



ENVIS NEWS

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ENVIS CENTRE WELCOMES DR. K.P.R. VITTAL



The ENVIS Centre on Desertification, at CAZRI, Jodhpur, extends a hearty welcome to Dr. K.P.R. Vittal on his joining as Director, Central Arid Zone Research Institute (CAZRI), Jodhpur. Dr. K.P.R. Vittal, an eminent Soil Scientist, joined CAZRI as Director on 1 January 2007.

Born on August 6, 1949, Dr. Vittal obtained his M.Sc. (Ag.) in 1972 from GBPUAT, Pant Nagar, and Ph.D. in 1976 from IARI. He pursued Post Doctoral research from IARI, New Delhi in 1976. Dr. Vittal has an excellent academic record and is well known for his high-level research contributions. He started his scientific career as Scientist (Soil Science) in 1976 and became Head, Division of Resource Management, CRIDA, Hyderabad from 1996 to 2001. From 1998 to 2001 he also concurrently held the position of Principal Production System Scientist (Rainfed Farming), NATP, to monitor 103 projects spread over 70 rainfed districts of the country. From 2001 to 2006 he was Project Coordinator (AICRPDA) at CRIDA, when he networked and coordinated the research programmes in several institutions across the arid, semi-arid and sub-humid regions of the country. Dryland agriculture, watershed management, farming systems, and soil physical improvements are some of the topics that received needed importance.

Dr. Vittal is well known in the field of soil science. He has also contributed significantly in the field of dryland agriculture. He has so far 240 publications to his credit, which include 30 research papers in international journals of repute, as well as in books, monographs, bulletins, etc.

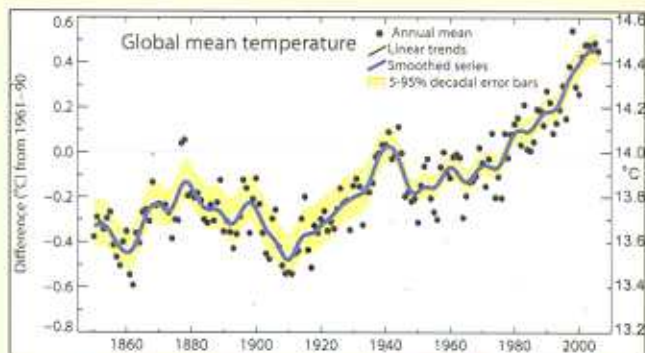
As a researcher he received the INSA Young Scientist Award in 1982, and the KRIBHCO Award in 1988. He was also a member of a multi-disciplinary team for the ICAR Best Institute Award in 1996 for development of CRIDA.

His contributions to research and development efforts have been well recognized and appreciated in both India and abroad. His efforts in developing the dryland watersheds have been appreciated by ICAR and the Ministry of Agriculture. He was a Technical Member of the Watershed Technical Committee of the Govt. of India that submitted its report in 2006, on the basis of which actions are now being taken for development in the country. He was a member of the ICAR team that prepared the contingency plans for model watersheds during the drought in 1987.

His attachment to research took him abroad also. At the Texas A&M University, USA, he worked under the famous soil scientist, Dr. B.A. Stewart. When at Australia, invited especially to talk on dryland agriculture at the CSIRO, Canberra and Adelaide, and at the Department of Primary Industries, Queensland. He worked on indicators of unabated degradation over four months there. He also went to Bangkok to discuss new ideas on on-farm participatory research methodology on improving management of natural resources. He was a consultant to Govt. of Andhra Pradesh on Micro-irrigation Project. He also assessed as a consultant of IWMI, the potential and avenues for water productivity increases under dryland agriculture in India. Needless to say, with his vast knowledge and experience, he also proved to be a successful teacher and trainer for both students and farmers. He served the Indian Society for Dryland Agriculture as Secretary, and the Indian Society of Soil Science, Hyderabad Chapter, as Vice-President. With his rich experience in research, planning and implementation, and his management and administrative capabilities, CAZRI will certainly move forward to achieve its goals.

