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EDITORIAL

Drought may be classified according to their intensity: *'Annkal* (No Crop grain), *'Jalkal'* (No rain), *'Trinkal'* (No fodder/grass) and *'Trikal'* (Scarcity of crop/grain, water/rain and fodder/grass). Rajasthan, formerly Rajputana, has been subjected to drought from the earliest times. In Marwar people generally expected one lean year in every three years and one drought year in every eight years (*Teejon karyon; Authan kal*). There is a famous couplet which tells us the severity and frequency of drought occurance in Western Rajasthan.

Marwari Phrase

It means, my (Drought) feet remain in Pungal (Near Bikaner), head in Merta (Near Jodhpur/Nagaur) and belly in Bikaner. Sometimes, I (Drought) can occur in Jodhpur but I permanently stay in Jaisalmer. Historically Jaisalmer faced most severe drought during 11 Century, when it did not rain for consequent 12 years. Again during 1348 AD and 1392 AD, the 'Thar Desert' faced severe droughts when people of the region survived on raw animal meet. Though, todate, region has faced many severe droughts and famines, yet, the *'Chappna Kal'*, 1899-1900 (Vikram Samvat 1956) had the worst impact on the people of the area. According to Lord Curzon, it was the most widely extended and most terrible drought known in Indian history. It was Triple Kal (*Trikal*) of food, fodder and water in Rajasthan. The people of the period who witnessed this severe drought used to say that no such dreaded famine occurred in Rajasthan for the last 100

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BRAIN STORMING SESSION ON WORLD ENVIRONMENT DAY (5th JUNE 2000)

Key-note Papers

Drought Proofing Policies for Arid Zone of India

Dr. Pratap Narain
Director
Central Arid Zone Research Institute, Jodhpur

A study on long-term rainfall records of the Indian arid region showed that the region experiences agricultural drought every third to alternate year in one or the other loation. To overcome the current drought situation many strategies are being adopted by the State agencies through Central and other relief. The measures include provision of drinking water, fodder and food for human and livestock, employment generation schemes, subsidy to cattle camps and *Gosalas*, etc. Drought relief funds are scarce and these must be utilized more efficiently to meet the emergent demands of the affected people as well as to evolve a long-term strategy to combat drought.

The drought situation like the present are/will continue to occur in this region and it needs a proper planning to combat drought/famine. Drought impacts are generally more severe on livestock than on human beings. Some of the measures that can be taken up for combating drought could be as follows:

Short-term measures:

1. Early warning and drought monitoring should be carried out on the basis of long, medium and short-term forecasts.
2. Constitution of task forces in each district to initiate relief measures immediately after the drought strikes.
3. Supply of good quality drinking water to human and livestock in severely affected areas.
4. Fodder banks should be established in the region. Low quality fodder/alternate fodder resources should be enriched to meet the protein demand.
5. Cattle camps should be opened and fodder should be provided at a subsidized rate.
6. Contingency crop plans should be prepared in advance to meet out the aberrant weather conditions such as early/late setting of monsoon and or early/late withdrawal of monsoon.
7. Implementation of crop and livestock insurance schemes.
8. Timely availability of credit, postponement of revenue collection and repayment of short-term agricultural loans.
9. Training of personal involved in drought relief measures on short/long-term basis.

Long-term measures:

1. Greater coordination among line departments should be ensured.
2. Constitution of a drought monitoring committee to advise on drought situation.
3. Rainwater harvesting for both the drinking and *in-situ* cropping, improvement and popularization of traditional rainwater harvesting systems and rainwater conservation/efficient utilization.
4. Rejuvenation of traditional rainwater harvesting systems viz., *Nadis, Tankas, Khadins*, etc.
5. Systematic study on the use, artificial recharge and augmentation of groundwater aquifers.
6. Completion of IGNP lift canals to divert water to drought prone areas.
7. Human and livestock population should be managed to reduce the pressure on fragile arid ecosystem.
8. Popularizing the improved agronomic practices to maximize the crop yield per raindrop.

