Indian Society of Remote Sensing
Ahmedabad Chapter

NEWS LETTER

Vol. 2 No. 4 and Vol. 3 No. 1 01 January, 1989

Dear Members,

We now have for you another issue of the newsletter - a combined fourth issue of 1988 and first issue of 1989. And we start with a note of apology - delays, delays, delays and sorry, sorry, sorry. But we will offer no reasons and justifications and let matters be. You know, we now realise bringing out a newsletter (and that too on time) is quite a tough Job. But so what, we are here to do that tough job and if we trip we are ready to face the brickbats. But we have just one small appeal - do send in a "bouquet" sometime. We shall hold it amongst the "brickbats" and carry on our job.

Since the last time we wrote to you there have been some developments. The chapter had its Annual General Body Meeting and some very pertinent issues were disscussed. From the Secretary's report (excerpts are there in this issue), you will realise that the chapter has been going from strength to strength and most important that we are an **ACTIVE** chapter (just look at all the activities that have been accomplished). We shall bring to you the details of the AGM in the next issue. You will also find a report on the second Laximinarayan Calla Memorial Lecture, which was delivered by Shri P A Raj, Vice-Chairman and Managing Directo of Sardar Sarovar Nigam on the Sardar Sarovar Project. He calls it the " Lifeline of Gujarat" and we are sure it will be so.

We also met Shri J F Mistry, Secretary Water Resources Department in the Government of Gujarat. The interview with him is the main content of this issue.

There is always a funny part in the things we do and so you will find out in this issue under a new section **"REMOTE HUMOUR"** (look out for more in the subsequent issues). These have been contributed by Dr S D Naik, Space Applications Centre and we would welcome contribution from others too.

Lastly, we shall be missing the services of Shri V Tamilarsan, who was the editor uptill now. He has opted himself out from the comittee because of health reasons. He set the pace for the newsletter activity with a determination which we hope we can match. We shall miss him in the committe. We now have two new members in the editorial committee - Shri J K Garg of Space Application Centre and D M Pancholi of Central Designs Organisation, Gandhinagar.

- Editor

EXCERPTS FROM ANNUAL REPORT

The Annual General Body of the Chapter meeting was held on 30 December, 1988. The annual report was **presented by the Secretary and excepts from the** report are given below.

Against a total membership of 150 in 1987, the total membership of the Chapter is now 154. The main feature of the membership drive this year was a marked increase in the life membership. Many members have now become life members.

The Council met five times to transact the business of the Chapter.

Two popular lectures on **Indian Remote Sensing Satellite System and Utilisation** were organised to mark the successful launching of the IRS-IA satellite on April 9, 1988 at the Tagore Hall, Ahmedabad. The lectures were delivered by Dr. George Joseph, Deputy Director,(Remote Sensing) and Dr. Baldev Sahai, Group Director, Remote Sensing Application Group, Space Applications Centre. The function was attended by about 300 persons.

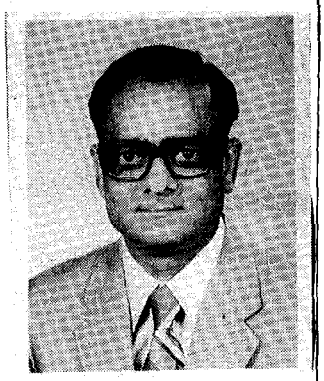
Second Laxminarayan Calla memorial Lecture was delivered by Shri P A Raj on **Sardar Sarovar Project - A Lifeline of Gujarat** on Decmeber 30, 1988, i.e. today. (Details are presented elsewhere in the newsletter).

A one day seminar on **Remote Sensing Activities in Gujarat** was organised on October 22, 1988 at GERI. Vadodara. The seminar was hosted by Gujarat Engineering Research Institute, Vadodara and was sponsored by Gujarat Council on Science and Technology, Gandhinagar. (Details of the seminar is given in the mewsletter)

This year three issues of the Newsletter were published. The last issue got delayed and now it is prosposed to be published along with the first issue of 1989.

The proceedings of SOARS symposium has been published. The publication of **Gujarat from Space** could not be commpleted due to pre-occupation of the scientists. We hope to complete this next year.

