# "An Assessment of National Watershed Development Programme for Rain fed Areas (NWDPRA) Implemented at Nellaya Grama Panchayath"

**FINAL REPORT**
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**Preface**

The Integrated Rural Technology Centre (IRTC), the R&D wing of Kerala Sasthra Sahithya Parishath (KSSP) took as one of it's objectives to address the problem of land, water, biomass, man, animal and energy relations in rural Kerala. Watershed approach is naturally a well-integrated programme in this direction.

A National Watershed Development Programme for Rain fed Areas (NWDPRA) was implemented by the Agriculture Department at Nellaya watershed, Nellaya Panchayat in Pattambi Block during the period 1993-97. The IRTC conducted a post project assessment of this project. The present report is the outcome of the same. During 1991-92, the Department of Science and technology had funded IRTC to carry out a hydrological study of the same watershed. The data then generated could be used as benchmark for the reported study. I extend my gratitude to Kerala Research Programme on Local Level Development (KRPLLD) for funding this study.

We submit this report to the reader's best judgment.

Mundur

17/07/04

Dr. K. Unnikrishnan

Director

## 1 Background of the study

Nellaya Panchayath comes under the Pattambi Block of Palakkad District. During 1991-1992, a Department of Science and Technology (DST) funded research project was implemented by the Integrated Rural Technology Center (IRTC) in a micro watershed coming with in this panchayat with the following objectives:

(1) To study the hydrology of this representative midland watershed to arrive at relation ships which would be useful to other micro watersheds.
(2) To evaluate the existing minor irrigation schemes in the selected watershed and to suggest rejuvenation measures wherever necessary and fit them in to the overall watershed plan
(3) To evolve an integrated watershed development and management plan through the analysis of the data collected from the field, after considering the details of already proposed development schemes.
(4) To demonstrate the scientific land and water management practices in the selected watershed with farmer's participation and participation of local bodies.
(5) To popularize the findings and to institute an action research programme with public participation of the community and the co-operation of local governments, availing the existing machinery of KSSP/IRTC.

After detailed studies, the report containing research findings was presented to DST and the Nellaya grama panchayat. The report contains detailed water balance estimation of the micro watershed, general recommendations for water resource development and management, specific action programs for soil & water conservation, plans for dry land agriculture and development of animal husbandry.

### 1.1 NWDPRA project

Meanwhile a National Watershed Development Programme for Rain fed Areas (NWDPRA) project was implemented in the period 93-97 in the same micro watershed, but without including the area to the south west of the Cherpulasseri-Pattambi road. The objectives of this project are: stabilization of hill slopes, regeneration of vegetative cover and improvement in productivity of fuel, fodder and crop using low cost innovative techniques, developing awareness of integrated watershed among the community and generation of ample local employment. This project was completed in 1997. Since IRTC is having enough benchmark data about this watershed, we thought that we could do a post project assessment of the NWDPRA project implemented at Nellaya.

The present study was originally intended to make a comprehensive assessment, both qualitative and quantitative, of the NWDPRA project. However, the objectives were modified due to the winding up of the KRPLLD project and subsequent shortening of the project period. The modified objectives are

To assess the effects of watershed development activities perceived by the watershed

community with respect to soil erosion, soil moisture content, soil fertility, crop yield, increase in crop area and increase in milk yield.

To assess the awareness on natural resources conservation achieved among the people through the implementation of the project.

To study the conflicts aroused if any, due to the over exploitation of ground water and mechanism developed to overcome the conflicts.

**1.2 Nellaya a macro view**[1] Fig 1

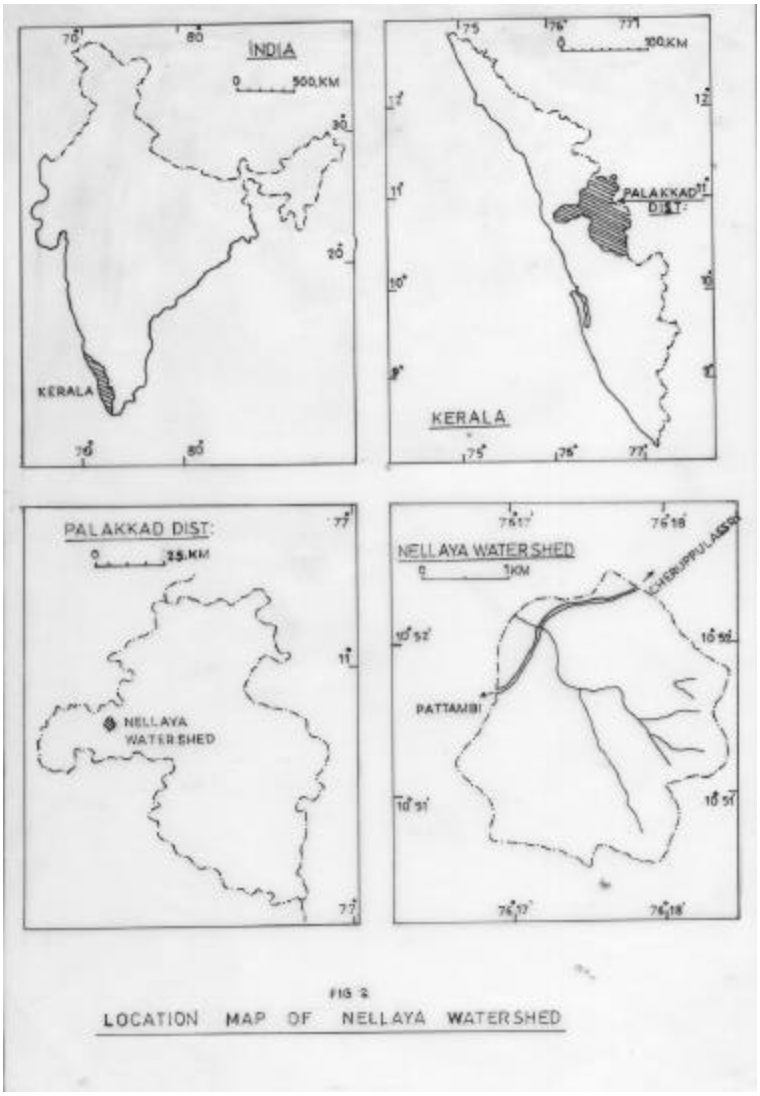



FIG 2
LOCATION MAP OF NELLAYA WATERSHED

This small-cultivated watershed is typical midland Kerala (Fig. 1). Kerala is geographically divided in to coastal (<7 meters from MSL), midlands (7 meter to 70 Meters from MSL) and High lands (>70 meters from MSL). It is situated in Pattambi block of Palakkad district and is part of the Bharathapuzha basin. It lies between $10^0\ 50^1$ and $10^o53^1$ N latitude and $76\ ^016^1$ and $76^0\ 19^1$E longitude. One can reach Nellaya by travelling a distance of 10 Kilometers from Pattamby along the Pattamby- Cherpulassery road.

*1.Ref; The report of the Hydrological Study of Nellaya watershed submitted to DST by IRTC*

The lowest and highest points in this watershed of 7.7 sq km are 40 meters and 208m respectively above MSL. The stream Nellaya thodu draining this watershed eventually joins the Thutapuzha, a tributary of Bharathapuzha.

### 1.2.1 Geomorphologic features

The geomorphology of a watershed describes its geometry and the stream channel system. Some of the quantitative Geomorphologic parameters of the Nellaya watershed are given below

| | | |
|---|---|---|
| Area of catchment | : | 7.7 Sq km |
| Perimeter | : | 11.75 Sq km |
| No of first order streams | : | 3 |
| No of second order streams | : | 1 |
| Total no of streams | : | 1 |
| Average slope, m/km | : | 16.9 |

The watershed has steep slopes (10%) near to the ridge, medium slope( 8%) and gentle slope in valleys.

### 1.2.2 Soil types

Granite rocks and laterite rocks are found near the ridge and steep slopes, latertic soil is there in medium slopes and sandy loam type texture is there at the valleys.

### 1.2.3 Land use

As part of the DST project a detailed land use survey was conducted in 1992. The land use details of that period are given in the table.

| **Crop** | **Area in Ha.** | **% of the total areas** |
|---|---|---|
| Paddy | 193 | 25 |
| Coconut | 150 | 19.5 |
| Mixed crop | 130 | 16.9 |
| Mixed trees | 108 | 14 |
| Waste land | 75 | 9.7 |
| Forest | 63 | 8.2 |
| Misc* | 51 | 6.6 |

*Includes rubber, teak, cashew nut, banana and tapioca.

