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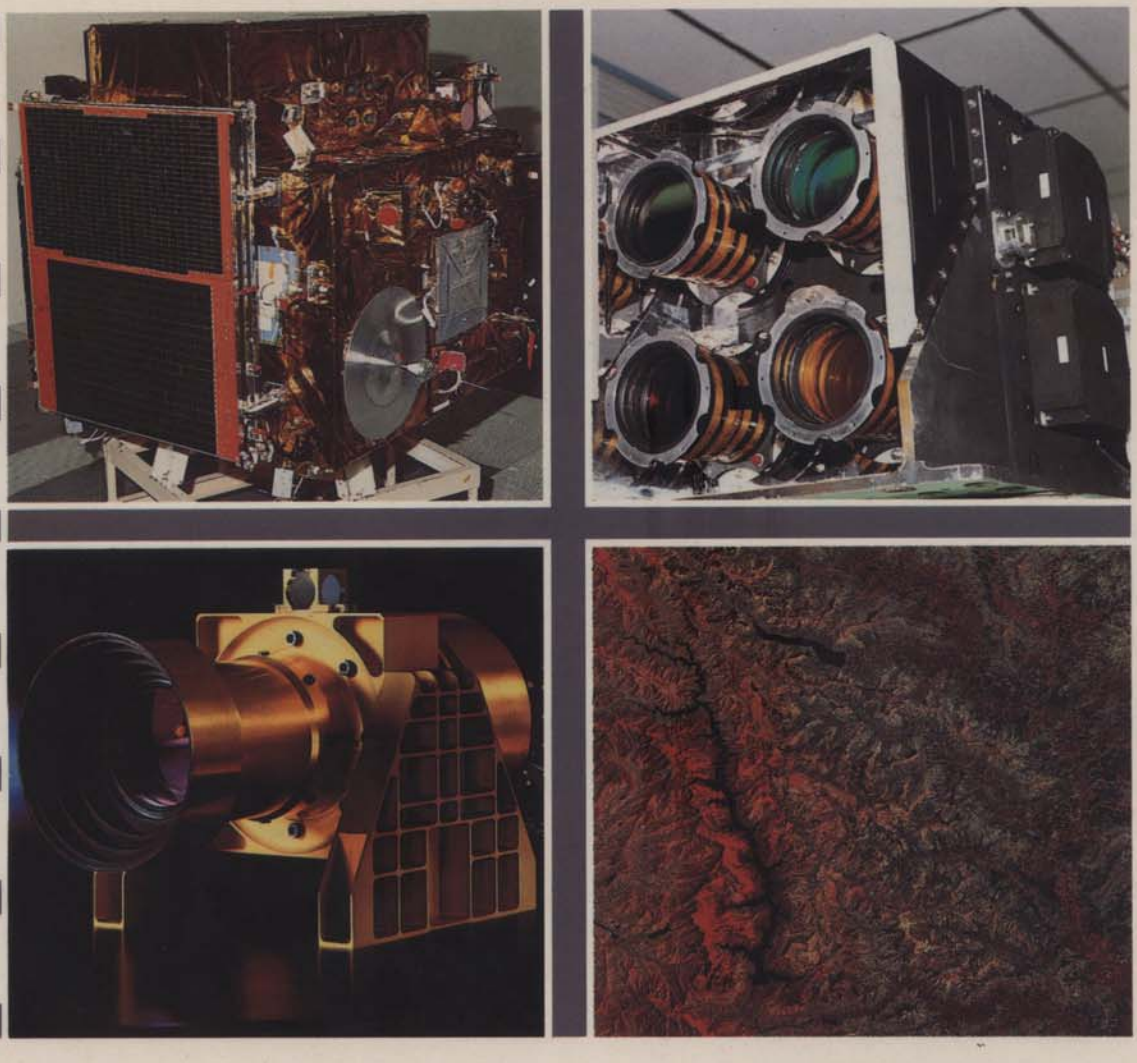

NATIONAL NATURAL RESOURCES MANAGEMENT SYSTEM
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SATELLITE EVALUATION OF CURRENT STATUS OF IRRIGATION MANAGEMENT IN RAJOLIBANDA DIVERSION SCHEME COMMAND, MAHABOOBNAGAR DISTRICT, AP

1. Introduction

This article presents the results of a study using satellite remote sensing techniques to evaluate the current status of canal system performance in terms of the spatial and temporal mismatch between water requirement and water releases within the command area.