INTERVIEW



Shri Jekishan Fakirbhai Mistry, Secretary to the Government of Gujarat, Water Resources Department is a well known engineer and administrator in the field of Irrigation and Water Resources Development. Shri Mistry's achievements encompass a wide horizon which include hydrology, water resources planning and investigation, research and design, construction of dams, dam safety, drought management and water management. Shri Mistry is also responsible for initiating modern methods and techniques for data collection in the field of water management. His pioneering contributions in these fields have fetched him many laurels in the form of awards and positions in national and international forums. He has written more than 115 research papers. He has also taken keen interest in manpower development and many engineers of the GOG have benefitted from his active role in the civil engineering of the state. As a person, Shri Mistry is dynamic and frank. He readily agreed for the interview inspite of his busy schedule. The Newsletter team met Shri J F Mistry at his residence in Gandhinagar and spent more than an hour discussing various issues.

Q. What are the problems of Gujarat related to natural resources from the overall developmental point of view?

A. Speaking of problems of Gujarat, I can certainly elucidate those which are concerned with irrigation and water. Other problems of minerals/geology etc., I am not an expert at. But I gather that the respective departments are looking into them and in many instances they have taken recourse to remote sensing techniques.

I feel that the major problems, with respect to irrigation and water, are the following:

i) It is well known that Gujarat is short of sweet water. Even though the state has a good amount of ground water, we are considerably short of surface water.

ii) One other problem in the state is the "Ghed" area near Porbandar in Saurashtra where 550 square miles of ground area is virtually flat and there is no drainage. When it rains, the entire area gets inundated -almost completely. As a result for almost 8-9 months in a year nothing grows at all.

iii) Another problem which is now plaguing Gujarat is the waterlogging in the command area of existing irrigation systems like Ukai-Kakrapar, Mahi-Kadana, Fatehwadi and old projects in Saurashtra - Shetrunji, Bhadar etc. The water-logging problems are mainly because of ignorance, of irrigation practices, on the part of the farmers who utilise the irrigation systems and also on the part of the government officials who are supposed to upkeep the systems. The farmers draw out huge quantities of water assuming that the officials would not release water when they need it. Because of the drawing of more water than what is required the areas get waterlogged. As a result, the GW table gets raised adding to the logging problem. This also brings the salts on the surface and ultimately we are faced with the additional problem of salinity in these areas.

iv) Another major problem in Gujarat is the existence of vast tracks of saline lands. We have four types of saline lands. The salinity ingress in the Saurashtra and Kachchh coast are well known. Here the excessive pumping and usage of saline water from the wells has caused the soils to go saline. The wells are having saline water because they are all in the cavernous miliolite limestone, which extends into the sea also and, thus, the sea water has transgressed through these formations from the sea to the main land and ultimately to the wells. Another factor here is that the excessive and rampant pumping out of water has lowered the sweet water table below the sea water level.

Salinity also occurs in the land under tidal ingress which is a slow process and renders the soil saline and useless for agriculture. With a vast coastline, almost 3,00,000 hectares is getting affected by this phenomena.

Moreover, we have the inherent saline soils of Gujarat. The coastal area from Valsad to Bhavnagar - almost 10,00,000 hectares - is having inherent salinity. This area was completely under the sea in the past and now the sea has retarded and we are left with the highly saline soils.

v) Wasteland is the another problem in Gujarat. We have 11 districts in Gujarat which have got more than 15% of the district area under wasteland category.

vi) One more area where we have been concentrating is in the rivers along the South Gujarat coast. We have seen the change of the course of the river Mahi which posed a problem to the power station at Dhuvaran. The Gujarat Electricity Board (GEB) had to costruct dykes, diaphragms etc. to save the power station because of the shift of the Mahi course. Actually, more than the change in the course it was the tidal conditions in the estuary that was of concern.

Q. How have you overcome these problems and where really the contributions from the remote sensing have helped in solving these problems?

A. In the inventorying of surface water, we have rightly taken on the job of making a detailed survey/inventory of surface water resources - mainly the river systems. We have now a network of river gauging stations for measuring the sediment load in the rivers - almost about 200 stations are working right now and accurately measuring the water and the sediment load that is flowing in the rivers.

