiah, was WC Chairman, Mr. N Satyanarayana was WC Secretary. All these members were available for consultation. | |
| v. If exists, activities of the committees | Not functional due to any clear guidelines for utilizing WDF to repair and maintain structures. | |

4. Community participation (how community participation have been ensured and what EPA have been taken up, inputs of details of beneficiaries)

Although EPA was not taken up; construction of 9 check dams, 5 percolation tanks, 16 farm ponds, 6 RFDs and other conservation works were taken up with the participation of farmers from 13 user groups (UGs) and landless poor from the watershed village.

5. Qualitative Parameters of Impacts

| | | |
|---|--|--|
| 1. Functioning of village level institutions | Satisfactory during project and after as the SHGs increased from ten to twenty without any financial help from watershed scheme. | |
| 2. Records of meetings properly updated | Yes | |
| 3. Liaison with scientific institutions established | No, farmers were not given any exposure to productivity enhancement | |
| 4. Watershed Development Fund (WDF) collected?, and its utilization | Yes; collected Rs.75 196 according to guidelines and deposited in Nagarjuna Grameena Bank, Noothanakal but unspent for maintenance works due to lack of clear guidelines on use from District Authorities. | |
| 5. Self Help Groups | SHGs increased from 10 to 20 after watershed interventions (no support from watershed program) | Revolving fund: Rs. |
| | V.O functioning: | Savings: |
| | Utilization of loans: | Loans were used for buying cattle (milk animals), inputs for agriculture and for establishing petty shops. |
| | Bank linkages established: | Farmers have linkage with Nagarjuna Grameena Bank, Noothanakal for credit and other transactions. |
| 6. Planned CPRs sustainable & equitable development | Afforestation was done in 10 ha of common land | |
| 7. Benefits to weaker sections (women, dalits and landless) | No specific initiatives; engaged for labor work during watershed works. | |

6. Quantitative Parameters of Impacts

| | | | |
|--|---|--------------|-------|
| i. Improvements in water table/water availability | Impact of watershed project has clearly reflected in enhancing the groundwater levels (about 1.5 m increase) and duration of water availability in wells for agricultural and other purposes in the watershed. There are about 120 functioning bore wells for irrigation and cropping intensity is increased after watershed interventions. | | |
| ii. Additional area under cultivation/horticulture/afforestation | 14 ha additional area brought under cultivation; 10 ha private land with horticulture and 10 ha common land with afforestation. | | |
| iii. Changes in cropping pattern and intensity | Before project sorghum, castor and paddy crops were grown; After watershed implementation, farmers shifted to horticulture plantations along with annual crops like paddy, cotton and pigeon pea. | | |
| iv. Changes in agricultural productivity | Crops | Yield (q/ha) | |
| | | Before | After |
| | Paddy | 45 | 55 |
| | Cotton | 10 | 14 |
| | Castor | 9 | 12 |
| | Pigeon pea | 6 | 9 |
| v. Changes in fodder & fuel wood availability | Not much improvement. | | |
| vi. Changes in size and character of livestock holdings | Buffaloes number increased by about 90 and milk production increased from 100 to 180 liters per day. | | |

| | |
|--|--|
| vii. Status of grazing land & their carrying capacity | Nil |
| viii. Employment generated due to implementation of project | About 115 laborers had employment during project period; on implementation of project increased water availability enhanced additional cropping area and productivity. |
| ix. Change in household category, total, & source- | Around 172 households improved their income through agriculture, dairying and livelihood activities. |
| x. Freedom from Debt and reduction in degree of dependence of money lenders (case studies) | Most of the farmers depend on banks, SHGs and about 15% people still depend on private moneylenders. |
| xi. Reduction in out-migration (case studies) | Migration in search of livelihoods was about 25% before watershed program and almost nil now due to <i>NAREGA</i> . |
| xii. Reduction in drought vulnerability of the watershed | Increased groundwater availability has reduced vulnerability to drought by about 30%. |
| xiii. Detailed case studies of specific farmers impacted by the project | Please see the attachment |
| xiv. Photographs showing work + its impact | Please see the attachment |

7. Learnings and process documentation (how the program could be implemented better; constraints, improvements possible, Changes made etc.)