## 2. Methodology

Since a field study to quantify gains requires data collection over a long period of time, it was decided to assess the gains of the NWDPRA project based on the perception among the different stakeholders. The different stake holders of the project are: direct beneficiaries and non beneficiaries living in the project area, the Mitra kisans who played a major role in the implementation of the project, the employees of agriculture and allied departments directly involved in the project implementation, the office bearers of the gram panchayat body and the contractors who were involved in the execution of different construction works related to the project

### 2.1 Random sample survey

For getting the response of the people of the watershed, area a field survey was conducted using an interview schedule among 10% households selected employing the method of random sampling. Starting from the ridge line of the watershed the 1st, 11th, 21st, 31$^{st}$ ---------- houses were selected for detailed survey by counting the houses based on their geographical spread. In fact, this resulted in the selection of proportionate number of households from the ridge, midland and valley portions.

### 2.2 Selected Interviews

The actors who played an important role in the formulation and implementation of the project were interviewed using the technique of open-ended dialogue; officials, mitrakisans, people's representatives and some farmers who could achieve good results from project activities were interviewed in this way

### 2.3 Case studies

Case studies were made to find out the problem over exploitation of groundwater in this watershed development project area and the social problems it has created.

### 2.4 Quantitative assessment of water level improvement

To have a quick estimate of the ground water improvement or depletion, the water levels in the control wells whose benchmark water table data are available, are taken.

### 2.5 Survey of bore wells in the watershed area

The overdraft of deep ground water is taking place in this watershed due to the proliferation of bore wells. To have an idea of the quantity of water thus extracted, the depth, capacity of pump fitted, duration of pumping every day, the year of installation etc, were taken in most of the bore wells coming in the watershed area.

### 2.6 Collection of secondary data

To find some correlation between rainfall and water availability, rainfall data of the last fifteen years were collected from the nearest rain gauge station at Regional Agriculture Research Station, Pattambi. The different registers regarding the watershed project available at the Krishibhavan, Nellaya, Participatory Resource Maps kept at Grama Panchayat office, Nellaya, milk collection details at Pengattiry milk society etc were scanned to collect relevant details.

## 3. The NWDPRA project: formulation and implementation

National Watershed Development Programme for Rain-fed Areas was a Government of India project implemented during the 8th plan period (from 1992 to 1997). The scope of its coverage was both arable and non-arable land. It provided assistance for both conservation and production system. It was implemented in seven broad ecosystems namely plain, plateau, hills, sivaliks, arid, coastal and ravine areas.

25% of the project fund was for basic activities and 75% for field activities as mentioned below

| **For basic activities** | | **For field level activities** | |
|---|---|---|---|
| Survey and projectisation | 2.5% | Arable land conservation | 45% |
| Nursery Establishment | 2.5% | Non arable land conservation | 6% |
| Training | 6.5% | Drainage line treatment | 10% |
| Establishment &management | 10% | Arable land production system | 6% |
| Research | 2% | Non arable land production system | 5% |
| Innovative activities | 1.5% | Livestock Management | 3% |
| **Total** | **25%** | **Total** | **75%** |

### 3.1 Project formulation

The available map of the watershed was in the scale 1:50,000; however during the project formulation or implementation phase the transfer of the watershed ridge on a usable 1:5000 scale cadastral map didn't take place. Because of this, a detailed resource map and the plot wise activity plan could not be produced as part of the project. The interventions were decided on the basis of a transect walk conducted by the agriculture officer Mr.V, Agriculture Assistant Mr.R, soil conservation department officials and two or three progressive farmers. One of them Mr.Venu Karthavu eventually became a Mitrakisan. Apart from those farmers, people's participation was not there in project planning. Moreover, a detailed plot wise intervention plan based on the factors like slope of land, soil depth and present land use pattern was neither prepared nor discussed with the watershed community before implementation.

### 3.2 Details of the project area

The project area does not cover the entire Nellaya watershed, but 600 ha area to the north east of Pattambi-Cherpulasseri road. Out of this an area of 510 ha is arable land and 90 ha, non-arable land.

Total no of families covered: 874 Nos.
No. of SC/ST families: 84 Nos.

The project area comes in the wards X, XI &XII of Nellaya Grama Panchayath. Out of this, an area of 208.8 ha area is below 3% slopes, 404.4 ha are 3 to 10% slope and 22.8 ha is above 10% slope.

## 3.3 Project activities

The project activities implemented and the amount spent including the establishment expenses are given in the table 3.1. The actual amount spent might be higher than that given in this table, since the expenditure made during the fag end of the year was not recorded in the register

**Table 3.1**[2]

| | **91-92** | **92-93** | | **93-94** | | **94-95** | | **95-96** | | **96-97** | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Activities** | | Qty | Amt(Rs) | **Qty** | **Amt**(Rs) | **Qty** | **Amt**(Rs) | **Qty** | **Amt** (Rs) | **Qty** | **Amt** (Rs) |
| Data collection & documentation | | 0 | 800 | | | | | | | | |
| **Preparation & Distribution of seedlings** | | | | | | | | | | | |
| Coconut | | 2500 | 314681 | | | | | | | | |
| Areca nut | | 2000 | 15000 | | | | | | | | |
| Pepper | | 982 | 7365 | | | | | | | | |
| Cashew | | 2810 | 4214 | | | | | | | | |
| **Farmers Training** | 11000 | 1 | 3617 | | | 10 | 36125 | | | | |
| Establishment& management | | | | | | | | | | | |
| Travel | 3053 | | 3995 | | 5225 | | 5927 | | | | |
| **Soil & Water conservation measures** | | | | | | | | | | | |
| Contour Vegetative Hedges | | | | 4755 | 22284 | 283 | 1135 | 6179 | 13358 | | |
| Repair of existing construction measures | 5 | 930 | | | | | | 100 | 1500 | | |
| Contour Terraces | | | | | | | | 6080 | 60800 | | |
| Stream stabilization | | | | 3060 | 7810 | | | | | | |
| Small dig out ponds | | | | 1387 | 108107 | | | | | | |
| Loose boulder check dam | | | | 47 | 5914 | 13 | 3689 | | | | |
| Run off measurement | | | | 34 | 139893 | 2 | 11329 | | | | |
| Loose boulder structure with vegetative support | | | | 824 | 75990 | 52.5 | 5850 | | | | |
| Earthen structure with vegetative support | | | | 17108 | 48906 | | | | | | |
| **Production System** | | | | | | | | | | | |
| Single crop | | | | 47 | 6175 | 2 | 260 | | | | |
| Dry land horticulture | | | | 200 | 1000 | 12027 | 60135 | | | | |
| Compost pit | | | | 9 | 900 | 34 | 3400 | | | | |
| Bio fertilizers | | | | 20 | 6000 | | | | | | |
| Homestead garden | | | | 2 | 200 | | | | | | |

*2. Ref; Data taken from the expenditure statement register kept at the Krishibhavan, Nellaya*

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Small livestock system** | | | | | | | | | | | |
| Poultry | | | | | | | | 100 | 10500 | | |
| Goat rearing | | | | 10 | 10000 | | | | | | |
| Coconut husk burial | | | | 200 | 5000 | 471 | 11775 | | | | |
| **Livestock Management** | | | | | | | | | | | |
| Artificial Insemination | | | | 15 | 225 | 10 | 150 | | | | |
| Vitamin & feed | | | | 8 | 483 | | | | | | |
| Fodder cultivation | | | | 8.65 | 17748 | 2.63 | 5254 | | | | |
| Carpentry tool kit | | | | | | | | 12 | 11952 | | |
| Black smith's kit | | | | | | | | 3 | 2994 | | |
| Fisher man's kit | | | | | | | | 5 | 5000 | | |
| Pappadam making units | | | | | | | | | | 18 | 18000 |
| **Total** | **14058** | | **349672** | | **461860** | | **145029** | | **106104** | | **18000** |

Grand total: 10,94,723

### 3.4 Project Implementation

A multi tier structure was established by the state government for the implementation of this project .At the state level, a committee formed with Additional Soil conservation Director as the convener in lieu of Agriculture Director was responsible for the project implementation. Below that there was a district level committee with District Collector as Chairman, and the Joint Director of Agriculture, Deputy Director of Agriculture, AGM, (NABARD), Agriculture Officers in whose jurisdiction watershed areas come, DD (fisheries), District Planning Officer, ADA(Soil Survey) and Lead Bank Manager as members, which steered the project. This committee met once in every month to review the project progress[3].