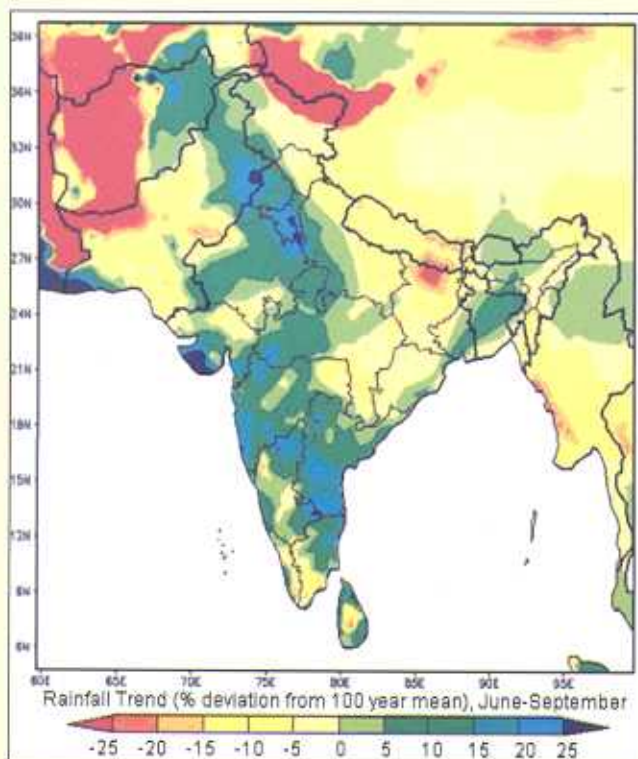
Indian Arid Zone in a Warmer Climate

Global climate is fast changing towards a much warmer environment, especially due to large-scale emission of anthropogenic greenhouse gases (GHG) into the atmosphere and partly due to land use changes. The Intergovernmental Panel on Climate Change (IPCC) in its Fourth Assessment Report (2007) says that at the present rate we should expect a warming of -2°C per decade during the next two decades. Even if emission is restricted to the level of year 2000, a further warming by $-1^{\circ}\text{C}/\text{decade}$ is expected.



Global temperature change from the mean of 1961-90.
Source: IPCC, 2007.

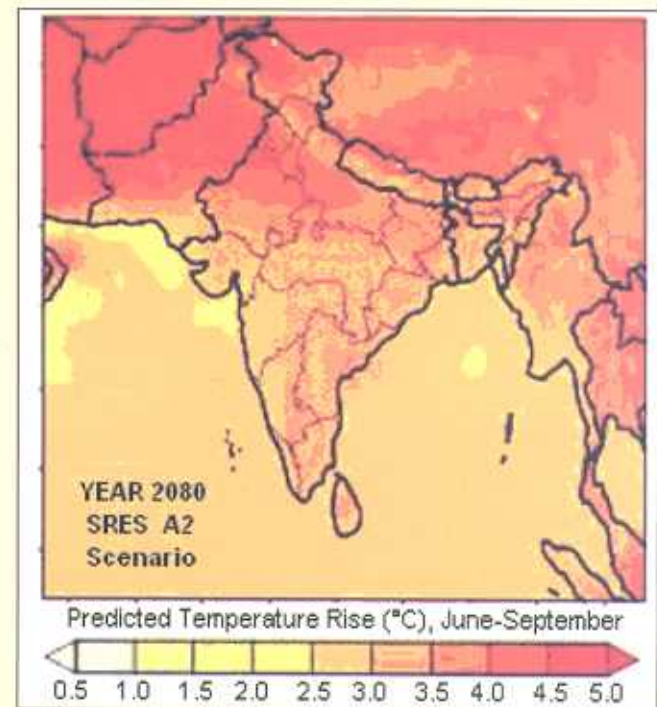
Surface air temperature is increasing in most parts of India also, the spatial average for the second half of the 20th Century being $+0.5^{\circ}\text{C}$. Spatial pattern of monsoon rainfall is also changing.



Trends in summer monsoon rainfall over Indian subcontinent (1901-1996).
Source: IITM, Pune.

Globally, one of the crucial factors of warming likely to be enhanced further is atmospheric CO_2 concentration, i.e., from the present 379 ppm (which already far exceeds the level attained any time during the last 650000 years) to >450 ppm by the last quarter of 21st century. It may lead to higher water use efficiency of crop plants and accelerated crop development, but will possibly lower the biomass and seed production efficiency. Indian subcontinent, though contributing a meager 7% of the global GHG load, will have to bear the impact of global climate change, and agriculture will be particularly impacted.

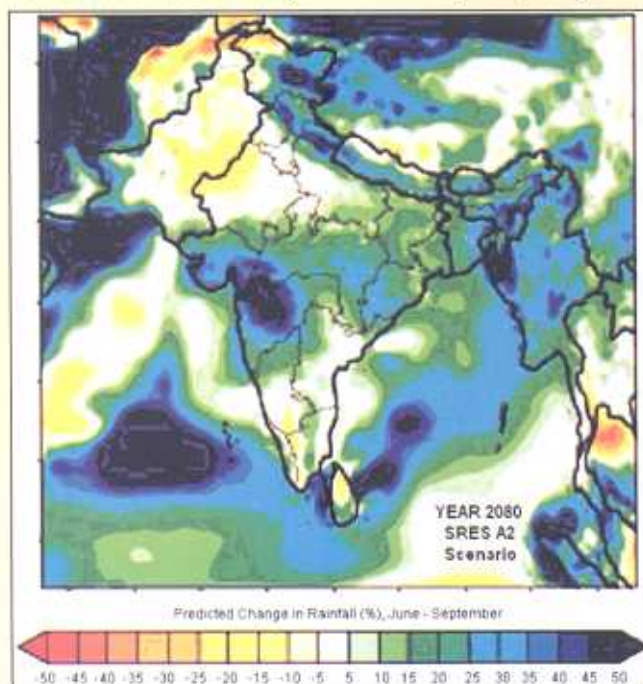
Simulation results from Hadley Centre (UK) and IITM (India) suggest that by the last quarter of this century temperature in arid western part of India, including the western part of Gujarat, Rajasthan, Haryana and Punjab, will most likely increase by $2-5^{\circ}\text{C}$. Southern Rajasthan and adjoining areas of west Gujarat may experience smaller increases. Apart from the increases in summer temperature, there is likelihood of a gradual increase in winter temperature, as well as in night temperature.