GW exploration is another area where we have

Q. What is your opinion on the Newsletter?

A. I should say it is very good. I have a few suggestions and that is that the listing of members should be done once at the end of the year rather than printing addendums to the list in every issue. The contributions from different agencies on their application of remote sensing techniques could be increased. I feel that there should be a feature on possible application of remote sensing in every issue. You see, we may tend to forget because of our limited involvement, but if it is "hammered-away" may be it will make more impact.

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Shri J F Mistry, **CONGRATULATIONS!**

Shri J.F. Mistry was joint recipient of the **BHARAT SINGH AWARD** for the year 1987. This was awarded to him for his meritorious contributions in the field of HYDROLOGY. His contributions for organising and promoting activities in hydrology - through his relentless efforts in the state of Gujarat have been recognised. The award is instituted by the National Institute of Hydrology, Roorkee through an endowment amount provided by M/s. Hoysala Group of companies, Bangalore. The award carries a sum of Rs. 5,000/-, a certificate and a citation. Shri Mistry is currently Secretary to the Government of Gujarat, Water Resources Department, Gandhinagar. **CONGARATULATIONS, Shri Mistry!**

In the photograph (opposite) Shri Mistry is seen receiving the award.

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SEMINAR ON REMOTE SENSING ACTIVITIES IN GUJARAT

A seminar on "Remote Sensing Activities in Gujarat" was organised at Gujarat Engineering Research Institute (GERI), Vadodara on October 22, 1988 jointly by GERI and ISRS Ahmedabad Chapter. About 200 delegates from various agencies of state and central governments participated in the seminar.

In his inaugural address, Shri P P Kale, Director, Space Applicaltions Centre emphasised the commitment of ISRO in offering continuity of remote sensing satellite services and also further upgradations in the future systems. He called upon the applications scientists to take up the challenge of developing matching applications packages to deal with the full potential of remote sensing data.

Shri J F Mistry, Secretary, Water Resources Department, Government of Gujarat emphasised the need for establishing a full-fledged autonomous centre for application of remote sensing technology. In his Presidential address, Shri Mistry presented a brief overview of problem areas of the state, the current and future role of remote sensing in solving some of these problems and felt the need for holding such seminars in various parts of the state .

In his keynote address, Dr Baldev Sahai spoke on the various remote sensing applications carried out jointly by SAC and state agencies of Gujarat. Dr Baldev Sahai highlighted the success story of Ground Water Targetting during the recent drought year and also the mapping of wastelands. Giving an overview of various applications, he mentioned the achievements of remote sensing in monitoring ecological changes in the marine national park, forest mapping in Dangs, water logging and salinity studies in command areas, urban sprawl of Ahmedabad and agriculture related studies.

Dr. N B Desai, Director GERI welcomed the delegates.

Scientists from Space Applications Centre and state agencies presented case studies on use of remote sensing techniques in solving the problems related to various natural resources of the state. Delegates took active part in the discussions at the end of each presentation.

A brief account of Chapter activities was presented by Dr. T A Hariharan, Chairman, ISRS Ahmedabad Chapter. Dr. B B Jambusaria proposed the vote of thanks.

A proceeding of the deliberation of the seminar is to be brought out shortly.

WORKSHOP ON CROP YIELD MODELLING

A two-day workshop on "Crop Yield Modelling" was organised at the Space Applications Centre, Ahmedabad during July 27-28, 1988 to critically examine various approaches to yield estimation currently in use and to see if integration of inputs from remotely sensed data in some of these approaches can be attempted to improve the accuracy and timeliness of crop yield predictions. Scientists from leading organisations engaged in agricultural research like India Meteorological Department (IMD), Indian Agricultural Research Institute (IARI), Indian Agricultural Statistics Research Institute (IASRI), ICRISAT, Universities etc. as well as members of crop related projects working at the Space Applications Centre participated in the workshop.