Integrated watershed management for efficient management of land and water resources should be given top priority. Appropriate land use planning, discouraging water intensive crops, encouraging sprinkler and drip irrigation systems, and practicing alternate land use such as agro-forestry, agro-horticulture and silvi-pasture would provide long-term drought proofing in the Indian arid zone.

Challenges in Drinking Water Scenario

Dr. Ram Gopal
Director
Defence Laboratory, Jodhpur

Today water is a major focus of attraction locally, regionally, nationally and internationally. Water scarcity, sustainable development and integrated water management have become global issues of prime consideration. Unfortunately, it is also a prime issue in some national and international disputes. World is running out of water has been stated by many experts. Water the basic and primary need of all vital life process as on this planet is the resource adversely affected both qualitatively and quantitatively by all kinds of human activity.

India, occupying 2.5% of the total surface of the globe and over one billion population is a second most populous country after China. Despite rapid industrialisation and all round development millions of our fellow countrymen do not have access to safe drinking water although provision of safe drinking water to rural areas became part of Minimum Needs Programme (MNP) of Govt of India in the fifth plan. Natural disasters like floods and droughts further keep throughing challenges to our management system in one or the other part of country. Our countrymen whether in Jaisalmer (Thar desert) or in Cherapunji/Maunsiram, Arunachal Pradesh highest annual rainfall in the world remain thirsty. Ministry of Rural Development through RGNDWM is implementing rural water supply programme in India.

In arid zones of India, groundwater account for major source of drinking water supply. Research on water quality of Thar desert during the last two decades have shown that problems of alkalinity, salinity, sodicity, hardness, fluoride and nitrate are largely associated with ground water. Local population freely consume water with Total Dissolved Salts (TDS) around 3000 mg/l, flouride over 3 mg/l and nitrate over 100 mg/l. Concentration of TDS as high as 30,000 mg/l and nitrate 4750 mg/l and flouride 90 mg/l reported in Nagaur district of Rajasthan perhaps are highest concentration of these two constituents in saline basins of the world. Nausia, vomiting, stomach disorders, kidney diseases, dental and skeletal fluorosis, skin diseases and abortive tendency, loss of milk, cancer and tumours in cattle population due to intake of high nitrate water are common diseases affecting work efficiency of consumers. On the other hand in cold arid region of Himalaya and some pockets of hot arid areas iodine deficiency diseases are quite common.

One third of the world's population will suffer from chronic water shortages within next 30 years. Further it is reported that 80 to 90% of all diseases and more than one third of all deaths in developing countries are caused by contaminated water.

Ground water resources are showing signs of over development in many arid regions in India. Once again we have to explore "Ratna Garbh" inexhaustic resource seas for our drinking water and other needs. Our 70% world population living in 50 km belt of coastal areas can depend on 5 globally available sea water desalination processes. In arid areas, besides depending on regional water supply schemes we have to put more stress on rain water harvesting for conserving and recharging our surface and ground water resources. To ensure supply of safe drinking water during peace time and disasters water quality monitoring and surveillance also need prime attention of management to control water borne disease outbreaks.

Desertification and Droughts-An Overview

Dr. R.P. Dhir
Ex-Director, CAZRI, Jodhpur

Our arid zone can boast of a highly evolved land use and management-an outcome of experience and wisdom gained over the generations. An efficient blend of agriculture and animal husbandry is just one attribute of this system. And this is possibly what explains the high density of population that the arid zone is able to sustain for a long time in the past. However, the phenomenal growth of population and the associated livestock during the past few decades together with the exploitative

management have been a cause of greatly accelerated natural resource degradation. This has happened despite the well known principle "in harsh environments, it is easy to degrade a resource but far more difficult to rehabilitate".

One of the most glaring degradation has been that of common grazing lands, the CPR's. Though constituting more than 26 per cent of the region, it is a rarity today to see even a single large patch of these with an optimum cover of vegetation. Though a technology had long been developed demonstrated by CAZRI time and again, an up-scaling of the same into a major programme on ground has not taken place. Though funds have been a constraint, the major reason is the complexity of rural society and diversity of interests and stakes in development. Over-exploitation of groundwater is another and a more serious form of degradation as recharging of a depleted aquifer is very difficult. Yet society at large and our policy makers and intelligentsia has shown little concern.