Project team consist of officials from the concerned line departments was formed for the effective implementation of the project in every project area. The Agricultural Officer was the team leader. 1st grade overseer, Office of the Soil Conservation office, Ottappalam, Diary Extension Officer, Diary Extension Office, Kulappulli, Veterinary surgeon, Regional Artificial Insemination center, Kulappulli, Surveyor, Office of the Assistant Director, Soil Survey, Palakkad, Research Assistant, Fish seed farm, Malampuzha, Forester, Social Forestry Range Office, Mannarkkad & Post Graduate representative from Agriculture University were the members of the project team at Nellaya watershed. This was done to overcome the watertight compartmentalization of the different developmental departments. The effectiveness of this arrangement in achieving project objectives is discussed in Section 8.1.

*3. Ref; As told to the author by Mr. V, Agriculture Officer, Nellaya (92-95) during an interview at ADA office, Tirur.*

### 3.4.1 Watershed Development Committee

Along with watershed development team, mitra kisans, mitra gopal, GP President and GP members coming in the watershed area formed the watershed development committee. They used to meet monthly and discuss the different aspects of the project implementation, during the project period from February 1992 to February 97, 35 numbers of such meetings were conducted[4]. The average participation of mitra kisans in those meetings was 5.4, the average participation of officials was 2.7 and the average participation of panchayath representatives including GP President was 0.34 only. Either the President or the Vice President of the grama Panchayath attended this meeting on seven occasions (20 % of the total number of meetings) only. The frequency of these meetings was high during 92 to 95 (almost every month it was conducted), there after the frequency decreased.

### 3.4.2 Mode of implementation

The agricultural officer after conducting discussions at the watershed development committee forwarded the works to be undertaken for the next year to the Joint Director, Agriculture. Allotment was given based on this plan. On receiving this the agriculture officer again conducted discussion on project implementation with watershed committee. The concerned departments implemented the activities coming with in its purview. The application from the beneficiaries for a particular activity was collected by the mitra kisan and submitted at the watershed committee for selection and approval. Thereafter the officer of the concerned department would visit the farmer and explain the work execution.

During the initial period of the project, meetings of people were conducted at seven regions. Mitra kisan was selected unanimously from amongst the people assembled at each place. Mitra Gopal was also selected to take care of animal husbandry activities, Sumangala diary (this dairy contains the list of benefits given to a particular farmer) for each household was distributed to all the people assembled. The maximum benefits allowed to a household/ one-hectare land was Rs. 5,000.

## 4. Effect of Watershed development activities

As mentioned in section 2 the effects of watershed interventions implemented at Nellaya were assessed based on the perception of the watershed community. 10% of the households selected randomly were interviewed using structured questionnaire. Among the interviewees, 83.5 % were men and 16.5% were women. Out of them 49.5% were direct beneficiaries who received at least one benefit as part of the project and the remaining 50.5 % were non-beneficiaries who received no benefits. 26% of the respondents reside near to the ridge portion [5] of the micro watershed, 49% in the midland and 25% in the valley portion. Comparatively low population density in the valley is due to the utilization of considerable portion of this area for paddy cultivation, low population density in the high lands can be attributed to low water availability.

*4. Ref; - This data is obtained from the watershed development committee meeting minutes kept at Krishibhavan, Nellaya.*

*5. Ref; - Ridge portion of a watershed is the area coming near to the water divide line; since this being the highest elevated portion in the watershed it faces highest water scarcity; below the ridge portion comes the midland with mainly perennial crops. Valley is the lowest portion, near to the watershed outlet; in a typical midland kerala watershed the paddy fields and paddy land converted to banana, tubers and perennial crops like coconut come in the valley.*

The land holding status of the respondents is given in the Table 4.1, from the table we can understand that 74% of the people are having marginal land holdings.

Table 4.1

| Land holding | % of the respondents |
|---|---|
| <10 cents | 12% |
| 10-50 Cents | 35% |
| 50 cents- 1 acre | 13% |
| 1-2 acres | 14% |
| >2 acres | 26% |

**4.1 Soil erosion, Soil fertility and humidity**

The soil and water conservation and agriculture activities implemented were listed in table 3.1. Activities implemented other than the distribution of alms like goats, cows, hen etc helped directly in the conservation and enriching of soil and water. Non- beneficiaries have not reported any improvement in water availability or soil fertility because of this project. 21.7 % of the beneficiaries reported moderate and 50% reported visible reduction in soil erosion because of the interventions. 23.8% of the beneficiaries reported significant improvement in land fertility due to different interventions; 32.6% reported moderate improvement, 19.6% reported no improvement. However, 24% have not observed any improvement. Increase in soil fertility and humidity can be attributed to reduced overland flow of water and increased infiltration.

**4.2 Production increase in the agriculture sector**

19.4% of the respondents reported good increase in agriculture production, whereas 9.75% reported marginal increase. The production increase took place in crops like coconut, areca nut, pepper, biomass yielding plants like glyricidia, cashew, mango, jack, banana, rice etc. Group farming was started inside the project area at Molur Padashekaram with an area of 250 acres. Due to increase in water availability the yield here has improved during both first crop and second crop. Mr. Narayana Panicker, Vijayamandiram, Nellaya has converted 5.4 acre land to rice by making bunts. Only 2.1% of the respondents sited cases of converting wasteland to cropland as part of the project.

The author observed the cultivation of medicinal plants like Aadalodakam, Vettiver and Neeroli on the bund of many farmers. A few hectares of land previously uncultivated were converted to coconut plantations. For example Mr.Uoosaf, a farmer residing at Pombilaya has converted 2 acres of barren land to coconut plantation. He could do this because of the percolation pits made in his land as part of the project. He and his family expect a good yield from the plantation within two years. Only 2.15 % of the respondents sited cases of two crops area converted to three crops. Only 2.15 % of the respondents reported that they knew the case of fallow land being used for vegetable cultivation.

**4.3 Farmers nursery**

Planting materials required for the watershed area was raised in the farmers nursery. This was done in the supervision of agricultural department officials. The saplings of coconut, areca nut and cashew were grown in these nurseries. Farmers were given training in the setting up of these nurseries; 50% for the expenditure needed for the nursery was given as subsidy from the watershed development fund. The fund was released only after being authorized by the Agricultural Assistant Director and Agricultural Officer. The seedlings were purchased using project fund and distributed among the farmers. The name of seven farmers who setup nursery are given in the Table 4.31

Table 4.31

| **Farmers who set up nurseries** |
|---|
| 1. O.P Achuthan, Ottupara, Puthan Vedu, Nellaya |
| 2. Venu Karthev, Athirampattu, Pombilaya |
| 3. Ramadasan, Agnithody, Pombilaya |
| 4. Ali Kutty, Thachotu house, Nellaya |
| 5 Vasudevan Nair, Iurayathu house |
| 6. Krishnan Kutty, Poovathingal |
| 7. Gopalkrishanan Nair, Karattil, Pombilaya |

**4.4 Planting of trees**

If a farmer had planted a fruit tree he would have got a sum of Rs10 during the first year and Rs 5 during the second year for it's protection. In the case of an agro forestry type non-fruit tree, he would have got Rs 5 during the first year and Rs 2.5 during the second year.

2810 cashew seedlings, 2500 coconut seedlings and 2000 arecanut seedlings grown at the farmers nursery were planted in the watershed area making use of the project fund. 19.8% of the respondents have reported the planting of cashew, coconut or areca nut.

**4.5 Animal Husbandry**

The first milk society in Nellaya panchayat was established at Pengattiry (in the watershed area) in 1997 following by continuous pressure from the local population. Milk farmers from Ezhuvanthala, Kulikkollur, Pombilaya, Pattisseri, Plakkad, Irumbalasseri and Pengattiri Ambedker colony sell their milk to this society .The annual milk collection of this society during the last six financial years is given in Table 4.5.1

Table 4.5.1 **Annual milk collection**

| Financial Year | Quantity of milk collected (Liters) |
|---|---|
| 97-98 | 42,378 |
| 98-99 | 58,540 |
| 99-2000 | 83,956 |
| 2000-01 | 77,958 |
| 2001-02 | 77,856 |
| 2002-03 | 81,443 |

Source: Milk collection register of Pengattiry milk society

Half of the milk collected at the society is from Pombilaya, Plakkad, Irumbalasseri and Pengattiry coming in our project area [6]. Before 1997, milk sales were restricted to the Nellaya panchayat only [7]. Therefore, it is very visible that there is a considerable increase in milk production. This can be attributed to the watershed project, because as part of the project many farmers were given fodder grass seedlings. This eventually resulted in bringing a considerable area of land under fodder grass cultivation. Moreover, goats were distributed to a number of poor farmers. This also contributed to increase in milk production.