To ensure uninhibited discussion on various problems related to operationalisation of remote sensing based crop yield modelling, the workshop was organised as a 'brain storming' forum. So the emphasis was on discussions and exchange of views instead of the usual ritual of presenting paper in quick succession. There were five technical sessions covering physiological parameters, agrometeorological aspects, meteorological yield models, inputs from remote sensing and the concluding session. Each session featured a lead paper by an eminent authority to highlight the state of the art and set the pace for discussions.

Some of the recommendations for future course of action in the country which emerged after the conclusion of workshop are as follows:-

1. IMD may take up an experimental trial of their model in an agroclimatic zone and also explore the possibility of incorporating vegetation index derived from NOAA data instead of technological trend terms used in IMD models.

2. Meteorological data be made available freely and liberally to research organisations, and their cost, if any underwritten by DST under Agromet Project.

3. Existing growth simulation models for wheat available with Water Technology Centre, IARI, may be studied and possibility of inclusion of remote sensing informations in the model be explored.

4. Possibility of using previous-year remotely sensed data for stratification for choosing crop cutting sites by the Director of Economics and Statistical should be explored in combination with agroclimatic zoning.

5. Possibility of using remotely sensed data in the ICRICSAT Sorghum model be explored.

6. For creating a wider national data base in the country, ICAR's All India Coordinated Project on Agrometeorology is recommended to include spectral measurements on crops in additions to the ongoing programme of measurements.

An extremely well-compiled bibliography on crop yield estimation distributed at the workshop won a word of praise.

For further information in this context, please contact Dr. R R Navalgund, Head, LRS/RSAG/ Remote **Sensing Area, Space Applications Centre, Ahmedabad** 380 053.

SECOND LAXMINARAYAN CALLA MEMORIAL LECTURE

The second Laxminarayan Calla Memorial lecture was delivered by Shri P A Raj, Vice-chairman & Managing Director of the Sardar Sarovar Nigam. Shri Raj delivered a talk on "Sardar Sarovar Project - A Lifeline of Gujarat."

The measures taken by the State Government to sort out the environmental issue in the areas affected owing to construction of Narmada dam were outlined by Shri P A Raj.

He said 19,386 hectares of the total 27,184 hectares of the cachment area brought under treatment had so far been identified for taking priority measures. The soil and moisture conservation works, which were undertaken as part of the measures, comprise nala bunding and fence building for protection against biotic interference. The fence building would be in the form of either trench-cum-line hedge or stone wall. The catchment treatment measures in 5,483 hectares of non-forest lands had also been planned. Soil conservation steps would have counter bunding, terracing, nala plugging, pasture development and afforestation. A systematic programme for implementing this has also been chalked out.

Referring to compensatory afforestation, Mr. Raj said under the guidelines of Government of India it had been decided to raise compensatory forests in no-forest areas of 4,650 hectares in nine villages of Kachchh district in lieu of the forest lands diverted for the project. The forest area required and allowed to be diverted for the project was 4,523 hectares. Moreover, 12,729 hectares of degraded forest lands would be afforested in the compensatory afforestation programme. There would be in all afforestation of 235 hecters in the vicinity of the dam. The implementation programme is spread over a period of five years, including a year of advance preparation. Planting and nursery would be done from the second and third year, he added. The State Government has recently taken a decision to spare all Government wastelands for development of forests to the Sardar Sarovar Nigam.

The limits of the existing wildlife sanctuary - Soolpaneshwar Sanctuary - had been extended up to the reservoir shore line to provide free access to water for animals, increasing total area of the sanctuary to about 447 square km. With fencing and other conservation measures, the area would in fact become a rich medium for preservation and protection of flora and fauna. Similarly other sanctuaries in the project's command area would also be benefitted.

Allaying fears about spread of diseases like malaria, scabies, dysentery and diarrhoea owing to the project, Mr. Raj said availability of ample fresh water after the impoundment would improve the hygienic habits of the people, minimising the incidence of scabies, dysentery and diarrhoea. Most of the health problems here were related to bad sanitation, which would not be the case now.

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CONGRATULATIONS Dr. Baldev Sahai and Dr. Ajai!