The impact of land degradation is felt particularly during the years of severe droughts, like the current one. Droughts have been part of our natural climatic cycle all along, however, the impact in terms of magnitude of distress caused in terms of the size of rural society and the livestock affected by it has greatly increased. The drought of years 1987 and 1988 caused large scale mortality of livestock, particularly the cattle but their number and also of sheep and goat has bounced back to reach an all time high. The reserve of fodder from a good rainfall year, that used to last for 2-3 years, are now not sufficient even for half that period. It looks as if we have already reached the carrying capacity of land, if not exceeded it.

The development efforts of the past, how-so-ever small had a high component of environmental concern but over time the rural development is becoming more welfare-centred only. This is a short sighted approach and desert development should receive a long-term sustained attention of the nation.

Role of Satellite Remote Sensing in Enviromental Studies

Dr. J.R. Sharma
RRSSC/ISRO/DOS
CAZRI Campus, JODHPUR

Environment is an integrated system in which all its elements act and react in such a way that a balance is always maintained. All the physical elements relief, structure, climate, natural vegetation, soils, water bodies etc. are for determining factors of environment on one hand, and man's activities on the other. Man is a user of the environment for his developmental activities and always alters this natural system and creates a background for environmental degradation. When this degradation is lesser, nature recovers it by its own system of recovery, but whenever its quantity is more it creates an imbalance in nature.

Environmental management is a process of planning, review, assessment and decision making for limited resources and changing priorities.

Satellite Remote Sensing due to its inherent characteristics offers unlimited opportunities for quantify and map the environment, monitor the environment and also provides useful inputs for management of environment. With large number of sensors available, higher repeativity, varying resolutions, and data in digital format, the technology offers variety of data sets to study the environment at global as well as regional scale in a very short period.

When the unique advantages offered by remote sensing, data are translated into application possibilities, many innovative uses emerge, in addition to routine resources inventories. These could be summarized discipline wise as follows:-

AGRICULTURE

- Early season estimation of total cropped area
- Monitoring crop condition using crop growth profile

- Identification of crops and their acreage estimation in multi-cropped regions (SWIR data improves crop discrimination).
- Crop yield modeling
- Cropping system/crop rotation studies
- Command area management
- Detection of moisture stress in crops and quantification of its effect on crop yield.

FORESTRY
- Improved forest type mapping
- Monitoring large scale deforestation, forest fire, etc.
- Monitoring urban forestry
- Forest stock mapping

GEOLOGY
- Lithological and structural mapping
- Geomorphological mapping
- Ground Water exploration
- Engineering geological studies
- Geoenvironmental studies

WATER RESOURCES
- Monitoring surface water bodies frequently and estimating their spatial extent
- Snow-cloud discrimination leading to better delineation of snow area
- Glacier inventory
- Water quality

COASTAL ENVIRONMENT
- More detailed inventory of coastal landuse
- Discrimination of coastal vegetation types
- Monitoring sediment dynamics
- Sitting of coastal structures

WATERSHEDS
- Delineation of watershed boundaries/partitioning of micro watershed
- Watershed characterization at large scale (shape, drainage, landuse/cover)
- Sitting of water harvesting structures
- Monitoring watershed development

DISASTERS
- Mapping flood inundated areas, damage assessment, droughts, sand drift, landslides, etc.

ENVIRONMENT
- Impact assessment on vegetation, water bodies
- Siting applications (Local level)
- Mapping landuse/cover
- Change detection
- Identification of degraded lands/erosion prone areas
- Urban landuse
- Updation of urban transport network
- Monitoring urban sprawl
- Identification of unauthorized structures
- Extent of pollution-air, water and land

Western Rajasthan - Where Goest Thou?

A.N. Lahiri
Ex-Head of Division, CAZRI, Jodhpur

Agricultural problems of arid parts of Western Rajasthan appear like a hydraheaded monster whose arms are tangled with numerous environmental constraints, fragile resource base, illiteracy, poverty, mental blockage of desert dwellers towards adoption of new technologies coupled with a massive population pressure of human and animals. This peculiar scenario sharply negates the proven claims of our extensive knowledge of arid land reconstruction.