- Repair, maintenance and de-silting of water harvesting structures are essential to get sustainable benefits.
- Recharging of dry open wells near small streams would have given better equity and results.
- De-silting and deepening of village tanks and percolation tanks can improve water harvesting.
- There is a scope for construction of some more percolation tanks, bunding and horticulture plantations.
- Guidelines are needed for using WDF.



Figure 1. Percolation tank at Tallasingaram watershed. Figure 2. Check dam at Tallasingaram watershed.

8. Specific datasets on different impact parameters:

9. Observations and Comments by Evaluators:

- Locations, design criteria and quality of construction of WHS are good and very effective in serving the purpose (Fig. 1 & 2).
- Water harvesting structures are filled with sediment, bushes and developed leakages resulting in reduced water storage hence the effectiveness of the watershed structures reduced (Fig.3).



Figure 3. Check dam filled with bushes at Tallasingaram watershed.

- Post-project maintenance was not clearly envisaged as an exit policy in the project, hence proper mechanism should be operationalized to repair and maintain the structures, and to ensure proper utilization of WDF/community contribution, clear guidelines should be in place. Otherwise watershed committee exists, but becomes defunct, as is the case with Tallasingaram watershed.
- Crop productivity enhancement and water use efficiency measures were not emphasized in the project to harness the full benefits of project activities, and increased water availability.
- Technology Resource organizations like academic/research institutions involvement was absent.
- As admitted by farmers in the village, availability of drinking water round the year, supplemental irrigation water for second crop and ground water increase helping growth of orchard crops and cropping intensity are the visible qualitative and quantitative impacts due to watershed development.

Success story

- **Many farmers** in the village said that watershed interventions have been helping in increasing the groundwater availability and cropping intensity. They are growing paddy crop in two seasons (Fig. 4).



Fig. 4. Paddy crop in Tallasingaram watershed, Nalgonda district.

ANALYSIS OF IMPACTS

Drought Prone Area Programme (Batch IV) in Nalgonda district targeted and developed 75 watersheds in 8 mandals in four years started in the year 1998-99 and execution of developmental activities completed by 2005-06, with a delay of almost four years from the sanctioned period. The area treated under watershed activities (SWC structures) was 40,000 ha with a total expenditure of Rs.1512.68 lakhs directly released to Watershed committees during the period. Amounts sanctioned towards training, community organization and administrative charges to the tune of Rs. 311.23 lakhs were released to concerned PIA directly. We chose 20 watersheds developed by PIAs from 7 different mandals of Nalgonda to have well distributed representation of watersheds for the impact assessment.

Verification of Records

In this district, we spent lots of time to fetch or access records during our team's field trips to watersheds and meeting with officials in DWMA office to gather information and verification of records, however, found it difficult to get the required reports. Our efforts were fruitful finally in getting final evaluation report of this project from the office of the Commissioner of Rural Development and Andhra Pradesh Academy of Rural Development (APARD), Hyderabad. This report was useful in cross verification of information, we gathered during focused group discussion with beneficiaries in each watershed. Most of the activity reports including action plans and measurement books and bank passbooks, supposed to be available with watershed committees were reportedly taken and placed in DWMA office for safe custody according to watershed committees' members.

Community (People's) Participation

One of the main objectives of DPAP was to ensure and enhance people's participation in this programme. Community participation was ensured by taking up soil and water conservation activities, construction of water harvesting structures and crop diversification with orchard crops. In watershed villages, even though EPA was not undertaken, villagers were satisfied and appreciative of the impacts due to implementation of watershed works.

Project expenditure pattern (Table 1) indicates that spending on community organizations development and training of beneficiaries was 10.28% of the total allocated budget. Although, there was ample scope and opportunities to address the issues of women by

forming self-help groups (SHGs) involving weaker sections of the society, this aspect was not actively persuaded and no micro enterprise/income generating activities were introduced to improve the livelihoods of women SHGs in the watersheds; and a very few are functional at present out of 211 SHGs in the selected 20 watershed communities. Livelihood activities like vermicomposting, raising nursery of horticultural and forest tree plants, value addition to agricultural/horticultural produce, dairy, poultry etc could have been taken up involving weaker sections and women through SHGs but efforts were not made in this direction. SHGs development would have impacted much better in terms of income generation and sustainability of rural livelihoods.