The Fertilizer Association of India has given an award to Dr. Baldev Sahai and Dr. Ajai, in the discipline of agricultural sciences (1987-88), for their article titled **Applications of Remote Sensing Techniques in Agriculture** published in **Fertilizer News.** Our heartiest congralutations to Dr. Sahai and Dr. Ajai.

ECOLOGICAL CHANGES IN THE MARINE NATIONAL PARK

Multidate satellite data were used to assess the ecological changes that have occurred during 1975-88 period in the part of the Marine National Park (285 sq kms) situated near Sikka in the Gulf of Kacchh. Visual analysis of satellite data for the years 1975, 1982, 1985 and 1988 was carried out at 1:50,000 scale. It was observed that the coral reef area which was 116 sq km during 1975 and 83 sq kms during 1982 reduced to 53 sq kms during 1982-85 period. The mangroves decined from 138 sq kms during 1975 to 50 sq kms during 1982 to only 33 sq kms during 1985. In 1988 the area occupied by mangroves increased to 47 sq kms.

The reason for the degradation of coral reefs is due to the deposition of mud over the reef area - thus converting them into mud flats. The decline in mangroves was due to their use as fuel and fodder by the inhabitants. Till 1985, the rate of degradation in coral reefs, as well as mangroves, could not be reversed or even halted even though the area was declared as a National park. However, the coral reefs and the mangroves of the National park have shown significant improvement from 1985 to 1988 - observed as a markrd increase in their areas. This could be because of the preventive measures taken by the authorities.

From the satellite data analysis the areas of various Wetland Categories in and around Sikka are shown in Table - 1.

The rate of change in the mangroves and coral reefs over a thirteen year period is shown in Table - 2.

For more details on this study, contact Dr S R Nayak, MWRD/RSA, Space Applications Centre, Ahmedabad - 380053.

Table - 1

(Area in Sq km)

Categories	1975	1982	1985	1988	Change (Sq km)	Change (%)
Mudflats	7.7	125.6	163.2	116.10	108.4	+1407.79
Coral Reef	116.6	83.6	53.1	77.69	38.91	-33.37
Mangroves	138.5	50.0	33.4	47.65	90.85	-65.59
Dense	58.4	21.8	23.4	29.47	28.93	-47.53
Sparse	80.1	28.2	10.0	18.18	61.92	-77.30
Salt Pans	8.4	13.7	17.5	17.6	9.2	+109.52

Table - 2

Components	Annual Rate of Change in %		
	1975-82	1982-85	1985-88
Mangroves	-9.13	-11.1	+14.22
Coral Reefs	-4.04	-12.16	+15.43

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NEWS FROM GEER FOUNDATION

The Gujarat Ecological Education and Research Foundation, Gandhinagar has set up some facilities for analysing remotely sensed data. Some information on the foundation's activities are given below:

1. PROCOM-2 has been installed in the premises of the GEER Foundation at GB-11, Sector-9, Gandhinagar. Any member of the society would be welcome to take the advantage of this instrument for interpreting the satellite data they desire to do.

2. GEER Foundation has also undertaken a research project on ecological aspects of industrialisation and urban spread between Ahmedabad and Vapi region of Gujarat State. The main thrust of this project will be to study the changes in the landuse over a period of 10 years using the satellite data. This information will be compiled along with the information of air and water status in this region for bringing out the total ecological changes in the region due to urbanisation and industrialisation during the last 10 years.

For more details on the above contact Director, GEER Foundation, GB-11 Sector-9, Gandhinagar - 382009.

NOW AVAILABLE

Proceedings of the Symposium on **Remote Sensing in Agriculture**, Ahmedabad, February 27-28, 1988.