- One need not probe far to unravel the dilemma. As an accepted thumb rule dryland farming should be practised in summer rainfall regions receiving precipitation of 500 mm or above. Here every land, be it a flat land or a dune, is cultivated in areas receiving up to 120 mm or less. Consequences are meager yields and accentuated wind erosion. Most regions fall under low land-capability classes. These are brought under the plough, which otherwise are suited best for raising grasses and trees. Aversion towards raising grasses and trees, existence of large population of domesticated animals and denuded

'village grazing grounds' compound the problem. However, local grasses and trees are eminently suited for this environment with their deep and extensive root systems and ability of 'Osmotic adjustment' under water stress. Scientific progress in range/sown pasture management, as well as, silvicultural practices have been fine tuned today to provide fairly assured animal production. But one has to rigidly adhere to requirements of fencing, rotational grazing and 'carrying capacity' norms for grasslands. Likewise a little watering to out-planted (in July) tree seedlings during the first dry months (Oct. ot June) assures tree establishment.

- Although adverse effects on crops due to droughts, of any intensity and complexion, may be mellowed by agro-techniques available today. But the virtues of elite varieties, bio-fertilisation, trickle system etc. may be completely erased off by the invasion of massive number of antelopes who are also competing with domesticated animals for forage. It seems that desert development also warrants political will and suitable legislation.
- But, in our random thoughts, we recognise the lack of scientific thrusts towards arresting of the water-weeds which are chocking the water flow of Indira Gandhi Canal. Again one is amazed by the indifference towards building of grain and fodder banks, from harvests of 'good' year to tide over the difficulties of 'bad' year in this drought-prone area.
- Although every one appreciated the importance of water, over-exploitation of ground waters through ignoramus use, destruction of catchments in many places, lack of water harvesting from dwellings in rural and urban areas pose as contradictions.
- It is noteworthy that Ladakh, the cold desert which receives only about 100 mm of precipitation and also suffers from a variety of environmental constraints, has yet to send a red signal of drought threat.

Does our distress essentially arise from over-population of human and animals?

Focus on Groundwater Recharge

Dr. Jagdish Chandra
Professor (Retd.), Civil Engineering, JNVU, Jodhpur

With increasing use of groundwater for agricultural, municipal and industrial needs to meet the requirements of country's increasing population and accelerated developmental activities, annual extraction of groundwater is far in excess of net average annual replenishment from natural sources. This results in an overdraft situation resulting consequently in water-levels of groundwater storage declining, crop failures, adverse salt balance, land subsidence and in coastal regions to instrusion of sea water into aquifers, both at micro (i.e. local) and macro (i.e. regional levels).

To rectify this overdraft situation and to attain annually stable groundwater levels, artificial recharge is resorted to which augments natural movements of surface water into underground formations by some method of construction or by use of pits and wells or by artificially changing natural conditions. Artificial recharge projects are designed to:

- maintain and augment the natural groundwater as economic resource
- coordinate operation of surface and groundwater reservoirs
- combat adverse conditions such as progressive lowering of groundwater levels, unfavourable salt balance and saline water intrusion (in coastal regions)
- provide subsurface storage for local and imported surface waters
- provide treatment and storage for reclaimed wastewater for subsequent reuse
- reduce or stop land subsidence.

Spreading methods are most commonly used as recharge methods which can be classified as basin, stream channel, ditch and furrow, flooding and irrigation. Research has continued on increasing efficacy of basin and stream channel methods considered more suitable for semi-arid region. Economy of water spreading hinges on

maintenance of high infiltration rate which in turn hinges on killing microbial growths. Also climatic factors (sunlight, water temperature algal growths) and soil composition which can lead to clogging of soil pores need to be investigated. Strategies to sustain maximum infiltration rates have to be devised.