User groups (261 UGs) were formed in all the 20 watersheds but soil and water conservation works and construction of water harvesting structures were undertaken by the WCs without much participation of people. User groups' participation in constructing SWC structures would have developed belongingness and prompted for timely management of these structures.

Soil and water conservation structures

Soil and water conservation (NRM) works undertaken under this component in the project to cover about 40000 ha, an amount of Rs. 1201.45 lakhs, which is 79.19% of the released amount was spent. A total of 161 percolation tanks, 112 masonry check dams, 304 farm ponds, 508 gully control structures were constructed, 25 numbers of feeder channels were renovated and 1500 ha area covered under field bunding in this project.

In ten out of 20 watersheds, water-harvesting structures constructed either by PIA of government organization or NGO were generally of good quality and suitably located. However, in these watersheds, for lack of maintenance of the structures for a longer period, some structures were damaged, need immediate attention to repair these structures and remove siltation to improve efficiency of the water-harvesting structures.

In Annadata watershed, Nadikuda village, Gurrampodu mandal and Sri Rama watershed, Ipparthy village, Munugode mandal, the structures constructed were of poor quality with improper locations and without good design criteria and foundation hence most of the structures in the watersheds damaged several years back and repairs were not done resulting in no benefit to farmers in terms water harvesting and groundwater improvement.

In Anjaneya Swamy watershed, Chalmeda village, Munugode mandal and Dirisanapally watershed, Dirisanapally village, Noothanakal mandal, watershed projects were not implemented properly and construction of the structures were left incomplete due internal disputes in the villages. In other 6 watersheds, locations and quality of construction of some of the structures are not appropriate.

Water availability for irrigation and drinking purpose

Farmers in eleven watersheds located in different mandals reported an increase in ground water levels ranging from 0.5 to 1.0 meter generally and in six watersheds water level raise was up to 2 meters, in 2 watersheds raise was more than 2 meters and increased availability of water for irrigation up to February-March months. In eight watersheds, the number of functional wells increased to more than 150 in each watershed, as an indication of water availability. In some of the watersheds, farmers realized less availability of groundwater in un-treated areas of their villages compared to more water availability in treated watershed areas of these villages. Impact of watershed interventions especially masonry structures has been felt very much by the beneficiary farmers in DPAP developed watershed villages in terms of their utility to control erosion and to some extent ground water increase and water availability for drinking purpose more importantly. Period of water availability for irrigation extended from November-December months before the watershed development, to end of February-March after the watershed development. This situation favored for double cropping with one or two supplemental irrigations for second crops between January to March every year. In most of the villages there was a clear agreement on availability of drinking water in plenty round the year after watershed development project implementation in their area. In some watersheds water storage in percolation tanks providing drinking water for cattle population even during summer months.

Enhanced agricultural productivity of seasonal crops

Due to increased water availability, farmers in all watersheds reported increase in cultivated area of paddy. Crop intensity increased between 150%-200% as the number of bore well those support second crop were more than 100 per village. Due to increased availability of water for longer period in the season up to end of February-March, crops like paddy, vegetables, groundnut, sunflower and maize as second crop after paddy are grown. Although, variability exists in reported productivity enhancement, it varied from 10% to 50% in case of paddy, 20 % to 100% in cotton, 25% to 57% in castor, 28% to 100% in

pigeonpea and 25% to 66% in case of groundnut as second crop in some watersheds. Some farmers cultivate paddy in two seasons under bore well irrigation. Although, paddy is not an efficient crop for scarce water utilization, farmers are taking up paddy as second crop also in watersheds for food grains and fodder for animals. Farmers were not exposed to best production technologies for dryland crops to achieve higher water use efficiency in these crops. This should have been possible as the farmers get exposed to advances in dryland technologies.