Edited by Baldev Sahai, Space Applications Centre, Ahmedabad

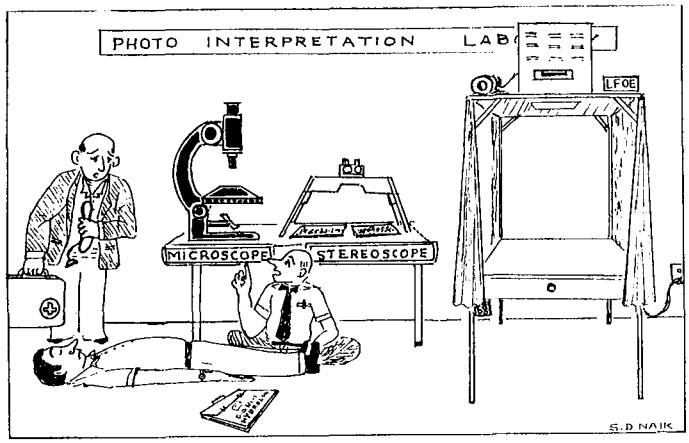
The proceedings contains articles on Sensors; Data Products and Information Systems; Crop Production, Yield Modelling and Crop Stress; Land Use and Land Degradation; Soil Mapping and Soil Moisture and a report on the panel discussion on Development and Management of Agricultural Resources in Gujarat

The cost of the proceedings is Rs. 200/-.

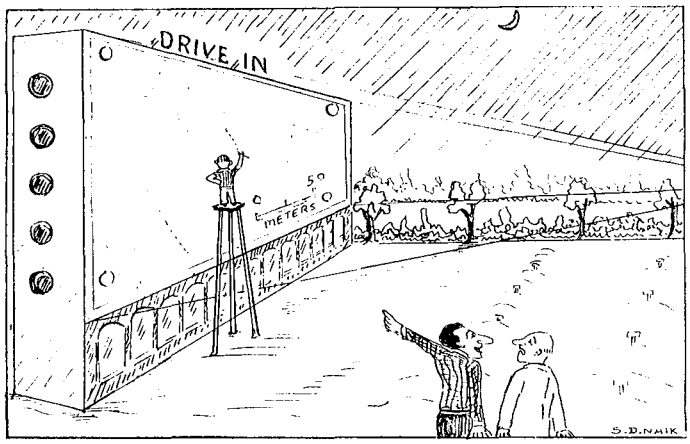
Orders may be placed with The Secretary, ISRS Ahmedabad Chapter, C/o. Remote Sensing Area, Space Applications Centre, Ahmedabad. The money may be sent through MO/Cheque/DD in favour of ISRS-Ahmedabad Chapter payable at Ahmedabad. Outstation cheque should include Rs. 6/- towards bank charges.

Members of the Indian Society of Remote Sensing can buy a copy of the proceedings for their personal use by payment of Rs. 50/- (plus postal charges).

REMOTE HUMOUR



I simply told him that this equipment we have procured for Micro-watershed studies from Landsat imagery



Whenever High Magnification Enlarger (HME) goes out of order he comes here for image interpretation

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BOOK POST

If undeliverd, return to:
Secretary,
ISRS-Amedabad Chapter
c/o Space Application Centre
Ahmedabad - 380 053

Edited by : R P Dubey, Mukund Rao, J K Garg, Space Applications Centre, Ahmedabad - 380 053
D M Pancholi, Central Designs Organisation, Gandhinagar.

Printed at : Library, Space Applications Centre, Ahmedabad - 380 053.

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done quite a good job. For quite some time we had been using the ground based methods - mainly drilling - to estimate the water availability. But from the last 2-3 years, we have had a good tie-up with the Indian Space Research Organisation (ISRO) in Ahmedabad to prepare the GW potential maps using Landsat-TM data. ISRO has done an excellent job in preparing the maps showing the potential areas. These maps have been used right away in the field for deciding on exact drilling areas. We have also used the maps for costruction of check dams and other water harvesting structures at various locations in the river systems. To sum it all, we can say that these maps came handy to us in the difficult times of drought and they have been useful in mitigating the effects to whatever extent was possible.

As far as the drainage problem of Ghed area, the maps from ISRO have been used to study the overall drainage system based on which we are making a master plan for ameliorating this problem. We hope this will be fruitful and we shall see a change in the Ghed area in the near future.

