MICRO WATERSHED BASED ACTION PLAN

NELLANAD MICRO WATERSHED (4V29b)

Nellanad micro watershed is the largest watershed in the IWMP cluster (IWMP-I) with an area of 3029.03 ha (37.94% of total geographical area). This micro watershed is spread over Nellanad, Manickal, Pullampara, Vamanapuram Grama Panchayaths of Vamanapuram Block, Mudhakkal Grama Panchayath of Chirayinkeezhu Block and very small portion in the Mangalapuram and Pothencode Grama Panchayaths of Pothencode Block Panchayath also comes under this micro watershed.

General Description

Table No. 18.1 - General Description of Nellanad micro watershed

Name of micro watershed	:	Nellanad
Micro watershed code	:	4V29b
River basin	:	Vamanapuram
District	:	Thiruvananthapuram
Block Panchayath	:	Vamanapuram, Chirayinkeezhu, Pothencode
Grama Panchayath	:	Nellanad, Manickal, Pullampara, Vamanapuram Mudhakkal, Mangalapuram & Pothencode
Villages	:	Nellanad, Manickal, Koliyakode, Pullampara, Vamanapuram, Mudhakkal, Melthonakkal
Latitude	:	$8^0$38’39” to $8^0$42’30” North
Longitude	:	$76^0$51’01” to $76^0$56’40”East
Wards	:	Pullampara Panchayath- 12, 13, 14 (full) Mudhakkal Panchayath- 9,10,11,12,14 (full), 7,8,13,15 (part) Nellanad Panchayath - 6, 7, 8, 9, 10, 11, 12, 13, 14, 16 (full), 1,2,4,5,15 (part) Manickal Panchayath – 4,5,6 (full), 7,13,14 (part) Mangalapuram Panchayath – 6 (part) Pothencode Panchayath –(part)

Total Area : 3029.03 ha

% of area in the IWMP cluster : 37.94%

Socio economic profile

As per the information provided in the baseline survey conducted, Nellanad micro watershed has a total number of 4480 households with a total population of 25146. The micro watershed has a total male population of 11983 and a total female population of 13163. 3092numbers of BPL families reside in the micro watershed area. A total number of 4573 persons have registered under MGNREGS. 1089 households belong to Schedule Caste and 78 families belong to Schedule Tribe. Majority of the farmers are marginal farmers having only less than 1 ha of own land. Agriculture is the major source of livelihood in the micro watershed area. Apart from agriculture/horticultural practices, animal husbandry is also a source of livelihood some families in the watershed area. The socio economic details of the Nellanad micro watershed are given below:

Table No. 18.2 - Table showing the socio economic details of Nellanad micro watershed

1.	Total number of households		10304
2.	Population	Male	11983
		Female	13163
		Total	25146
	Child population	Male	5107
		Female	4871
		Total	9978
3.	No. of BPL families		3290
4.	No. of persons enrolled under MGNREGS		4573
5.	Households	Scheduled Caste	1089
		Scheduled Tribe	78
		General	9137
6.	Land holdings	Landless	113
		Very Marginal (less than 5 cents)	1854
		Marginal (5 to 250 cents)	7718
		Small (250 to 500 cents)	53
		Large (more than 500 cents)	22

Biophysical Resources

Physiography

The relief of the watershed ranges from 10 m above MSL to 200 m above MSL. The majority of the area falls in the relief category of 40 to 60 m above MSL which occurs in an area of 1507.56 ha (49.77 %). An area of 11.12 ha is located above 150m above MSL.

Slope

The watershed area is divided into six categories of slope classes. The majority of area is under the strongly sloping class having 10 – 15 % slope. The category spreads over an area of 1355.79 ha (44.10.%),754.57ha of the watershed area is having moderately steep to steeply sloping lands and 98.31 ha is having very steeply sloping lands which requires urgent soil and water conservation measures.