**4.6 Poultry**

A poultry unit consisting of ten hens purchased at a rate of Rs80/hen was distributed per family as part of the project. Nevertheless, most of the beneficiaries complained that the hens were very small compared to their price and died in the subsequent three months. Therefore, egg production was not improved. If the hens were healthy, the increased egg production would have boosted the health of the poor beneficiary families.

**A critical look on the agriculture production improvement**

The following aspects need further examination to arrive proper answers:

1.Nearly half of the population was not included among the beneficiaries of the project.

2. Only 30% of the population reported any production increase

3.Eventhough the animal husbandry sector performed well, the poultry sector could not be improved.

4. A mere 2.1 % of the respondents reported any increase in crop area. Similar is the case with increase in paddy production. Both of these achievements were far less than what was targeted.

However, the fact that nearly half of the population was excluded from the project and the failure of the project to create a substantial improvement in the agriculture production (Nearly 30% of the population only reported any production increase.) raises some pertinent questions about the efficacy of this project in achieving the objectives set while formulating the project.

**5. People's participation**

The success of any watershed programme depends on the participation of people living in the watershed area. Subash Chand et al[8] (2000) formulated some measures for assessing people's participation in watershed development programme. People's participation index was calculated from participation in programme planning, programme implementation and programme maintenance.

*6. Ref; - As told to the author by Sinulabdeen Master who serves as the secretary of the milk society from its inception at Pengattiry during an interview at pengattiry milk society.*

*7. Ref; - As reported by Mr.P. Ramadasan, Ayyaruthodiyil House, Pombilaya post, who served as Mitragopal in the watershed project during an interview at Ayyappan kavutemple, Cherpulasseri.*

*8. Ref;- PP 326 to 333, Proceedings of then workshop on watershed development in Western Ghats region, Feb 2000*

People's Participation Index = mean participation score (P) x100
Maximum participation score

$$P=\sum_{i=1}^{n} Pi/N,$$

Where Pi is the mean participation score, n-total number of respondents

$$P=\sum_{j=1}^{k} P\ P_j+ PI_j+ PM_j$$

PPj-total score of people's participation in programme planning,
PIj-total score of people's participation in programme implementation
PMj-total score of people's participation in programme maintenance.

But none of the respondents except two Mitrakisans and two implementing officers have participated in the planning of NWDPRA project at Nellaya, out of the total 91 respondents, 2 persons took part in programme planning, 45 persons took part in the programme implementation and 10 numbers took part in programme maintenance. Putting a score of '1' for each participant for each activity, we would get the different parameters as given below.

PPj = 2, PIj =45, PMj = 10.

Therefore, Mean participation score Pi = 2 + 45+ 10 = 57.

$$P=\sum_{i=1}^{n} Pi/N = 57/9$$

People's participation Index (PPi) = (P/Maximum Participation score) x 100
= (57/91) /((91+91+91)/91)x 100 =57/273 x100

**= 20.9**

The maximum participation index possible for any project is 100. For the case of Nellaya watershed project, we get a participation index of only 20.9. Fom this it becomes very clear that people's participation in this particular project would have been better.
Other aspects looked into for assessing people's participation are: no of self help groups formed and their functioning; attendance in watershed meetings; community contribution to common property resources; and percentage of population attended in various trainings related to watershed development (Subhash Chand et al 2000).

In the Nellaya watershed project no self-help group was formed, this impaired the participation of women in an enormous way (this will be dealt in detail in the next section.). As[9] a prelude to the starting of the project, meetings of the watershed community were conducted at different localities of the watershed area. Quite a good number of people participated in these meetings. Sumangala diaries were distributed to all the participants at the rate of one diary per household and Mitrakisans were selected for each area by the people who attended the meetings. The details of the participation were not obtained. There are very few instances of community contribution in the management and development of common property resources at Nellaya; an often-quoted instance is the renovation of Plakkad check dam. A beneficiary committee, with Mr.Haneefa, Plakkoottathil as convener did this work. The beneficiaries put a lot of manual labor. Voluntary organizations like KSSP took part in this. However, there is not much water in the dam now. Mr. Haneefa attributes this to the reduction in water infiltration consequent to fallowing of paddy fields in the upper areas of the check dam in recent years.

## 5.1 Training

Then number of farmers trained in soil and water conservation is a quantifiable parameter identified by Rajesh Rajora[10] (1998) for assessing the watershed programme.
It is an indicator of people's participation also. Mitrakisans and other farmers were trained on different aspects of watershed development. Mitrakisans were given training three times at Regional Agricultural Research Station (RARS), Pattambi. Two trainings were given to the staff of the agricultural and allied departments. The details of the farmer's trainings conducted are given in the table 5.1.1

Table 5.1.1

**Training given to farmers on watershed development**

| Place of training | Date | No of participants |
|---|---|---|
| ENUPS, Nellaya | 1992 Dec 22nd and 23rd | 55 |
| ENUPS, Nellaya | 1995 March 18th | 55 |
| LPS, Pombilaya | 1995 March 25th | 50 |
| ENUPS, Nellaya | 1996 Jan | 50 |
| ALPS. Palakkad | 1996 March 22nd | 50 |
| **Total** | | **260** |

Source: Training Register kept at Krishibhavan, Nellaya

Out of the total 874 families coming in the project area, 260 people, representing only 29.7% of the families, got any training related to watershed development; 70% of the families have been left out. Therefore, one can state categorically that, the reach of the training programme to the stakeholders was limited.

*9. Ref;- As told to the author by Mr.Soman Vaidyar who functioned as a proxy Mitrakisan in the place of Mr.Ummer, Mundakkottuthody, Nellaya post.*
*10. Ref;- Integrated watershed management, A field manual for Equitable, Production and Sustainable Development- Rajesh Rajora I A S, Rawat Publication, Jaipur.*

**5.2 Women's participation**

Even now, women are supposed to bring water to the houses for different needs. When the wells dry up their burden increases. Now they have to walk long to bring water from distant sources. Similar is the case of degradation of forestland. The poor women earlier depending the forestland for firewood and fodder needs became further impoverished due to lack of income. This is the case with the depletion of any natural resource. Therefore, it becomes very clear that the depletion in ground water affects women more than the men. However, the G.O.I guidelines (for watershed development programs) only require that adequate representation shall be given to women in the watershed development committee. Considering the fact that women are the most important stakeholders in watershed programme, one cannot deny the paramount role they should play in it. Therefore, the guideline needs to take a much more aggressive and pro-active stand on the gender issue by requiring that a minimum of 50% of watershed secretaries be women and by assigning certain specific tasks like raising of nurseries, seed banks, fuel and fodder banks exclusively to women (Abbas Kumar Jha [11] )

However, the role played by women in the Nellaya watershed programme was far from satisfactory. Their involvement was not there in the programme formulation. During the first three years of the project, all of the seven mitrakisans and mitragopal who played a pivotal role were men. It is astonishing that this happened during the time when the GP president was a woman. After three years, two of the mitrakisans were replaced by two mistrakarshaki's (Kamalavathy teacher and Smt. Lakshmi). 16.5% of the respondents for this assessment were women, out of them only 56.3% were aware of the watershed project implemented in their place. There was no particular activity in the project intended to focus on women. Moreover, no awareness programme on soil and water conservation was undertaken focusing them. Lack of emphasis given to women might be because of the lack of their representation in watershed committee during 93 to 96 periods. Even though the Chairperson of the watershed committee was the woman grama panchayat president, she attended only 6 out of the total 35 watershed committees convened; if she had played a proactive role, women's participation would have been more. Concerted attempt was not made to get the Mahilasamajams and Anganwadis that were active in every area, involved in the project activities. Furthermore no organizational set up like women's self help group was created to involve women in the project. No part of the project fund was earmarked to take up targeted activities for the empowerment and capacity building of women. Two of the women respondents reported to have goats and one a cow from the project. However, both the goats died with in 5 months. To be very precise, out of the respondents only one woman reported to have really improved her lot by way of selling milk from the cow she got as part of the project.

An activity in which women can excel men is the raising of high quality seedlings intended for growing in the watershed area. By doing this as group even landless women can earn by participating in it. However in the case of Nellaya watershed all the Nurseries raised were by men as given in Table 4.31. In this way, an area where the talent of women could have been used very well was not properly utilized.

The best woman farmer was decorated during the celebration of farmer's day on 1996 Nov. 1st. It is reported that, women also participated in the trainings organized, as part of the watershed programme. However, the details of their participation are not available.

