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## CHAPTER V

### DISCUSSION AND CONCLUSIONS

#### 5.1 GENERAL :

The present work includes the multiple view approach of remote sensing techniques which is followed by field checks to investigate geomorphological and geological environments of the area around Pishor of Kannad Taluka of Aurangabad District, Maharashtra. The lineament and geomorphological maps were prepared from IRS-1A satellite data of band 2 of scale 1 : 125,000, while drainage, geomorphological and geological map-s were prepared with the aerial photographs of scale 1 :50 ,000. The ITC symbols given by Verstappen and Van Zuidan (1968) are used to prepare these maps.

#### 5.2 REGIONAL STUDIES :

The small scale IRS-1A satellite image of band 2 of scale 1 : 125,000 provides synoptic view of the part of dissected areas of Deccan Trap plateau. This image was found to be helpful to distinguish three sub-units as highly dissected areas, moderately dissected and gently dissected

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areas. In addition to these sub- units, the landforms such as mesa, scrap, meandering river course and fracture lineaments have been recognised easily. The most common trend of fracture lineaments in the studied area is in the direction of East-West while the trends of other fracture lineaments is observed in NE - SW and NW - SE directions.

### 5.3 SIGNIFICANCE OF DIGITAL ANALYSIS :

The digital analysis of IRS-1A data of band 1 to 4 revealed that, the contrast and brightness on the FCC is improved to enhance the topography, landforms and agricultural fields. On this FCC, the three lava flows are distinctly discriminated. Such differentiation was not possible on monotonous single black and white image.

### 5.4 DETAILED MAPPING WITH AERIAL PHOTOGRAPHS :

The study of medium scale ( 1: 50,000) aerial photographs under mirror stereoscope provided three dimensional model of topography alongwith the portrayal of associated features such as drainage, land forms and lava flow units. The maps prepared are of significant to display drainage, landforms and lithological units.

#### 5.5 GEOMORPHOLOGICAL INVESTIGATIONS :

Drainage pattern, stream length, bifurcation ratio, stream length frequency parameters were used to study fluvial characters of the area under study.

The most common drainage pattern and landforms observed are the dendritic drainage pattern and mesa and butte landforms respectively. Both of these features are indicative of a part of flat lying layers with uniform lithology, which has been dissected by fluvial media. The area under study comprises of major two rivers namely Anjana and Purna. These are having meandering courses, and flows on the gently dissected area. The courses of these rivers constituted of deposition of alluvium with soil, silty soil, sand, pebbles from top to bottom.

The spatial resolution of satellite imagery is inadequate for delineation of drainage network which is easily demarcated by using aerial photographs. The average bifurcation ratio determined is 4.96, which reveals that the drainage network is not controlled by structure. The plot of log of total stream length of each order versus log

of stream order is concave downward indicate the headward erosion of streams of higher orders.

Although satellite imagery are not useful to demarcate smaller data of drainage network, it has its greatest geomorphological potential in analysing static phenomena. The integrated approach of remote sensing techniques by using both small scale satellite imagery and medium scale aerial photographs are found to be useful to study mega and micro geomorphic units shown in the table 5.1.

#### 5.6 FIELD STUDIES:

The field studies are carried out for ground truths of lineaments, slope, landforms, litho units, groundwater occurrence and sample collection. Field investigations indicated that the area under study is a part of Deccan Trap plateau which has been dissected to yield the present physiography. The various geomorphological features and lithological units interpreted by using satellite data and aerial photographs are found to be highly correlatable with observed terrain characters.