Afforestation and Horticulture Development

Under DPAP Batch-IV watersheds of Nalgonda, afforestation activity was promoted in 245 ha while horticulture activity was taken up in 365 ha. Our visit revealed that there was considerable interest generated among farmers for sweet lime, acid lime and mango cultivation on seeing the success of watershed farmers planted these orchard crops through DPAP-IV. In 8 watersheds, considerable area in the range of 20 ha to 59 ha was developed with horticulture plantations. Farmers who have diversified their annual food crops with orchard crops like sweet lime, acid lime and mango and getting a sustainable net income ranging from Rs.20,000 to Rs.40,000 per acre based on growth and age of orchard crops developed through DPAP-IV.

Common Property Resources and Wasteland Development

Nalgonda is one of the frequently drought affected districts having large areas of wastelands. Development of common property resources (CPRs) was done in eleven watersheds of the twenty selected watersheds in the project for the impact assessment study. In 11 watersheds CPRs were developed similar to the entire watershed with construction of check dams, percolation tanks and formation of field bunding as CPRs land had already been under cultivation by SC/ST farmers with usufruct rights.

Employment and Migration

Nalgonda district has considerable labor migration in the state, due to scarce rainfall and low productivity of dryland crops. In the selected twenty watershed villages for impact assessment, the migration for employment reduced to almost nil from as high as 15%-50% in all the villages, not only due to watershed development and crop productivity increase, but because of National Rural Employment Guarantee Scheme (NREGS) of the central government. As informed by respondent farmers at the time of focused group discussion,

5% migration in some of the villages was for higher wage earnings and for especially skilled labor like construction workers and security duties. Parity in labor wages between men and women still exists in most of the watersheds.

Our analysis of focused group discussions with village communities indicate that only in 25% (5) of the watershed villages farmers expressed affirmatively for withstanding drought effects for one year (risk reduced by 50%) and vulnerable for mainly fodder scarcity as there is no fodder security for large number of goat, sheep and cattle population. Farmers expressed fodder scarcity even in years of subnormal or poorly distributed rainfall season when crop production becomes lower.

Watershed Development Fund

Watershed development fund should be collected in all the watersheds as per guidelines and deposited in the banks for joint operations by watershed committee and WDT from the PIA. It was gathered from the reports that deposits of Rs. 8,140 from Dirisanapally watershed to Rs. 1,21,000 in Gopal watershed were available as watershed development fund with various WCs collected from watershed member beneficiaries as WDF at the rates specified in guidelines and the amount has been transferred to PD, DWMA. Farmers and WC members in almost all watersheds mentioned that if the fund was made available for repair and maintenance of watershed structures, or for construction of much needed new structures their impact would have been felt very much by the beneficiaries in the watershed.

Suggestions for enhanced impacts in these watersheds

1. Watershed development fund contributed by watershed members should be utilized for repair and maintenance of water harvesting structures on regular basis annually, by desilting and attending necessary repairs for masonry structures and rock filling or stone revetment and earth works for breaches of percolation tanks, farm ponds and other structures.
2. As an exit policy, a matching grant equal to accrued WDF may be provided to a village body, which must accept the responsibility for repair and maintenance of the structures annually by utilizing the interest portion of the WDF.

3. Sweet lime, acid lime and mango cultivation is of interest to farmers and remunerative, hence smallholder farmers may be given an opportunity to take up one hectare orchards based on feasibility, with possible option of drip irrigation for efficient use of water in scarce rainfall zone.

4. Fodder availability is another issue, which may need attention to enhance income and livelihoods for poor by maintaining milch cattle, goat and sheep. Increasing fodder availability by growing improved forage grasses and fodder supplying trees in agricultural and non-agricultural vacant lands.

About ICRISAT



The International Crops Research Institute for the Semi-Arid Tropics (ICRISAT) is a non-profit, non-political organization that does innovative agricultural research and capacity building for sustainable development with a wide array of partners across the globe. ICRISAT's mission is to help empower 644 million poor people to overcome hunger, poverty and a degraded environment in the dry tropics through better agriculture. ICRISAT belongs to the Alliance of Centers of the Consultative Group on International Agricultural Research (CGIAR).

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