Smt. Vilasinin Kovilamma, the Nellaya Panchayath president during the period 1993-95 observed that women's participation was less in the watershed project and special efforts were not made to bring them to the forefront of the project implementation activities.

*11. Ref:- Abbas Kumer Jha (1995), Economic and Political Weekly. Vol XXXIII No. 36, pp 2231 to 2233*

## 6 Awareness Creation

Awareness creation on the importance of land and water management was done through Newspapers, radio, workshops and meetings. It seems that this effort did not succeed. Only 40% of the respondents, interviewed as part of the assessment reported to have awareness about soil and water conservation from this project. Awareness level on soil and water conservation is high among the beneficiaries (60.9%) of the project and low among the non-beneficiaries (19.6%). Among the women, respondents 31.5% were aware of the importance of soil and water conservation. It appears that five years of implementation of this watershed project did not succeed in creating awareness on soil and water conservation among majority of the people.

At Nellaya, awareness creation was mainly done through Newspapers, radio, workshops and meetings. Many other channels of communication like posters, banners, bit notices to every households etc were not utilised. Institutional arrangements at local level like arts and sports clubs, vayanasalas, mahilasamajams, post literacy centers, voluntary organisations and anganavadis were also not utilized as mentioned earlier. There are a number of primary and upper primary schools in the watershed area. Perhaps through the children studying in these schools, it would have been possible to create land and water literacy among their parents. Very powerful communication media like street plays, soil & water conservation jadhas, slide shows and video shows were not utilized.

## 7. Over exploitation of ground water

The moral development achieved with people playing active role to create a civil society, a society which is responsible to itself and its environment and responsive to the needs of it's members, rich or poor, upper or lower caste, along with economic development is the reason for watershed development success at Relegon Sidhi (Meeta[12]et al 1994). If this were achieved at Nellaya, the problem of overexploitation of ground water would not have aroused.

As part of the DST supported project, the water table in 20 observation wells were monitored on a monthly basis at Nellaya during the years 1992 & 1993. In 1992, itself seven out of the 20 observation wells used to dry up in summer. Before 1990, only 9.58% of the respondents reported to have had electric pumps fitted in their wells. Now 52% of the respondents are having electric pumps, out of this 29.9% is fitted with more than 1HP motor. This has resulted in the drying up of more wells. 28% of the respondents have bore well in their compound; off this, 39% is having a depth of more than 200 feet. However, only 7% of the bore well owners admitted to have received any complaint of ground water depletion due to their bore wells from neighbors. 23% of them reported reduction in water level in their bore wells since its inception.

The water levels in the 20 control wells as on *01/02/92 & 28/01/04* are given in Table 7.1. The control wells were identified as part of the DST sponsored study conducted by IRTC

*12. Ref:- Gram vikas in relegon Siddi Social Innovation & religious Moral Under current, Meeta et al, Economic & Political Weekly, Vol29, No47 Nov19,1994*

Table 7.1

**Change in ground water table in control wells**

| Well No | Name & address of the land owner in whose premises the control well is situated | Depth to water level from ground level on 1/02/1992 (meters) | Depth to water level from ground level on 28/01/2004 (Meters) |
|---|---|---|---|
| 1 | Padmavathy Kolpad, Pothengil Padmalayam | 4.0 | 6.18 (well dried up in November) |
| 2 | Abeedulla, Harafa Manzil, Nellaya | 3.88 | 4.08 |
| 3 | Anwar, Anwar Manzil, Irumbalasseri | 9.4 | 10.14 |
| 4 | Kutti Ali, Parambil Peedika, Nellaya | 7.65 | 8.35 |
| 5 | Muhammed, Pashnath Kavil, Nellaya | 2.95 | 4.25 |
| 6 | Sreekumaran, Puthiyedathu House, Nellaya | 4.25 | 3.24 |
| 7 | Moithu, Kunnathu Peedikayil, Nellaya | 2.6 | 6.12(well dried up ) |
| 8 | P.Narayanan EzhuThachan,Pottakunninmel, Pombilaya | 6.24 | 7.02 |
| 9 | P.R. Krishnan Kutty, Poovathingal, Pombilaya | 5.37 | 7.67 |
| 10 | Ramankutty, thottathil, Chalavara | 5.6 | Data not available |
| 11 | O.P.Kunjunni Ezhuthachan, Oattupara | 5.15 | 5.35 |
| 12 | A.Ammuni Amma, Andalil House, Pombilaya | 6.15 | 6.38 |
| 13 | K.Kalyanikutty Amma, Kariyattil, Pombilaya | 4.0 | 4.64 |
| 14 | P.K.Abu, Parakunnath, Nellaya | 3.5 | 4.25 |
| 15 | C.P.Muhammed Kutty, Chedathupalliyalil | 4.8 | 5.13 |
| 16 | K.C.K.Vellodi, Arundikalam, Nellaya | 1.5 | 2.63 |
| 17 | E.M.Ramankutty Nair, Matathil, Nellaya | 5.53 | 5.72 |
| 18 | Narayanan Nair, Pappanamthodi, Nellaya | 7.89 | 7.52 |
| 19 | P.Sulekha, Parakkathodi, Nellaya | 5.6 | 5.66 |
| 20 | O.P.SethuRamakrishnan, OttuparaputhenVeettil, Pombilaya | 4.0 | 4.92 |

Off this, water level has improved only in two wells when compared to water level on 01/02/92. The depletion is more than 1 meter in the case of wells numbered 1,7,16,5 and 9. This can be partially attributed to the cumulative reduction in rainfall in 2002 & 2003 compared to 1990 & 1991 as given in the Table 7.2

Table7.2

**Details of rainfall measured at the nearest rain gauge station RARS, Pattambi**

| Year | No. of rainy days | Total Rainfall (mm ) |
|---|---|---|
| 1990 | 109 | 2489.3 |
| 1991 | 111 | 2976.6 |
| 1992 | 117 | 2884.1 |
| 1993 | 103 | 2862.6 |
| 1994 | 117 | 2841.5 |
| 199 | 115 | 2752 |
| 1996 | 95 | 2204.6 |
| 1997 | 118 | 2784.1 |
| 1998 | 125 | 2716.2 |
| 1999 | 107 | 2392.1 |
| 2000 | 97 | 4964.2 |
| 2001 | 105 | 2439.9 |
| 2002 | 100 | 2096 |
| 2003 | ---- | 1994.6 |

In fact increase in water draft mentioned already has also contributed to this depletion But segregating these two components require more studies on ground water formation. However, the water table improved in wells 6 and 18, off this 6 is situated in a plot formed by conversion of paddy fields. In case of well 18, the owner Mr. Narayanan Nair said that apart from soil and water conservation measures undertaken, they have cut down their consumption both for domestic and agricultural purposes in recent years. This might be a reason for the groundwater replenishment.

Among the respondents interviewed for project assessment having open wells, 61.85% have wells with granite rock, 4.4% laterite and 14% clay and 8.7% sand at well bottom. High prevalence of rock at bottom stands in the way of increasing the depth of wells. There is not much possibility of ground water development in the unconfined aquifer zone in this watershed.

**7.1 Issue of proliferation of bore wells**

Among the respondents 22.7% reported to have drilled the bore well due to the drying up of open wells, 2.17% reported to have drilled because of the construction of new house, 2.17% due to the extension of agriculture.

A survey was conducted to find out the depth, rating of the pump used and duration of pumping of the bore wells coming in the watershed area. Not all the bore wells in the watershed area could be covered, but 105 numbers were covered. The consolidated details of these bore wells are given in the following tables 7.11, 7.12 & 7.13

**Table 7.1.1**
**Details of pumps fitted to bore wells**

| RATING OF PUMPS | NO. OF BORE WELLS |
|---|---|
| 6 HP | 1 |
| 2 HP | 12 |
| 1.5 HP | 19 |
| 1 HP | 59 |
| Jet pump | 1 |
| Data not available | 13 |

**Table7.1.2**
**Details of the bore well's depth**

| DEPTH (in feet) | NO. OF BOREWELLS |
|---|---|
| 350-400 | 1 |
| 300-350 | 2 |
| 250-300 | 6 |
| 200-250 | 8 |
| 150-200 | 28 |
| 100-150 | 46 |
| < 100 | 6 |
| Data not available | 8 |

**Table7.1.3**
**Details of the duration of pumping**

| PUMPING TIME per Day ( hours) | NO. OF BOREWELLS |
|---|---|
| > 3 | 2 |
| 2-3 | 2 |
| 1.5-2 | 7 |
| 1-1.5 | 8 |
| 0.5-1 | 56 |
| < 0.5 | 13 |
| Data not available | 17 |

Proliferation of the water extraction structures has diminished the ground water availability in this watershed considerably. During 1991-92 period, when the IRTC conducted the hydrological study of the Nellaya watershed there were only less than ten bore wells in the whole watershed. Now by a rough survey the numbers of borewells are found to be 105. Any way the actual number will be more than this. Moreover, the well depth has increased to about 400 feet and the capacity of electric pump connected has increased to 6 HP. The pumping duration varies from 10 minutes to 8 Hrs per day. The proliferation of these water extraction structures has started creating a lot new set of problems between the neighbours, and between rich & poor. Case studies were made to depict this problem.