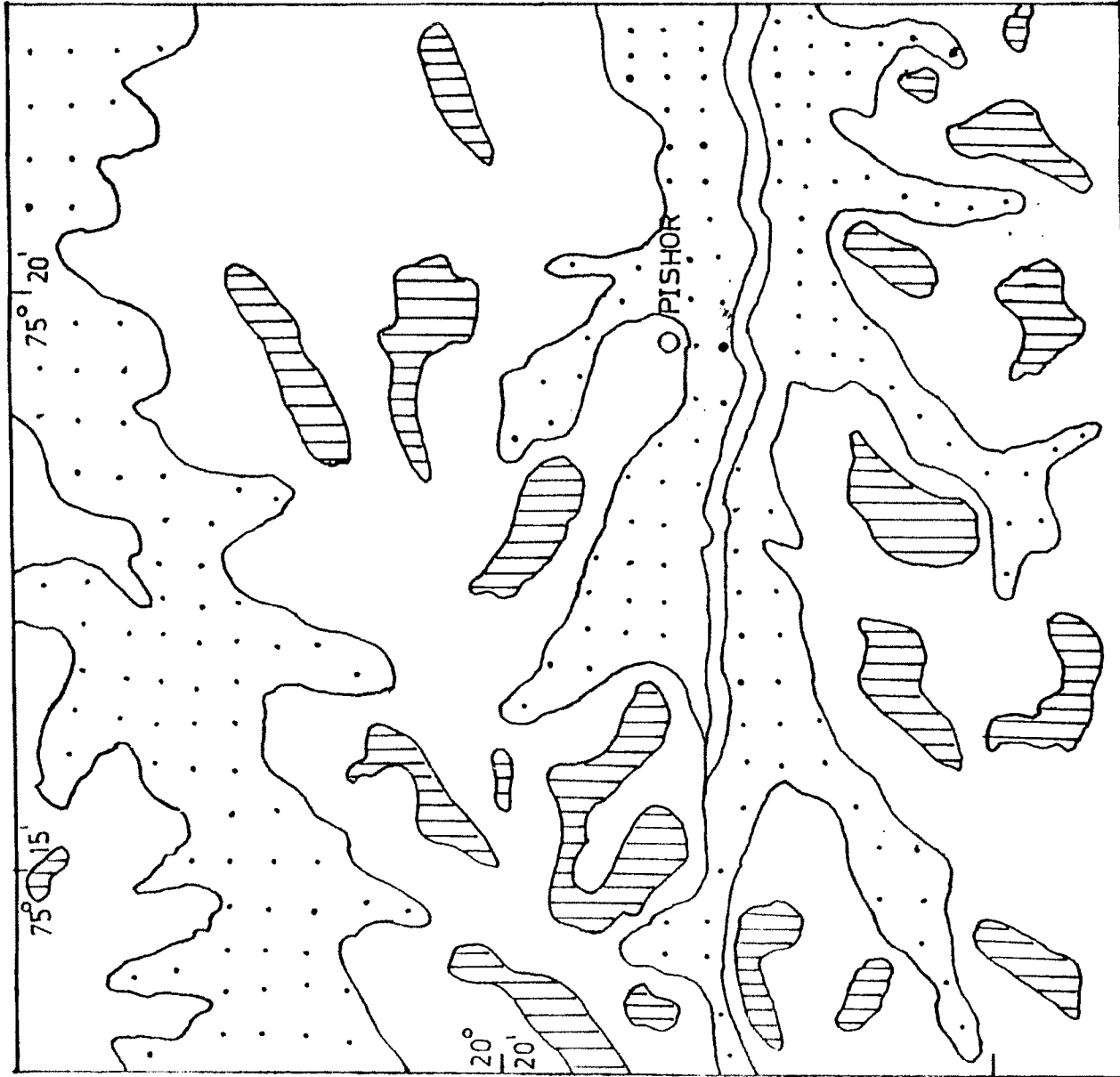
Table 5.1 : GEOMORPHIC FEATURES RECOGNISABLE ON IMAGES

I	Satellite Imagery	Macro units
	1. Regional features	Landforms of 2 <sup>nd</sup> order and their parts. Major physiographic units as hills, plain, ridge, water divider, river.
	2. Landforms	Complex land system assemblage as part of plateau.
	3. Landforms units	Landforms having distinct shapes as mesa, scarps, ridge, meanders etc.
II	Aerial photographs of medium scale	Micro units
	1. Land system	Area with definite landforms i.e. 3rd order landforms as mesa, butte scarp, ridges.
	2. Land catena	Group of smaller landforms i.e. 4th order landforms with vegetation, flood plain etc.
	3. Land facet	A distinct landforms unit with which vegetal cover is associated as river terraces.




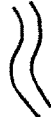
The area typically show steplike appearance, which is result of fluvial action on the parts of Deccan lava flow plateau. Each lava flow distinctly disposed in horizontal form and extend upto ten's of kilometers. The base of each lava flow is made up of massive basalt and graded into pink zeolitic or red beds. The pink zeolitic basalts and massive basalt ~~at~~ at places shows vesicular and amygdaloidal structures. These characteristics of lava flows are of Pahaehoe lava type. (Mac Donald, 1967).

#### 5.7 GROUND WATER POTENTIAL :

The digitally analysed contrast images such as the linear stretched FCC and aerial photographs are adequate to give the information regarding landforms of different orders. Such information has been used to prepare the ground water occurrence map in the studied area ( Fig. 5.1). The geomorphological map prepared by using FCC (Plate 2.5 and Fig. 2.4) and aerial photographs ( Fig 3.5) are brought to one scale by optical pentograph and the map of ground water occurrence is presented (Fig. 5.1). This map shows three zones of ground water occurrence as 1)poor ground water zone 2)moderate ground water zone and 3)Good to high ground water zone. The high ground water occurrence is located in the



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-  Good to high groundwater
-  Moderate groundwater
-  Poor groundwater
-  Anjan river

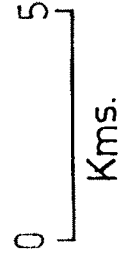


FIG 51 MAP SHOWING GROUNDWATER POTENTIAL ( Base Aerial photographs 1:50,000 and Digital data 1:25,000Scale )



area of flood plain and river terraces.

#### 5.8 CONCLUSIONS :

Based on the investigations carried out by using visual interpretation of satellite image, aerial photographs, digital analysis and field investigation the conclusions arrived are given below:

- 1) The small scale satellite images provides synoptic view of macro-geomorphological units, while aerial photographs are useful to recognise micro-geomorphological features.
- 2) The digitally analysed FCC image is most suitable to descriminate and delineate the lava flows than black and white image. The three distinct lava flows have been recognised.
- 3) The digitally analysed FCC and aerial photo-interpretation is useful to demarcate zones of ground water occurance. The area under study divided into three zones such as poor moderate and good to high ground water potentials.

- 4) Although digital data analysis and aerial photo-interpretation technique are adequate for mapping of geomorphological, geological and ground water occurrence. Field checks are essential for unrecognised features, to study smaller micro-features and to collect specimens.