Drains

The Nagaraukuzhy-Thycaud-Mudakkal thodu, one of the major tributary of Vamanapuram River flowing through the south boundary of the watershed is the major drain of this watershed. A number of drains are originating from the different parts of this watershed reaches to this drain which joins to the Vamanapuram River. The watershed also has 25 numbers of ponds distributed throughout the watershed area. The details of the drains and ponds in the watershed area is given in table No. 18.3 & 18.4

Table No. 18.3 - Table showing the details of Drains in Nellanad micro watershed

Grama Panchayat	Drains	Length (m)	Breadth (m)	Depth (m)
Nellanad	Taikkadu Makkamkonam	2750	5	1.5
	Makkamkonam Panikkarukonam thodu	1250	3	1
	Puthukulangara mailathukavu thodu	750	5	1
	Thallu Vattakonathu thodu	450	3	1
	Kannakkodu Ela thodu	250	2	2
	Kariyakonam thodu	750	2	3
	Kaithodu 1	100	2	2
	Kaithodu 2	250	2	4
	Parameswaram kizhakkemudakkal ela	2050	5	4
	Pinantharakonam kanjirampara thodu	2950	5	4

Grama Panchayat	Drains	Length (m)	Breadth (m)	Depth (m)
	Kaithodu 2	1050	5	3
	Kuruvallikonam thodu 2	700	5	3
	Kuruvallikonam Ela thodu 1	1050	5	3
	Vettuvila kaikkad thodu	4300	10	5
	Chanelil Ela thodu	1500	6	5
	Mudakkal Kaithodu	600	3	3
	Puthoor thodu	600	2	3
Manickal	Chettakavu Thodu	350	1.5	0.5
	Kaithodu	250	1.5	0.5
	Kalkudi Thodu	550	1	0.5
	Kunchikuzhi Thodu	425	2	0.5
	Kuthirakulam Ela Thodu	775	3	0.5
	Kuthirakulam Thodu	573	3	0.5
	Mulayam Thodu	950	2	0.5
	Panayil Thodu	300	1.5	0.5
	Ponnambi Nada Thodu	650	3	0.5
	Thozhunthur Thodu	1025	1	0.5
	Udiyancode Edanadu Thodu	260	3	0.5
Pullampara	Karijamkonath Ela Thodu	450	1.5	2
	Kavathiyottu Ela Kaithodu	650	1.5	2
	Mullamangalam Kaithodu	600	2	2
	Nagarukuzhi Kaithodu	650	1.5	0.5
	Nagarukuzhi Palamkonam Thodu	3300	3	1.5
	Palamkonathu Kaithodu	450	1.5	1.5
	Pattayanikonath Ela Thodu	2000	3	1.5
	Pennambi Nada Thodu	650	3	0.5
	Thevarukonathu Kaithodu	600	2	2
	Udiyancode Edanadu Thodu	260	3	0.5
	Villyamangalam Kaithodu	200	2	1

Table No. 18.4 - Table showing the details of Ponds in Nellanad micro watershed

Sl. No	Grama Panchayat	Pond	Survey No.	Length (m)	Breadth (m)	Depth (m)
1	Nellanad	Chullakulam	391	35	10	30
2		Mariyam Kulam	436	10	8	0.5
3		Mariyam Ambalakulam	427	20	5	1
4		Mariyam Thodikulam	435	17	10	1
5		Mariyam Kavukulam	434	7	4	4
6		Paravilakonam Chira	536	140	70	6
7		Chirathalakkal Kulam	459	50	25	12
8		Paravilakonam Cherukulam	523	20	10	4
9		Kottaram Kulam	456	20	10	25
10		Makkamkonam Kulam	245	25	25	10
11		Panikkarukonam Chira	229	25	15	25
12		Kannankottu Chira	290	20	20	75
13		Mulavettu Parambu Kulam	145	5	4	7
14		Chengazhattu Kulam	149	17	5	2
15		Platharakonathu Chira	168			
16		Parameswaram Ambalakulam	175	45	45	5
17		Parayarukonathu Chira	317	30	25	3
18		Parayarukonathu Kulam	335	25	20	5
19		Mukkunnoor Ambalakulam	344	40	32	2
20		Cherukottukavu Ambalakulam	356	18	17	1
21	Pullampara	Manikkan ValliChira	344	25	20	4
22		Palamkonam Kulam	388	20	10	5
23	Manikal	Pirappancodu Kshethra Kulam	67	100	65	3
24		Kunjikuzhi Chira	145	35	25	1
25		Chelakkad Kulam	44	25	25	3