The Rajolibanda Diversion Scheme (RDS) is the only operational major irrigation project in the drought prone district of Mahaboobnagar in Andhra Pradesh. It is an inter-state project between Karnataka and Andhra Pradesh which comprises of an anicut constructed in Karnataka in 1955 across river Thungabhadra and a 143 km long left bank main canal. The initial 42.6 km of the canal lies in Karnataka consisting of 12 distributaries and serves an localised ayacut of 2739 ha. In Andhra Pradesh, the latter stretch of the main canal consists of distributaries 12A to 40, is localised to serve an ayacut of 35,410 ha. of which 14,215 ha. during kharif season, 19,332 ha. during rabi season and 1,863 ha. of perennial crops.

2. Status of Irrigated Cropping

The study area is covered in IRS LISS-II B2 subscene (Path-26; Row-57). The actual cropping patterns in RDS command for the rabi 1990-91, kharif 1991, rabi 1991-92, kharif 1992 and rabi 1992-93 seasons have been visually identified from the corresponding cloud free geometrically corrected false colour composites (FCC). Figure-1 shows FCC (IRS LISS-II data of 21 October 1992) of the RDS command area during kharif 1992 season. The corresponding wet and irrigated dry crop maps have been prepared in 1:50,000 scale. Verification of crop classification has also been conducted in near real-time for the rabi 1991-92, kharif 1992 and rabi 1992-93 seasons in association with the RDS field authorities. The corresponding acreages under irrigated wet and dry crops have also been estimated and submitted to the field authorities within 15 days of acquiring the satellite data. The information given by NRSA for kharif 1992 was used by RDS field authorities for further irrigation scheduling in the kharif season, as well as in the Irrigation

Fig. 1 : FCC (IRS LISS-II data of 21 October 1992) of the RDS command area during kharif 1992 season