### 7.1.1 Bore wells, mitigating water scarcity for the rich, while creating new water scarcity for the poor.

**Case study 1**

A case study of wells drying up due to ground water over exploitation by another person residing and cultivating nearby is described below. Padmavathy Kovilamma, Arundikalam, is a widow of 65 years residing at Pombilaya. She stays with her daughter and mentally retarded son. Partition took place in their joint family in1975. Followed by this they drilled a 50' bore well near to their house in 1975, fitted with a half HP jet pump. They used to pump bore well water to a 500-litre sintex tank before using it. Their mentally retarded son uses the latrine a number of times on some days and water requirement is very high on those days. Things were moving smoothly till Mr. Veerankutty, a gulf returnee purchased 2 and half acres of land at a distance of 200 meters down the slope from their house. In 1996, he made a 250' bore well in his land and started irrigating the coconut, arecanut, banana and other garden crops in his land; but somehow the submersible motor became defective and could not be taken out of the bore hole. This forced him to drill one more bore well of 300' depth fitted with 5 HP motor. He used to irrigate from December to May. The coconut and arecanut trees are irrigated by flooding the basins through water channels; the irrigation starts at the early hours of Sunday and continues till Monday morning. With in three or four hours after irrigation started, the bore well in the premises of the hapless Padmavathy Kovilamma dries up with a big sound, their well remains dry till Thursday morning. Since their water tank is not big enough to keep water for their needs for the subsequent four days, they don't have any choice but to fill up all the vessels in their house with water. There is no other well within 100 meters of their house.

The same thing happens in the 50' depth bore well of Mr. Janardhanan, Sithara, 6$^{th}$ ward of Nellaya GP. But, they did not suffer like Padmavathy, because of the presence of their big water tank. A.K. Padmini Kovilamma's open well didn't dry up earlier. Even in peak summer there used to be half ring of water.But due to overexploitation by Veerankutty, her well also dry up since the last five years. Mr.Mani, Mampattakattil is working in the gulf. His house is at a distance of 150 meters down the slope from Mr.Veerankutty's. His house was constructed by filling the paddy fields. His open well with 4m depth (dug 4 years back) used to dry up by February every year. Three years back he dug a bore well with a depth of 100' inside the open well, fitted with 1.5 HP jet pump. Normally water flows up from the bore well to the open well. When Veerankutty starts irrigation on Sunday morning, Mani's bore well dries up, the water level comes back to previous stage only after four days.

Even though Janardhanan wanted to register a complaint against this groundwater exploitation, he was dissuaded by others. They brought this problem to the notice of Smt. Vasantha, the GP Vice President, but nothing happened. Since all are residing nearby, they don't feel it good to approach the court to stop the exploitation. Many a time they registered their complaint to Veerankutty also. Consequently, he started informing his irrigation schedule in advance to the aggrieved people so that they can fill up their tanks & pots.

Veerankutty's response to his neighbor's suffering caused by his action was not totally indifferent. While he was approached to discuss this problem, he told that he took corrective measures to ameliorate the grievances of his neighbours, but asserted that he will continue with irrigating the crops because he has invested lakhs into it. He also observed that instead of blaming him his neighbours should have installed pumps with more capacity. The corrective measures he claimed to have taken are: the frequency of pumping is reduced from weekly to fortnightly; the people affected are informed in advance about the time and day of pumping; reduced the pumping duration from two days to one day. However, at the beginning he was not very much enthusiastic about converting his farm to drip irrigation because he is afraid that he will be unable to bear the cost. But when the advantages of drip irrigation were explained to him he agreed to consider that option. The most striking aspect is that he is not convinced about the fact that the whole water is not his property and drinking water should be given priority over irrigation water.

**Case study 2**

Raman, Kundil House, Nellaya Post, is an Ex-serviceman with 4.5 acres of garden land at a higher elevation of the watershed in which he has built up his house. He drilled a bore well 15 years back when his open well dried up. This was one among first few bore wells drilled. It coasted him Rs.18000 including Rs.12000 spent for purchasing the motor. The well (100' depth) was used for taking water for drinking and other domestic needs only. He has got 130 coconut trees, 500 plants of pepper, arecanut etc in his premises. He practices soil and water conservation measures like field bunds, making basin for coconut trees and filling this basin using coconut husk etc. He says that due to this the leaf falling of his coconut trees has markedly reduced the biomass yield in his plot improved and biodiversity in his plot increased. But six years back, two bore wells were drilled within 150m periphery of his house, first one owned by the grama panchayath is at a higher elevation and the second one privately owned is at a lower elevation. In 1999, his bore well suddenly stopped yielding water. On close examination it was found that because of water level falling below 70 feet, the 1 HP jet pumps couldn't take water. Thus, he was forced to change it to 1 HP compressor investing another Rs. 15,000. He says "Now I am getting enough water for domestic use". Considering the mushrooming of bore wells in the watershed area one may doubt the wisdom of his optimism.

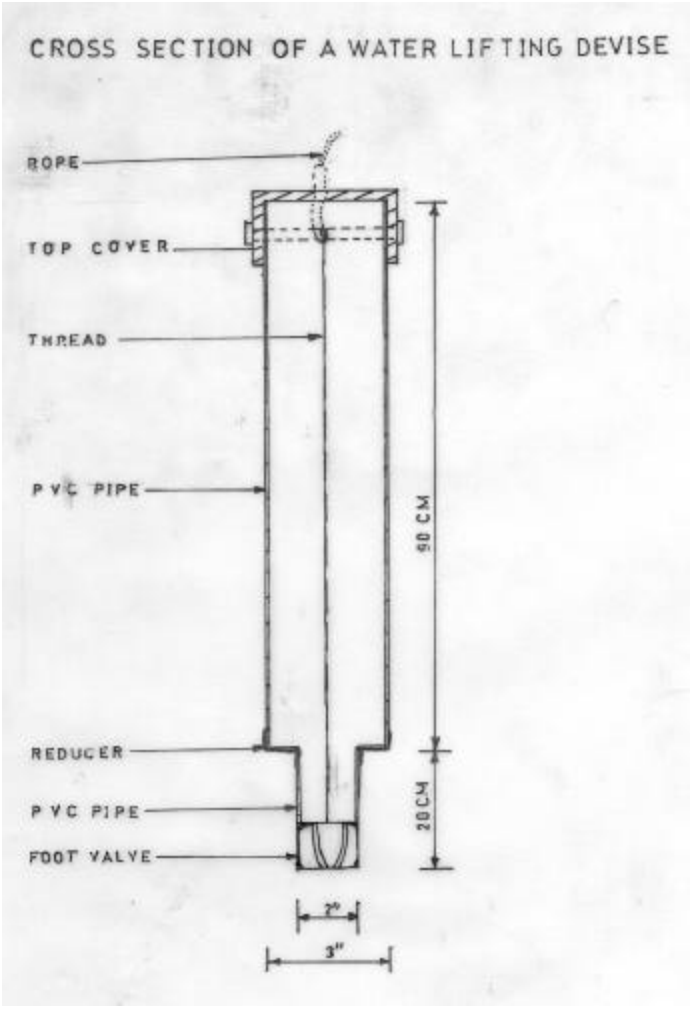
**Case study 3**

Mr.Yousaf, Thazhvarathil,Pombilaya post is a hardworking farmer staying near to the ridge line of the watershed. He is having two acres of garden land and one acre paddy field. As part of the watershed intervention programme 15 pits of size, 1.5m x 1.5m x 1m was made in his 1.5-acre land, which was hitherto remained uncultivated. This improved soil moisture content by

reducing soil erosion and increasing water infiltration. Soil quality also improved; one can see dark soil in his land now. This prompted him to plant 100 coconut trees five years back in this land. They are growing very well now. He and his wife are expecting an improvement in their life condition due to the good yield they may get from the coconut trees in the coming years. However, his open well dried up in 1998. This forced him to drill a bore well of 150' depth inside the well spending Rs. 20,000. Out of this Rs. 15,000 was spent for purchasing the 1.5HP motor. During the initial years he was getting continuous flow of water from the well. Now a days, during summer, water comes out from the pump fitted to the well only in an intermittent fashion. This necessitates running the pump for more time than earlier to get the same quantity of water. Mr.Yousaf believes that this is due to the digging of four or five bore wells around his house during the last few years.

