GEOLOGY

The project area falls in the geological division viz. Archean Crystalline rock. This comprises of Khondalite Group, Charnockite Group and Migmatite Group. The Khondalite Group is composed of Garnetiferousbiotite-sillimanite gneiss, with occasional bands of cale-granulite and quartzite. Charnockite are acidic to intermediate in composition. Irregular patches of Khondalite, veins of pegmatite and quartz are seen within the Charnockite. Pyronene granulite occurs within the Khondalite as thin discontinuous lenticular bands conformable to the foliation planes. Migmatite are evenly distributed in the major part of the area as narrow zones within Garnetiferoussillimanite gneiss. All these rocks are indicated by a number of dolerite dykes, but their distribution is restricted to the midland region. The tertiaries and the basement rocks of the midland are extensively laterised.

Reddish brown to buff colored vermicular to pisolite laterite is predominantly developed to the west of Thiruvananthapuram- Kottayam road. The thickness of laterite ranges from 5 to 8 m. Bauxite generally occurs on flat tops.Garnet- Biotite gneiss with migmatite is concentrated along the northern border of the area. A North West –South East stretching strip along Thengumukku, Muduvilla, Kallara area near Chullalam and a major area around Pullampara, Venjaramoodu, Manikkamangalam etc. GarnetiferousBiotite is scattered all over the block and mainly seen at the western part of the block near Mudakkal region.

More than half of the project area is under GarnetiferousBiotite and the remaining area is under Garnet - Biotite gneiss with Migmatite. Five major rock groups viz Basic rocks, Charnockite group of rocks, Khondalite group of rocks, Migmatite complex, sand and silt. The major groups are Migmatite complex (53.39%) and Khondalite group of rocks (43.44%).

The table showing the distribution of geology in the six watersheds are given below:

Table: Distribution of geological classes in watersheds

Geology	4V10a	4V11a	4V11b	4V25a	4V26a	4V29b	Area (in Ha)	%
Garnet-Biotite Gneiss with Migmatite	406.70		82.65	140.54	1696.59	1188.94	3515.42	44.02

Garnetiferous Biotite	1301.82	174.40	643.37	289.06	191.09	1840.09	4439.83	55.60
River	14.25	1.19		10.48	4.44		30.36	0.38
Total	**1722.77**	**175.59**	**726.02**	**440.08**	**1892.12**	**3029.03**	**7985.61**	**100.00**

GEOMORPHOLOGY

The thematic map on geomorphology revels that there are four geomorphological units in the project area. Terrain basement rocks like Khondalite and Migmatite has an undulating to rolling topography and is characterized by undulating spurs. Thick columns of laterite soils in the area supports the growth of coconut. A quantitative analysis of the ground water potential of these units are also made through interpretation of lineaments supported by necessary ground truth. The various geomorphological units identified in the project area and their spatial extent is given below:

Table: Distribution of geomorphological classes

Sl. No.	Geomorphological unit	Area (in ha)	Percentage (%)
1	Valley fill	631.44	7.91
2	Lower plateau- laterite	7097.42	88.88
3	Linear ridges	102.97	1.29
4	Residual mounts	123.42	1.55
5	River	30.36	0.38
Total		**7985.61**	**100.00**

The majority of the area is under Lower plateau laterite and its occupies an area of 7097.42 ha (88.88 % of the total geographical area) followed by valley fill with an area of 631.44 ha (7.91 % of total geographical area).

The table showing the distribution of geomorphology in the six watersheds are given below:

Table: Distribution of geomorphological classes in watersheds

Geomorphology	4V10a	4V11a	4V11b	4V25a	4V26a	4V29b
Valley Fill	145.54	2.66	54.99	15.50	71.19	341.56
Lower Plateau	1508.81	166.27	658.43	394.22	1739.54	2630.15
Linear Ridges	26.16	0.34	0.08	16.29	44.04	16.06
Residual Mount	28.01	5.13	12.52	3.59	32.91	41.26
River	14.25	1.19		10.48	4.44	
Total	**1722.77**	**175.59**	**726.02**	**440.08**	**1892.12**	**3029.03**