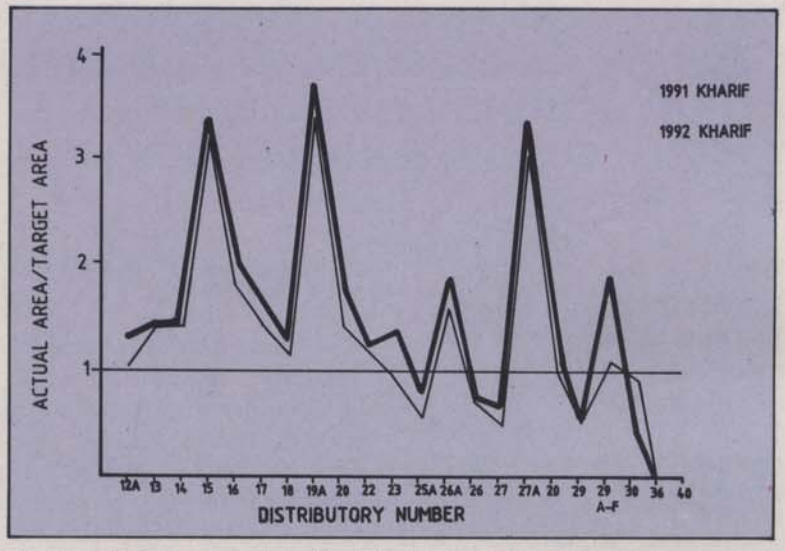

Fig. 2 : Distributary-wise irrigation intensities in RDS command

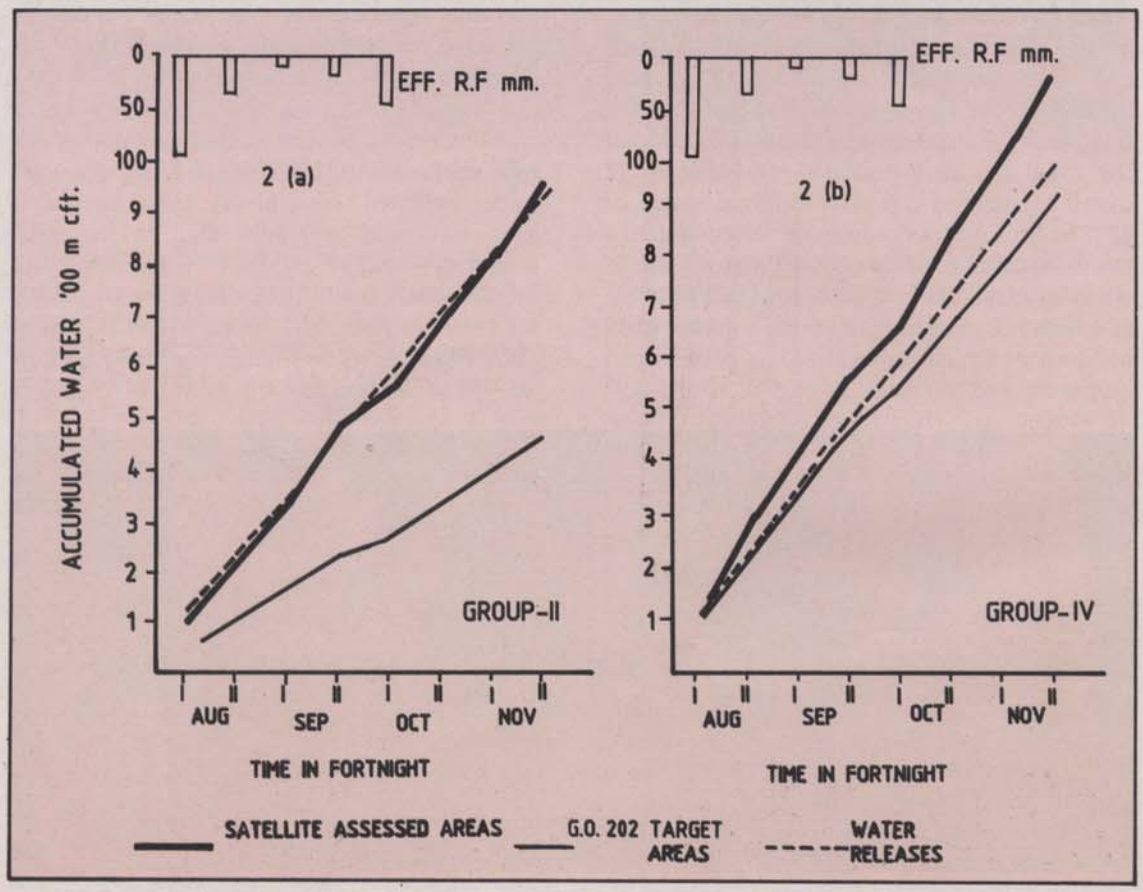

Fig. 3 : Comparison of fortnightly cumulative water requirements and water releases during kharif 1992

Development Board (IDB) meeting for localising for the ensuing rabi 1992-93 season in the command.

- During kharif, the recommended wet crop cultivation targets are not only attained but it is seen that considerable unauthorised wet ayacut is developed at the cost of reduced tail end dry crop cultivation.

- Paddy crop cultivation is to be prevented during rabi seasons. However, considerable paddy crop cultivation is noticed and shows an increase from 1990 to 1992.

- The inequitable distribution of irrigation water has resulted in decreasing irrigation intensities towards tail end distributaries as shown in Figure-2.

- Field reports of distributary-wise crop acreages are significantly underestimated.

3. Status of Irrigation Water Demand and Water Supply

An analytical study has been conducted (for kharif 1991 and 1992 seasons) to see how the irrigation demands have been addressed by water releases. The daily main canal discharges (at various locations), the daily distributary-wise discharges, the daily rainfall data in the command and the crop acreages estimated from the corresponding satellite imagery have been used for this purpose. Irrigation demands by the standing crops have been computed after taking into account crop water requirements, field application and conveyance efficiencies and effective rainfall.

The field reports of daily distributary-wise discharge data have been found inconsistent. Hence distributaries were merged into five groups as per the gauge locations along the main canal, and the main canal discharges at these locations were considered for estimating releases in the distributary groups.

It is observed that during kharif 1991, water requirements for satellite assessed areas matched well with water releases for distributary groups 3 and 4, and there was excess supply in case of the remaining distributary groups. During kharif 1992, water requirements for satellite assessed areas have good correspondence with water releases for distributary groups 1, 2 and 5, and there was deficit in supply for the other distributary groups.

For illustration purpose, Figure-3 (a) & (b) are given to depict the comparison between fortnightly cumulative water requirements and water releases for distributary groups 2 and 4 during kharif 1992 season. Figure-3(a) shows that the actual water releases match better with the water requirements computed from the satellite assessed areas than with those from the localised acreages (as per GO 202). Although similar observation can be made from Figure-3(b), water releases fall short of the irrigation water demands.

It can be seen that the temporal and spatial distribution of water supply in the command is adequate to meet the water requirements of the existing cropping pattern (which exists only upto distributary No.30) wherein the cultivated areas far exceed the localised areas. However, unless the recommended cropping pattern is strictly implemented, there is no possibility of significant saving of water and diverting to the tail end distributaries (which hitherto haven't received water during kharif 1991 and 1992, i.e., to distributaries 36 and 40). It is seen that satellite remote sensing techniques are useful in diagnostic assessment and improvement of the canal system performance in command areas.

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