He had an interesting experience before fitting the pump in the bore well. After drilling the bore well inside the open well, he had to wait for some time to muster enough money to purchase the motor. During this period, he kept the bore well mouth closed by using an inverted bucket over it. In the next rainy season, water was filled in the open well over the bucket. He used to collect this water by drawing coir connected to the pot over a pulley. One day the perilous thing happened! Some how the bucket covered over the mouth of the bore well was removed and the whole water filled in the well disappeared through the borehole with a big sound. This is a typical case of loosing the water from open well (unconfined aquifer) to the confined (deep) aquifer, because of the improper sealing of the borehole.

### 7.2 Appropriate technology for drawing water from bore well



The depletion of ground water in this area has forced many poor people to go for drilling bore hole in their open wells; but due to lack of money they are unable to fit jet pump or compressor in the bore hole. Thus to collect water from the deep borehole they developed an indigenous system as shown in the picture above.

In this arrangement a PVC pipe with a foot valve at the bottom with reducer and covering at the top is tied to a rope, which is allowed to dip in to the borehole either through a pulley or directly; once filled with water, it is lifted by drawing the rope. Water would not be lost while lifting, because of the closing down of the valve during the upward movement. The lifted water is transferred to a vessel by pushing the valve up. This water-drawing device is available at the shops in Cherpulasseri town and costs Rs 245 per piece. Mr.Kurikkal, owner of a shop said that three to six pieces are sold every day.

But this system is having a serious problem; in the case of bore holes dug in open wells, if the bore hole is kept opened, during rainy season the recharged water from the unconfined aquifer will disappear to the confined aquifer through this open bore hole and create water scarcity in the nearby open wells.

## 8. A critical appraisal of the institutional arrangements for NWDPRA project implementation.

In the last three sections, we have tried to evaluate the effects of the watershed project in different realms. From this we understand that the over all development achieved were short of what was aspired. What was the role of the different institutional arrangements in this? Are they functioned effectively? Moreover, was the institutional set up used was insufficient to meet the challenge of the watershed project? In this section, it is attempted to find answers to these questions.

The implementation arrangement for the watershed project was explained in section 3.4. Since the study is confined to Nellaya, the state & district level arrangements are not reviewed here and the focus is given to the operation at Nellaya GP. As mentioned earlier the configurations, which played a pivotal role in the implementation, are the watershed team and the watershed committee. The members of the watershed team were officials of the concerned departments. The constituents of the watershed committee other than the officials are, the Gram panchayat office bearers, the Gram panchayat members from the watershed area and the mitrakisans. A detailed review of the functioning of each of these constituents is given in the coming sections.

### 8.1 Role played by officials

As mentioned in the Part 3.4, the agriculture officer was the team leader for project implementation. Mr.V[13], Nellaya Agriculture Officer during 1992-95 period played a key role in the successful launching of the programme. He along with Agriculture Assistant Mr.R and soil survey department officials conducted pre project survey to identify the interventions. His pleasant manners, hard work and honesty were motivating factors for other officials, Mitrakisans and people's representatives to rally around him for the successful implementation of the programme.

*13. Ref- personal communication from Mr.V .*

However there was not much innovations applied in devising strategies for involving people, especially women in the programme. ''The agriculture officer who functioned as the team leader had to play this role in addition to his normal departmental work. Since this watershed covers only 50% of the panchayat area, he has to spend more time and energy to discharge the normal departmental duty for the balance area. Moreover the scheme was designed for North Indian conditions and took little consideration of the Kerala realities.'' Observed Mr.K[14] who has succeed Mr.V. This additional responsibility came in the way of discharging team leader's duty efficiently

When he took over charge from 1995 July, Mr.K's relation with the mitrakisans became troubled. The Mitrakisans accused him of corruption and favoritism in the purchase and distribution of hens and goats. The hens were given to the beneficiaries as a unit consisting of ten hens (hens were purchased @ Rs 80/hen). Most of the farmers we interviewed reported that the hens were much younger compared to the money paid for them. The hens, Mr. Kunjunni, Kunthanithodi House, got were dead after 3 months.

However, Mr. K maintained that the hens were purchased from certified nurseries[15] after obtaining approval from the veterinary surgeon Mr.P who functioned as the veterinary doctor at that time. He is presently working somewhere in Tamil Nadu and therefore his opinion could not be elicited on this matter. All this suggests something foul in the purchase. also complained that Mr. K overlooked their suggestions on the selection of beneficiaries. When brought this to Mr. K's notice he contested this by accusing that two of the mistrakisans Mr. Sainulabdeen and Mr. Achuthan had partisan motives in beneficiary selection. However, his effort to replace them did not succeed due to the support they enjoyed among the people. Subsequently, the corruption charges resulted in a departmental enquiry. But Mr. K claimed that he was acquitted and got transfered to Trichur District (in July 96).

Anyway, this episode had created a bad impression amongst the people and was sited as a reason for the set back of the project. Mr. M took over as the team leader followed by this and soon the project was wound up.

Dr. A succeeded Dr. P as the veterinary doctor of Nellaya Grama Panchayat. During his term, goats were distributed in the watershed area at the rate of Rs. 1000/goat. He claimed that all the goats were healthy and no mortality was reported during his tenure at Nellaya. But one of the respondents we interviewed Smt. Ayisha, Parambil House told that the goat she received was not of good health and died after five months. Another beneficiary Smt. Kollathi, Veenamkunnu Parampu house, also reported that she sold the goat because of it's ill health. On the other hand, two other respondents Aalikkal Muhammed and Ravunni Mampulliyil informed that they have benefited from the goats they received.

As per the NWDPRA guideline of 1993 the Assistant Director of Agriculture of the block in which watershed comes has a pivotal role in the implementation of the project. However, on verification it was found that the Assistant Director started attending the watershed development

*14. Ref- personal communications from Mr.K.*
*15. Ref- Mr.George Joseph, Deputy Director of Agriculture(Rtd), told that no private nursery is considered as certified by the agriculture department for purchases*

committee only after three years of completion of project implementation. Therefore, the project was bereft of the services of a senior officer and had to contend with the implementation experience of the team leader. As per the minutes of the watershed development committee, the Assistant Director of Agriculture started attending the meeting regularly only after transfer of the team leader Mr. K under a cloud of suspicion around him.

**8.2 Role of Grama panchayat and its functionaries in the implementation of the project**

**NWDPRA watershed programme was implemented at Nellaya from 1992 to 1997 Before the passing of Kerala Panchayath Raj Act, 1996 the powers of Kerala's panchayaths were very limited.** They had no control over the affairs of line department offices like agriculture, health, animal husbandry etc that functioned in the panchayath area. Once the people's planning campaign was launched in 1996, their financial and administrative powers improved a lot. However, the watershed project was wounded up after a short period of the launching of people's planning campaign. It is in this background that, we look into the role played by panchayath functionaries.

Smt. Vilasini Kovilamma, the GP president during the period 93-95 felt that the project was implemented in an effective manner. However, people were not much enthusiastic about the project activities. She also admitted that, other than during the watershed committee meetings she could not play any significant role.

Smt. Vasantha functioned as the GP president during the fag end of the watershed project period. She remembers attending as a guest in some functions like agriculture product exhibition, cattle exhibition and distribution of benefits like sewing machines etc. Besides this she had not played a decisive role.

Moithooty master, the present Nellaya Grama Panchayat president was the Vice President during the project implementation period. He says that apart from being a chairperson of the watershed development committee the GP president was not having much of a say in the project implementation. He says that this happened because of the below mentioned steps of procedures adopted in the project implementation.

(I) Unlike the present set up of funds coming to panchayat directly, the money flowed from district level implementation committee to the account of the team leader.
(ii) Most of the activities were implemented through a caucus consisting of farmers close to officials and mitrakisans without much people's participation.
(iv) Gramasabhas were not called for beneficiary selection. On the other hand, beneficiaries were selected from the list given by mitrakisans at the watershed committee.
(v) Even though many people deserved to be beneficiaries of the project, they could not ,because of the lack of awareness among them about the project activities; this resulted in the people having some contact with mitrakisans, becoming the beneficiaries. The people sidelined due to all the above reasons were the most poor. But the question comes to a third person’s mind is why the presence of GP representatives in the watershed committee did not help to overcome the above-mentioned problems? In the watershed development committee, the Grama Panchayath President was the chairman, people's representatives from the watershed area were ex-officio members and the watershed team leader was the convener. However, in the 35 watershed committee meetings conducted during the project period, any one amongst the GP members or

president participated only in nine meetings (less than 30%); the participation of GP president was only in six meetings (17%). This happened, in spite of the fact that the GP president was the Chairperson of the watershed committee. From this it is clear that 83% of the meetings were conducted without the chairperson. One may doubt the validity of the decisions taken in a meeting conducted, with out the chairperson presiding over it. This all happened because the grama panchayat representatives were not aware of the powers vested on them as per the NWDPRA guideline. This ignorance prevented them from asserting their authority in the watershed committee.