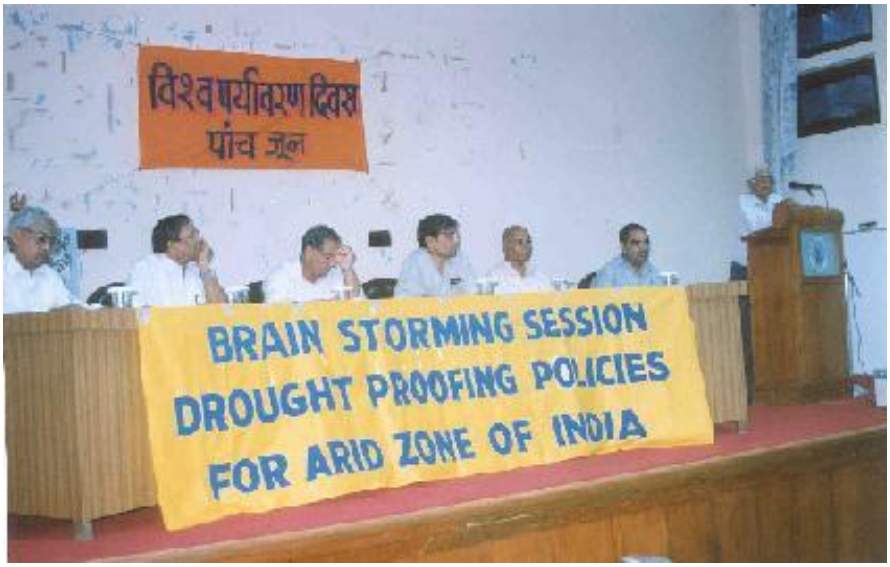
Potential Applications of Biotechnology for Plant Resources of Rajasthan

Dr. N.S. Shekhawat
Biotehnology Unit, Department of Botany,
J.N. Vyas University, Jodhpur

The Indian Thar desert and the Aravallis are important ecosystems of Rajasthan. These regions harbour germplasm of several types of plants that support life under different types of climatic conditions. The plants and microbes of these areas experience different kinds of recurring stresses during their life cycles. Through natural processes of selection and evolution the plants of Rajasthan have acquired valuable traits/genes. These genes and their products are candidates for prospecting.

Biotechnology can be defined as the provision of useful products and services from biological processes. Often, biotechnology can provide a cleaner, cheaper and lower-energy way of doing jobs that were previously carried out in chemical factories, manufacturing and agriculture. Biotechnology provides new, more precise and efficient tools and techniques to (i) increase the plant productivity and (ii) the enhanced stability of yield by improving health and resistance(s) to stresses.

At J.N. Vyas University, Jodhpur, the Biotechnology Unit of Department of Botany we have been working on development of application-oriented biotechnological processes for plants of the Indian desert and the Aravallis. Some of the methods developed are to address the problems of propagation and reproduction of forest plants of Rajasthan. Protocols have been generated for large-scale production and cloning of plants of *Anogeissus spp.*, *Aegle marmelos*, *Maytenus emarginata*. Similarly, for the conservation of germplasms and propagation of rare/threatened/endemic plants, biotechnological processes have been developed. Our laboratory has been successful in generating tissue culture technologies for *Caralluma edulis (*Paimpa*), Celastrus paniculatus (*Malkangani*), Ceropegia bulbosa (*Khedula*), Leptadenia reticulata (*Jeewanti*)* and *Withania spp* (Ashwagandha and Paneer Bandh). The Department of Botany, M.L. Sukhadia University, Udaipur has been able to generate know-how for micropropagation of safed Musli and other plants of the Aravallis. These processes can be very useful for utilization of plant resources of the state of Rajasthan.



Indira Gandhi Nahar Pariyojana - A Boon or Environmental Disaster in the Thar Desert of India

K.D. Sharma
Sr. Scientist, Central Arid Zone Research Institute, Jodhpur 342 003

The Indira Gandhi Nahar Pariyojana (IGNP) in India is one of the largest irrigation systems of desert areas in the world; using 9.36 billion m^3 of water annually to irrigate 1.869 million ha of arid land within the Thar region. The dominant landforms in the region comprise sandy, undulating alluvial plains, giving way to sand dunes with interdunal plains towards the south. Geologically, marine, alluvial and Aeolian deposits, lying on sandstone and limestone with intermittent beds of gypsum, shaly lignite, fuller's earth, gypsiferous bentonite clays and other minerals, underlie the area. Soils are predominantly sandy.