Land use

Agriculture is prime activity in the watershed area. The major land use category mapped in the watershed area is rubber plantation. It occurs in an area of 1500.70 ha

(49.54%). The second major category is the mixed crops which are the typical homestead cultivation of Kerala wherein the different crop species are grown together that cannot be spatially mapped separately. This is mapped in an area of 939.77 ha. An area of 70.27 ha is under coconut plantation. This area can be brought under intensive agriculture through multi-tier cropping. An area of 17.42 ha is under paddy cultivation and 18.16 ha of paddy lands has been left as cultivable wasteland which can be brought to paddy cultivation by providing necessary labour and irrigation facilities. An area of 7.62 ha is mapped as cultivable wastelands which can be brought under horticulture. An area of 81.75 ha (2.69 %) is under the built up land and an area of 9.45 ha is under the rocky area. The details of the land use categories with spatial extent are given in table.

Table No. 18.5 - Table showing land use categories in Nellanad micro watershed

Sl. No.	Land use category	Area in ha	Percentage
1	Builtup land	81.74	2.70
2	Paddy	17.42	0.57
3	Paddy converted Banana	41.82	1.38
4	Paddy converted Tapioca	34.78	1.15
5	Paddy converted Banana + Tapioca	38.29	1.26
6	Paddy converted Banana + Vegetables	2.74	0.09
7	Paddy converted Builtup land	3.36	0.11
8	Paddy converted Coconut	30.02	0.99
9	Paddy converted Coconut + Tapioca	7.59	0.25
10	Paddy converted Mixed Crops	73.46	2.43
11	Paddy converted Rubber	82.83	2.73
12	Paddy land left as cultivable waste land	18.16	0.60
13	Coconut	70.27	2.32
14	Mixed Crops	939.77	31.03
15	Plantation Rubber	1443.18	47.64
16	Plantation Rubber (Young)	57.51	1.90
17	Playground	1.19	0.04
18	Cultivable Waste Land	7.62	0.25
19	Wasteland	1.30	0.04

Sl. No.	Land use category	Area in ha	Percentage
20	Quarry Abandoned	4.60	0.15
21	Quarry	6.77	0.22
22	Rock	9.45	0.31
23	Road land	34.57	1.14
24	River Bank	19.21	0.63
25	Water body	1.38	0.05
	Total	**3029.03**	**100.00**

Geology

The major geological unit in the watershed is Garnetiferous Biotite occurring in an area of 1840.09 ha (60.74 %). The remaining area has a geological formation of Garnet-Biotite gneiss with Migmatite. The majority of the area in the watershed has Migmatite complex of rocks, followed by Khondalite and Charnokite group of rocks. A very small portion is having sand and silt group of rocks. There are four geomorphological units, of which more than 85 % (2630.15 ha) of the area falls under the category viz. lower plateau (laterite).An area of 341.56 ha is mapped under the category viz. valley fill.

Soils

The major soil series mapped in the watershed area is Trivandrum series having moderately deep to deep medium textured and well drained soils. The soils are acidic in nature having dark reddish brown colour with gravelly sandy loam texture. This occurs in an area of 1216.49 ha. This is followed by Nedumangad series having a solumn thickness of 150 cm with very dark brown to pale brown colour. The soil is very strongly acid and has a surface texture of gravelly sandy clay loam to gravelly sandy clay. This is distributed in an area of 662.11 ha (21.87 %). The major low land series mapped in the area are Manickal and Vembayam which are alluvial in origin. Soils in more than one third of the watershed area (1236.55 ha) are moderately deep soils with a depth of 75- 100 cm and 36.11 % of the area (1094.15 ha) is having deep soils with a depth of 100- 150 cm. The major surface soil textures in the watershed area constitutes that of gravelly clay loam (1401.92 ha) and gravelly loam (542.78 ha) and clay (381.81 ha). Nearly 50 % of the watershed area is prone to moderate soil erosion and 943.69 ha is affected by severe erosion which calls for proper soil and water conservation measures in the area.