This non-participation prevented the GP representatives from playing an effective role in making the project useful to the larger masses.

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**8.3 Role of mitrakisans in the project implementation**

As mentioned earlier mitrakisans were unanimously elected by the watershed community at the different locations meetings. They were progressive farmers selected with the following purposes:

1) To transfer soil and water conservation practices, modern agriculture practices and other technical subjects to farmers and agriculture workers
2) Project farmer's interests in the formulation and implementation of the different activities.
3) Collect applications from prospective beneficiaries and present at the watershed development committee for selection and approval.
4) To take care of the particular geographical area of operation within the watershed assigned to him.
5) Bring the voice of watershed community before the watershed committee.

The opinion of mitra kisans were taken care of during the occasions like conduction of kisan mela, distributions of awards to farmer's etc.

**8.3.1 Characteristics of mitra kisans of Nellaya**

During, the initial period (92-95) all the mitrakisans and mitragopal were men, two of them teachers, two of them ex-servicemen, one retired teacher and three farmers. All were honest people from middle class background who acquired the trust and good will of the people. None of them was active in politics. Most of them did various soil and water conservation activities in their fields making use of the project fund. Later period (95-97) three of them were replaced, two women members and one-artisan representatives were inducted.

Mitra kisan were given training in different aspects of watershed management at RARS, Pattambi and at Nellaya. They played a vital role in the project implementation. They were taken for a visit to show new agricultural practices at KAU, Mannuthi and FACT. All of them have good understanding about the importance of watershed development activities.

Not everybody appreciated the role played by mitrakisans; one implementing officer accused that two of them had partisan motives in the selection of beneficiaries, but people again and again selected them because of their usefulness in the filling up of beneficiary application form and other works. However, the author could not get sufficient evidence to prove the

accusation, when the triangulation was done. Before being selected as mitrakisan, most of them functioned in some capacity in padasekara committee, milk society or kera samithi; moreover all of them showed leadership qualities. All of them were from middle class background. This also might have contributed to the alienation of the project from poorer sections. The observation of this author is that the number of beneficiaries from poor sections was less.

### 8.4 Role of contractors

One soil conservation activity taken up was digging of percolation pits. Rs 30 was the subsidy amount provided for a pit of size 1.5m x 1.5m x 1m size but, farmers were reluctant to undertake this because of the shortage of laborers. In many watershed committees, this problem was discussed. Many members demanded increased subsidy for the pit. Finally, Mr.Veerankutty a contractor residing at Pombilaya came in to the picture. He implemented the pit digging work of 2000 percolation pits at the rate of 10 numbers per one acre land; in addition to this, renovation work of five ponds were also undertaken.

The mode of implementation was like this: the contractor meets the farmers and explains the importance of the pit in water conservation and in planting coconut saplings after four or five years; the position of the pits was identified by the officials from the soil conservation department. The laborers engaged by the contractor made the pits. Followed by this the soil conservation department officials passed the bills after taking the measurements. No contribution from the beneficiaries was received for this work "You are getting a lot of profit from this work, give us also a share of that" this was the attitude of the people, observed Veerankutty.

## 9 Bank finance towards the implementation of watershed project

One limitation of the NWDPRA project implemented at Nellaya was the total lack of bank finance as the loan component in the implementation of any scheme, which forms a part of the project. The nearby nationalized or cooperative bank's manager was not a member of the watershed team or watershed committee. The watershed development projects of Nellaya were not part of the credit plan of the lead bank. In the NWDPRA guidelines, if the presence of bank representative on the watershed committee were made mandatory, this anomaly would have been rectified.

## 10 Follow up activities of NWDPRA watershed programme

By March 1997 the NWDPRA project was wound up at Nellaya. There was a very positive environment created due to people's planning campaign, which might have helped to continue with the good work undertaken in the NWDPRA scheme. According to Moitheenkutty Master, the GP Vice President at that time, the people didn't come for the review meeting. However, Moithootty himself, Smt. Vasantha, the GP President and Mr. Rajan, Agriculture Assistant of Nellaya at that time admitted that there was no purposeful continuation of the watershed works in the annual projects of Nellaya Grama Panchayat. In the Panchayath Development Report, there is reference of the NWDPRA project being implemented in the panchayat; but it was observed that the project was not implemented in a comprehensive manner. In the people's planning campaign, attempts were made to renovate a few ponds by soil excavation. An interesting case study of renovation work at Payyankulli pond is sited here. This pond having an area of about 20 cents comes in the Nellaya watershed. Many people were using this pond for bathing, washing of clothes and bathing of livestock Moreover, it was a head pond

used for irrigating the second crop of paddy lying below it. An amount of Rs. 4 lakhs was apportioned is the 97-98 year plan of Nellaya Grama Panchayath for the renovation of this pond. Earth excavation and side bank protection were the activities envisaged in the project. However, the country road leading to the pond is not having sufficient width along a 250m stretch to bring lorries to the pond site. R. Unnikrishnan, a local farmer, says that the people living on both sides of the road were not willing to contribute their land to widen the road by two feet on both sides. Smt. K.P. Vasantha, the GP representative from the area and the GP president at that time also intervened to overcome the deadlock, but could not succeed. Mr. Unnikrishnan says that the local party politics sabotaged this project. The lesson one can derive from this is that the awareness on land and water conservation created by the NWDPRA project was not sufficient to overcome petty rivalries.

## 11 Conclusion

When evaluated with reference to the objectives set, the project achieved good results in certain parameters like reduction in soil erosion and surface run off, increase in biomass creation and agriculture production. It also promoted cultivation of medicinal plants and fodder grass; increased fodder grass production could achieve increased milk production.
However, the project activities could not inculcate land & water literacy among the large chunk of the population. Consequently a considerable section of the people did not bother about the over exploitation of ground water resulting in a drastic reduction of the ground water table and proliferation of bore wells. Another important area where the project failed was in people's participation; nearly half of the population was not given opportunity to take part in the project. The institutional arrangements created for project implementation under NWDPRA scheme were not equipped to create a massive people's participation.

Now, when the local bodies in Kerala are moving in the direction of preparing watershed based development master plans especially for the productive sector, the following lessons learned from the Nellaya experience count:

1. Since most of the activities as part of the watershed project needs to be undertaken in individual land holdings by the landowners, their wholehearted cooperation is essential for the success of the project. In spite of many other positive features, lack of people's participation in the planning, implementation & maintenance may doom the watershed project.
2. People's participation can be created only through micro level people's institutions. The role of the local body is paramount in creating people's participation. This fact is taken in to consideration by the Rural Development Department, Government Of India while formulating the guideline for the Haryali project; which is the new name for Integrated Waste Land Development project.
3. Since women being the most important stakeholders, lack of their participation can cause failure of the project.
4. In the absence of grass root level people's institutions for project implementation, there is the possibility of contractors creeping in to the implementation system.
5. Information creates awareness and action follows awareness, lack of information dissemination results in half baked outputs; therefore wide campaigning needs to be done to take the message of watershed development to the doorstep of each individual in the project area.

6. The officials associating with this type of work need to spend more time to do extension activities; this helps to make the programme successful.
7. Since most of the activities as part of this project are undertaken in the land of individuals, people having more land may get more benefit. This may cause the alienation of the poor. Therefore, a concerted attempt is needed for bringing the poor & marginalized sections in to the project fold.
8. As in the case of Nellaya, over exploitation of ground water by some people can whither away the benefits of the project. The Ground Water Law (regulation & control), 2002 passed by the Kerala Assembly is a positive step in controlling over exploitation of ground water. This law allows the ground water authority to declare places where over exploitation of ground water is taking place as notified areas; the consumers other than domestic in this area need to get a registration for their well from ground water authority. The ground water authority after making an assessment of the ground water status (both availability & utilisation) can give or reject the registration. Along with this, widespread awareness creation against inefficient utilization of water is needed to guarantee equity in the availability of this vital resource.