The IGNP brings water to an area where surface water is not present and groundwater is either saline or too deep. The arrival of water in the Thar Desert has opened up land for colonization in the drier districts of Ganganagar, Bikaner and Jaisalmer. Further, with the introduction of irrigation under IGNP, crops such as food grain, oil seed, fodder and cotton worth Rs. 1,100 are produced annually. Besides, a rapid pace of industralization has set in the region.

The IGNP promised to green the desert but it has also waterlogged vast tracts of land and more stand in danger of being turned saline through this process. Initially, during 1962 the project area had a deep water table, and the monitoring of water table was also not a high priority. Therefore, it took until 1973 for awareness of the salinity and water logging problems to reach the stage when systematic monitoring began. During 1997, about 57% (297, 820 ha) of the Stage I area (5250 km^2) had water table at less than 6 m below the ground, 5% (24,140 ha) of the area had water table between 1.0 and 1.5 m of the ground surface, and 3% (17,220 ha) of the area was waterlogged. The water table is rising @0.81 to 1.10 m year. A far more serious water logging and salinity problem envisaged in Stage II. Owing to an underground hard substratum of gypsum within 10 m depth, about 34% (120, 500 ha) area is vulnerable to water logging. Due to capillary action, the water rises to the surface with dissolved salts and evaporates, leaving the salt behind, thus leading to secondary salinisation of the soil and groundwater.

In the IGNP area, the natura groundwater balance has been disturbed, and water logging has arisen due to: large percolation losses from the irrigation water applied to farmers' fields, due to the increase in water supply rates, permeable soils and rudimentary irrigation practices; seepage losses from channels providing particularly large localized sources of recharge water; overuse of escape channels from the canal system, leading to extensive ponding in areas used to dispose of the excess discharges; relatively low levels of development of the use of groundwater for irrigation; restriction to regional groundwater flow which lead to reduced groundwater outflows on a regional basis, with shallow low-permeability horizons producing perched water tables in some locations; some water logging is almost inevitable in the absence of natural drainage, either through surface or groundwater systems, from the area; and other localized factors such as geomorphologic features or ponding of flood waters. It is estimated that instead of surplus water of about 50 mm a year, the oversupply of irrigation water has resulted in an excess of perhaps 400 mm a year, creating a rapid rise in groundwater, and water logging/salinisation in vulnerable areas.

A number of techniques useful in mitigating the problems of water logging and salinisation or delaying the adverse effects include construction of open drainage, horizontal sub-surface drainage, vertical drainage, soil management, artificial recharge, fish farming and growing acquatic cash crops. Efficient irrigation management practices, reduced water allowance, and vertical drainage, by way of construction of shallow skimming wells, are technically feasible and economically viable solutions to combat irrigation salinity in the region.

ICASALS Associate Attends First International Conference on Greenery and Environment in Arid Zones

Safei-Eldin A. Hamed, an assistant professor in Landscape Architecture at Texas Tech University, recently attended the first International Conference on Greenery and Environmental Beautification in Arid Zones, which was held in Kuwait. Regional speakers from Saudi Arabia, Syria, Iran, Egypt, Tunisia, the Emirates, and many from Kuwait, explained their recent research. Also, 12 international speakers from Australia, Hong Kong, Japan, Mexico, and the United States were invited, including Hamed, who presented a paper entitled *Recreation Planning and Tourism Development in the Arid Zones: From Problems to Landscape Objectives*.

During the past seven years a National Greenery Plan was in the making for Kuwait under the leadership of the Kuwait Institute for Scientific Research (KISR) and the Public Authority for Agricultural Affairs and Fishery (PAAF). The conference was a public unveiling of the plan and a forum to discuss it with experts from around the world.