In Mahi-Kadana area, in 1985-86 more than 36,000 hectares was waterlogged with almost 3-5 ft of water on the surface. However, of late there has been a considerable understanding of the irrigation practices and the trend of drawing excess water seems to be declining. We are also trying to see that this does not happen in the yet to come irrigation systems. What we feel is that,it is very difficult to make an assessment of this problem from the ground. Remote sensing could make a great contribution here - mainly because of the synoptic view and also its sensor capabilities. It is very essential for us to have a systematic assessment of these problem areas, rather I would say it is of prime importance because there is an associated problem. For example in Mahi, we have now taken up a massive effort of making a network of drainages, channels, deep tube wells etc. so as to allow the logged water to flow away. But the implementation is a bit difficult as there is considerable resistance on the part of the farmers to give land for such schemes and that too when they have given away land already for canals etc.. Of course, it is also a problem for them. So, you see, we must have precise and repeated information on not only the identification of problem areas but also for the monitoring of conservation measures taken up in the water logged areas. As a result of this major problem, we are now trying to bring in some legislation by amending the presently available Bombay Irrigation Act, 1879 so as to bring in the following:-

- Ask farmers to form a group/team - say a team of about 30-40 farmers who can then apply for water needs rather than all the 30-40 applying separately for the water

- Assess the water needs based on soil condition, climate, and farming practice and then release water on volumetric measures. This we hope will bring in a semblance of judicious usage of water as farmers will have to pay for each litre they use. May be the wastage would be much less. Further, by releasing the irrigation at critical crop growth stages (as against the present practice of rotation cycles) we hope they will be able to get good and better results also.

- Introduction of rotational water system in the canal regulator. This will mean that the last man in the area will get the water first and then the rotation will start from the end to the head regulator.

- Revision of water charges so as to be able to make good the operation cost, if not parts of the capital cost. Actually, the funding agencies - mainly World Bank insist that we should recover at least 1% of the capital cost but we are yet to finalise this aspect.

With these, we hope to improve the operation and also allay the fear of the farmers about water availability. I am sure you shall all see the results of all this in the future years to come.

We have taken steps to recover the land from the salinity ingress effect and it may interest your readers to know that out of 1,00,000 hectares of saline land almost 18,000 hectares have been recovered. Thirty-five villages in the area are now getting sweet-water to drink. But there is a lot to be done. Here too, remote sensing information has helped to provide us actual information of the existing damage. We also hope to use the data for monitoring the efferts of the conservation measures that we take.

We have taken steps to reduce the ingress by constructing embankments along the sea and thus utilise the reclaimed land to productive use. Here also we feel remote sensing data can help us in the study and monitoring of this process.

We have been involved in the National project for the delineation of these wasteland areas and also suggest measures to improve these lands so that they can be taken up for various uses - irrigation, afforestation, industry, rehabilitation etc. The mapping of the wastelands is being done in collaboration with ISRO, Ahmedabad and from our side the Gujarat Engineering Research Institute (GERI), Vadodara is involved. I am told that out of the 11 identified districts, the mapping has already been done for seven districts using the satellite images.

The estuary of Mahi is very wide and the tides of the Gulf were entering the estuary to almost 50 km into the river. This sort of a monitoring of the estuary conditions, tidal effects etc. cannot be done on the ground. Remote sensing techniques are best-suited for this sort of a problem and we are involved in a project with ISRO, Ahmedabad to study this aspect, not only in Mahi but also in the Narmada and Sabarmati estuaries.

Q. What is the status of the remote sensing centre at Gujarat and also its plan in solving the problems of Gujarat.

A. Many of these problems, and also those related to minerals like lignite, graphite, marble etc., have been taken up seriously by the Gujarat Government, way back in 1985, based on a letter from the Secretary DOS to the Government of Gujarat (GOG) in which he called for a collaboation for some of the major problems using remote sensing techniques. This letter gave a big boost and the assignment was taken up in areas of ground water exploration,

wasteland etc. The GOG also recognised that a nodal agency must be set up to take up these tasks related to remote sensing and liase between ISRO and other departments of the GOG. This nodal agency is now existing as the Remote Sensing Cell in GERI, Vadodara. This agency will be well equipped with instruments/equipments for analysing the remotely sensed data and is also to be manned by trained personnel. The GOG has no lack of trained personnel at all. We have 62 officers well trained for using remote sensing techniques in the various departments. Out of these 62, the services of about 15 officers from 7 departments have already been placed with the nodal agency, who have been working there for the last 3 years under the guidance of Director GERI who is himself trained in the use of remote sensing techniques. This nodal agency is already involved in about 7-8 projects for solving some of the problems of Gujarat.

