CHAPTER VI

DATA SELECTION
Apart from this, notes, reports or papers' produced by previous workers (on this region and its problems) have also helped to understand the study area in terms of its floristic composition, problems, rural set-up etc.
The present day remote sensing data poses a unique problem due to its wide range - that of selecting the most suitable one for a particular study. The range of data available is so wide, that it is totally upto the objectives of the work and experience of the worker to choose the right kind of data.

Further, data selection does not involve data selection in terms of only spatial and spectral resolutions. It also involves:

1) Selection of right season of the imagery
2) Better quality data in terms of cloud-free cover and minimal signal to noise ratio
3) Appropriate scale (original)
4) Proper format compatible with photointerpretation instrument
5) Scanning of various photo-optical and digital enhancements
6) Spatial resolution
7) Proper selection of spectral band

All the points mentioned above have been studied thoroughly during the process of data selection and each one has been discussed.
6.1 SEASON OF IMAGERY

The phenological pattern of the grasses of this locality shows that the density of grasses varies from month to month. Maximum density is found during and just after monsoon. It decreases in winter months and is almost nil in summer.

Remote sensing data is most useful when there is an optimal contrast between the grassland and its background. Keeping this in mind, different seasons' data were scanned from all the available data.

Remotely sensed data (especially one in visible or near infrared region of EMR) of rainy season viz. from June to September is not very useful as the sky is overcast with clouds.

Monsoon comprises of a few irregular and scattered showers from June to September.

Immediately after the first few showers, the seedlings of the annual and perennial grasses start fresh vegetative growth and grasses dry out by the end of December. Annuals flower in June-July. Perennial grasses flower a little later, i.e. in September/October and flowering continues till February. They then survive during the long, hot and
dry season due to deep rooting and formation of rhyzomatous undergrowth. Such perennial grasses are Desmotachya bipinnata, Sporobolus helvolus, Cenchrus biflorus and Dicanthium annulatum.

Based on such observations, imageries of different seasons were scanned and it was found that September/October imageries should be most suitable for this study. Since discrimination of palatable and salt tolerant grasses; pure and mixed Prosopis and different salinity areas was quite clear.

However, April-May imageries can give good information on Prosopis proliferation and salinity as there is almost no grass during that time. Fig. 16 shows comparison of two FCCs.

6.2 SPECTRAL BAND SELECTION

Vegetation is one resource which directly or indirectly provides information on various land conditions. A lot of studies have been made for studying spectral signature pattern for different kinds of vegetation. Workers who have contributed substantially for the selection of spectral bands for monitoring vegetation are, Gansman et al., (1973); Kondratyev, et al. (1973); Miller, L.D. (1976); Col. Vo Coresses (1977) and Tucker C.U. (1978).
Fig. 16 Comparision of two FCCs - summer and post-monsoon
In general, the following bands are found suitable for vegetation studies:

<table>
<thead>
<tr>
<th>Sr.No.</th>
<th>Spectral band</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>0.35-0.50 um</td>
<td>Strong chlorophyll absorption</td>
</tr>
<tr>
<td></td>
<td></td>
<td>carotenoid sensitive</td>
</tr>
<tr>
<td>2.</td>
<td>0.50-0.62 um</td>
<td>High reflectance</td>
</tr>
<tr>
<td>3.</td>
<td>0.62-0.70 um</td>
<td>Strong chlorophyll absorption</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(direct chlorophyll sensitivity)</td>
</tr>
</tbody>
</table>

6.3 SPATIAL RESOLUTION

For the grassland mapping of Banni three types of remote sensing data with different spatial resolution were used IRS-1A LISS II data with spatial resolution of 36.25 m, Landsat MSS data with 79 m (coarse) and Landsat TM data with spatial resolution of 30 m.

IRS-LISS II kind of resolution seems to be fair enough for the classification adopted. However, higher resolution data expected from IRS-1C would help in Level III classification effectively.

Fig. 17 shows relationship between the level of details required and the spatial resolution of various remote sensing systems for vegetation inventories.
Fig. 17 Relationship between the level of details required and the spatial resolution of various remote sensing systems for vegetation inventories

6.4 ORIGINAL SCALE AND FORMAT

In order to finalize the image interpretation instruments to be used, original scale and format are very important. Remote sensing data is received in various scales and formats.

Landsat MSS data generally comes (for users) in 23 cm x 23 cm format at 1:1 million scale. This would mean that one needs 20x magnification to achieve 1:50,000 scale. In order to get these mapping scales, there are 20 or 3 alternatives:

i) To get 1:50,000 (or 1:63,360) scale paper prints,
ii) Laboratory, equipped with an enlarger which can take 23 cm format diapositive having variable magnification or
iii) A small contact negative and subsequent diapositive of study are to be made to reduce the film format in order to use normal enlarger.

This process involves 2-3 generation of photographic products and hence quality of image degrades at every step.

For the present study following scales and formats were used

<table>
<thead>
<tr>
<th>Sr.No.</th>
<th>Data</th>
<th>Format (cm)</th>
<th>Scale</th>
<th>Enlarger</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Landsat MSS</td>
<td>23 x 23</td>
<td>1:1 million</td>
<td>LFOE, HME</td>
</tr>
<tr>
<td>2</td>
<td>Landsat TM</td>
<td>23 x 23</td>
<td>1:1 million</td>
<td>LFOE, HME</td>
</tr>
<tr>
<td>3</td>
<td>RS-1A LISS II</td>
<td>24 x 24</td>
<td>1:500,000</td>
<td>LFOE, HME</td>
</tr>
</tbody>
</table>
Enhancements of normal imageries are essentially required to help the interpreters for reading the imagery in an easy way. There is one kind of variables which remote sensors can increase directly, without having to use other surrogate or ancillary data. Then, there is a second general group of variables that may be remotely sensed. These are hybrid variables created by systematically analysing more than one biophysical variable. For example, plant’s chlorophyll absorption characteristic, its temperature and moisture content. Majority of such biophysical and other information lies hidden or dormant, waiting to be extracted. Various enhancements help in formulating the image interpretation key. Enhancement techniques fall under two major groups:

i. Photo-optical Enhancements

This constitutes of various techniques like Diazo (which includes FCC, Hybrid ratio, contract enhancement, change detention, etc.). Additive colour viewing, density slicing colour composites and enlargements FCCs (False Colour Composites) were extensively used during the course of this study.
ii. Digital Enhancements

There are certain thresholds beyond which the human interpreter cannot detect just noticeable differences in the imagery. Visual interpreter can discriminate only about 8 to 16 shades of grey. If the data were originally recorded with 256 shades of grey, there may be more subtle information present in the images than the interpreter can extract visually. In digital enhancement, algorithms are applied to remotely sensed data to improve the appearance of an image for human visual analysis and occasionally for subsequent machine analysis.

Different digital enhancements are explained in detail under the chapter methodology.