There was strong support for increasing the visibility and appreciating the value of the natural landscape, native plants and the traditional environmental ethics that older generations of Kuwaitis have held. There was considerable discussion about the relationship of public government and the private sector as implementation of greenery becomes more opportune for the private sector. During a work session at the end of the conference, many speakers gathered to generate a series of official conference recommendations that addressed both the generic arid land goals and the Kuwait-specific landscape objectives and environmental action plans.

For more information, contact Hamed at the Department of Landscape Architecture, Texas Tech University, P.O. Box 42121, Lubbock, TX 79409 USA. His phone number is 806-742-2672; fax 806-742-0770 or 798-3418; and e-mail address is shamed@ttu.edu

Source: ICASALS Newsletter Vol. 31 No.2 Fall/Winter 1999

Arid Zone Hydrology

In collaboration with the Pakistan Council of Research in Water Resources, UNESCO New Delhi sponsored a Regional Workshop on Arid Zone Hydrology on 10-12 February 2000. The workshop was held to share ideas, knowledge and experience and discuss problems and alternatives measures for the sustainable use of land and water resources in arid regions.

The workshop recommended that steps should be taken to avoid the improper use of watershed which are the source area of water supply and a country's major asset. Poor utilization causes a high rate of erosion, creating problems of desertification and reduction of storage capacity of downstream storage reservoirs.

Reckless deforestation by inhabitants of watersheds needs to be strictly prohibited and alternate arrangements for cheap fuel made. Extensive afforestation programmes should be launched.

Different rainfall runoff models were needed to predict the performance of different types of catchments, so that water resources could be managed and used effectively.

Use of high-tech irrigation systems be encouraged and propagated in arid and semi-arid regions. Mass awareness campaigns should be launched via the electronic and print media on the need to conserve water by using it effectively. Priority needed to be given to water oriented projects in arid zones for human and livestock consumption.

Conjunctive water management strategies should be developed in arid zones for optimal human and plant use.

Crop insurance policies should be introduced to save the community from natural disasters.

For all this, community participation in planning, implementation and operation of land and water resources projects had to be ensured.

Source-UNESCO Newsletter Vol. 9 No.1-2 Mar-June 2000

Desert Development Conference Held in Egypt

Scientists from around the world met to discuss challanges facing researchers working with the problems of drylands development at the Sixth International Conference on the Development of Drylands, which was held during August 22-27, 1999, in Cairo, Egypt.

The conference, titled Desert Development: Challenges beyond the Year 2000, was held under the auspices of the International Drylands Development Commission (IDDC) and hosted by the Ministry of Agriculture and Land Reclamation in Egypt under the patronage of H.E. Dr, Youssuf Wally, Deputy Prime Minister and Minister of Agriculture and Land Reclamation. Dr. Adel El-Beltagy, Director of the International Center for Agricultural Research in the Dry Areas (ICARDA), served as chairman of the organizing committee for the conference.

Idris Rhea Traylor Jr., Executive Director of the Office of International Affairs and Harold Dregne, special consultant to ICASALS, represented Texas Tech University at the conference. Traylor, who has served for several years as vice chairman of the Commission, co-chaired on opening plenary session and chaired the session on Socio-Economics and Anthropology. Dregne gave a plenary address titled, Water Erosion Control: Generating Support.

Conference participants discussed numerous issues of desert development, including soil and water degradation, range management, stress physiology, application of biotechnology for improvement of stress resistance and socio-economic aspects of life in the drylands. One of their field trips allowed them to view desert development research west of the Nile Delta. A desert development exhibition representing desert agriculture was also held.

The group was entertained by viewing a sound and light show at the Pyramids, which was hosted by Ministry of Tourism. A dinner on a Nile cruise was hosted by the Ministry of Agriculture and Land Reclamation, and a cultural evening was hosted by the Ministry of Culture.

The officers for the International Drylands Development Commission for the current three-term were elected in Cairo. They are El-Beltagy, chairman; Traylor, vice-chairman and Manuel Anaya-Garduno, of the Colegio de Postgraduados, Mexico, secretary general.