Q. You have been laying stress on the aspect of monitoring the effects of various conservation measures that you have taken. Is the nodal agency doing anything in this regard?

A. Today, the agency is in its infancy as against some of the counterpart agencies in other states. So it is too early to ask them about monitoring aspects. Initially, they have started off well and had done some spade work - all in consultation with ISRO. They are studying these problems and coming to grips with it. I feel the "monitoring stage" is yet to come - but this will be done in the near future. But we completely agree on the importance of monitoring activities and we shall do it soon.

Q. One of the hot issues nowadays is the Narmada project. There is one group of people who make it out to be an ecological and environmental disaster. There is such a hue and cry being raised about it. On the other hand there is the group which makes it out to be a revolution in the developmental efforts of the state. What, in your perspective, is the actual situation? Can remote sensing techniques help to make an assessment of the pros and cons of the project - may be based on the valuable experience of waterlogging and other problems of the existing projects over Mahi and Tapi?

A. May be you are asking the wrong person about all this. I am not an authority to speak on these aspects. But as an Engineer - a concerned engineer at that - let me tell you something. Yes, there is a lot of hue and cry. But, I can emphatically say that there is no cause for worry. Just imagine, there are more than 100 countries in the world who have constructed more than 20,000 irrigation projects. Out of these about 10,000 are just in one country - the United States of America. Can you imagine the land submerged, the forests destroyed and other ecological attributes for the 10,000 dams in USA? When the USA and other developed countries have recognised the need for tapping the river water and have gone in a big way, I don't understand why there should be a hue and cry here. What has all this done to them? They are now reaping rich harvests and have a large stock of food grains and are able to better manage the problems of the people. I really find it difficult to believe that there have been no ecological inputs there at all. How can it be?
We are the third best in the world in the dam building activity. At the present, only about 40% of the river waters have been tapped in the country and we have constructed about 2000 dams for this. But there is still a major part of the river which is flowing away unutilised - about 60% of the availability. Yes, one has to be careful about the environment. You can ask for certain assurances about this and consciously ensure that the damage done at one place is made up somewhere else. For example around the Periyar dam in Tamilnadu excellent afforestation has been done and it looks so green everywhere. There are even wildlife in these forests. Fishing is a major activity in the reservoir. So, you see there are benefits which I feel are much more than the so-called damage. But it has to be well-planned and lot of efforts have to go in. I feel that it is the reverse that is true. Dams do not degrade but improve the ecology or the environment. The impounded water of a dam can be used for all the purposes that the enviromentalist can think of - for forests, for fishing, for agriculture for drinking, for power etc. Therefore, I feel that all this outrage by the environmentalists is just unnecessary and is just a one-sided view of the whole thing. These people sit in closed-door offices and raise a hue and cry. I feel that if the environmentalists go out and meet the engineers, officials etc. and they all join together and constantly interact, then I am confident that there will not be a single project which would be called an invironmental disaster and we shall have no problem for the future.

I also feel that it is wrong to assume that the engineers are not being conscious of environment. We know the place of birds, animals, flora etc. in the system. But, we value the human life the most and place it at the top of the system. Our main concern is to provide for the humans at large. I feel that there should be 6000 more dams in India to tap the remaining 60% of the water. It will then give us a complete handle on the developmental activity and you will not have to see the face of drought as we saw recently.

Q. Coming over to the Chapter aspects, what is your suggestion regarding the activities of the Chapter?

A. I feel that there must be a process of continuous dialogue between the members so as to make a cohesive impact on the activities of the state. It is not just enough to organise a seminar once in a way. These do not serve the complete purpose at all. This must be followed up with continous interaction between the members - who are engineers, geologists, agriculturists, soil-scientists, remote sensing experts etc. I feel that we should have one-day meetings every quarter and repeat these at different places. I feel it should be a process of continous hammering by the members at the various utilising and remote sensing techniques. We must see that the techniques are known to a majority of the officials. We should try to expand horizontally to involve as many people as possible.