Members of the commission are Adli Bishay, Director of the Sustainable Development Program in Cairo, Egypt; Hama Arba Diallo, Executive Secretary of the Interim Secretariat, Convention to Combat Desertification of the United Nations in Bonn, Germany; Till Darnhofer, Deputy Director of the DEPC/PAC, United Nations Environment Programme; Dregne; K.H. Batanouny, Desert Research Center in Egypt; R.G. Wyn Jones, University of North Wales, United Kingdom; lwao Kobori, The United Nations University, Japan; Gamin Akemalief, Academy of Agricultural Sciences, Kyrgyzstan; Amar Singh Faroda, Director, Central Arid Zone Research Institute, India; and Wang Tao, Director, Desert Research Institute, Chinese Academy of Sciences, China.

In 1996, Texas Tech University hosted more than 200 representatives from 40 countries at the Fifth International Conference on Desert Development, which was the first time the conference had been held in the United States, and Traylor chaired that conference. Other conferences have been held in Cairo, Egypt, Beijing, China; and Mexico City, Mexico.

The Seventh International Drylands Development Conference will be held in July 2002 in the Islamic Republic of Iran. An invitation to host the conference was extended by representatives from Iran and accepted by the International Drylands Development Commission.

Source: ICASALS Newsletter Vol. 31 No.2 Fall/Winter 1999

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years. The most acutely affected regions were Marwar, Bikaner, Mewar, Jaisalmer, Ajmer and Jaipur. Over whole of Rajasthan, the severity of the drought was considered as unprecedented. The havoc caused by this famine can be judged from the fact that one million persons had starved to death and a large number of survivors were reduced to the condition of moving skeletons.

During 20th Century, many scientific, technical, communication and transportation advancements have taken place, which of course, have succeeded upto some extent in reducing the death ratio but the frequency of occurrence droughts is yet to be minimized.

In 1973, Central Government in collaboration with State Governments initiated some programmes for Desert Development. 'Drought Conservation' programme is presently being run in 96 districts of 13 states covering 627 blocks in India. In 1993-94, Central Government provided a sum of Rs. 153.34 Crore for the drought affected states for Land improvement, Water resource development, Forest conservation and Grazing land development.

The idea of better monitoring and assessing drought has been a quest for CAZRI for about five decades. The CAZRI is always advocating for better climate monitoring, particularly drought monitoring, because drought is a normal, recurring hazard in virtually all parts of Rajasthan. The challenge is to recognize drought, a slow on-set or 'Creeping' natural disaster.

The present Director, Dr. Pratap Narain, primarily recognized the situation as failure of south-west monsoon during 1999 and scarcity of rainfall during 1997 and 1998. Among 12 states of the country, the Rajasthan, Gujarat, Madhya Pradesh and Andhra Pradesh are severely affected. A committee headed by the Director surveyed the drought affected areas of western Rajasthan and suggested for long term policies to mitigate the drought conditions. A brain storming session on 'Drought Proofing Policies for Arid Zone of India' organized on the World Environment Day (5th June) can be considered as an appropriate step at appropriate time.

WORLD WATER DAY

Water Resources Day has been celebrated in India every year since 1986 with a view to making people conscious about the need to conserve water and manage it on scientific lines. In 1993, the United Nations declared 22 March World Water Day.

To mark the occassion, a curtain raiser function was organised in New Delhi this year by the Indian Water Resources Society and sponsored by the Ministry of Water Resources (MOWR), Central Water Commission (CWC), Central Ground Water Board (CGWB), Water and Power Consultancy Services (India) Limited (WAPCOS), Narmada Control Authority (NCA) and the UN System in India (UNESCO, UNICEF, WHO and UNDP etc.).
On behalf of the UN System, Prof. Moegiadi presented a theme paper on "Water for 21st Century". Dr. Robert J. Kim, WHO Representative to India emphasized the need for drinking water quality surveillance.

A paper on the theme "Human Issues in Water Resources Development" was presented by Mr. P.C. Lau, Director General, National Water Development Agency.

Source:

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Principal Investigator	Editorial Assistant	Computer Design
Dr. D.C. Ojha	Sh. D.V. Kothari	Miss Sunita Arya

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