Predicted change in June-September temperature by 2080, using PRECIS model.
Source: Hadley Centre, 2004.

Simulation results also suggest that by the last quarter of this century monsoon rainfall will most likely decline by 10-30% in northwest Rajasthan and adjoining Punjab, while the eastern fringe of west Rajasthan and adjoining Haryana may experience a marginal increase up to 10%. At the same time winter rains may gradually increase by 20-40%. Arid west Gujarat and adjoining south Rajasthan are likely to experience 15-30% higher monsoon rains, as well as higher winter rains. Incidence of tropical storms will most likely increase in the Arabian Sea, and as a result the rainfall intensity will increase. Consequently, high magnitude floods may occur in Maharashtra, Gujarat

and south Rajasthan. There is also the probability of higher incidence of droughts, especially in the northwestern part of Rajasthan and adjoining Punjab.



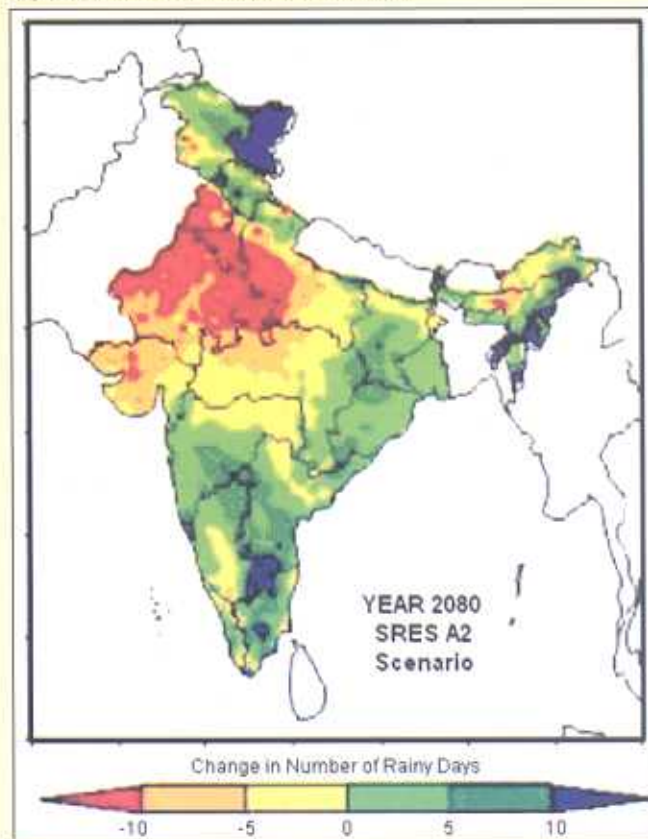
Predicted percent change in June-September precipitation by 2080, using PRECIS model.
Source: Hadley Centre, 2004.

Based on the current understanding of climate change simulation results, we can broadly divide the northwestern hot arid zone into three major sub-zones: (1) the hotter and very dry north-west Rajasthan and adjoining Punjab, (2) the warmer and moderately wetter arid Gujarat and adjoining south Rajasthan, and (3) the hotter and slightly wetter eastern fringe of arid Rajasthan and adjoining Haryana.

Elsewhere in the country the arid areas of Ananthapur and Bellary may experience up to 3°C rise in annual temperature and >100% rise in winter rainfall, although the annual total may not rise beyond 20-30%. Summer rains are likely to decrease by 5-15% in the interior Karnataka and south coastal Tamil Nadu, where temperature may rise by 3-4°C. Precipitation is likely to increase in the cold arid areas of the Himalayas by >30%, where rise in temperature is melting the glaciers very fast that may adversely impact water availability in north India in -5 decades. Overall, the changes in monsoon rainfall amounts and shifts in timing of the rainy seasons, as well as rise in temperature will add to the uncertainty in agriculture. Soil moisture status during the cropping seasons will experience a change, and so will the incidence of pests and diseases.

Since there is also a likelihood of sea level rise, the coastal areas of arid Gujarat, especially between Okha, Jamnagar and Kandla, as also parts of the Great Rann of Kachchh and fringes of the Banni, may face inundation threat. Estuaries of large peninsular streams in south Gujarat may experience, under such a scenario, a greater threat of flooding during the monsoon due to the dual problem of discharging a larger volume of water into a raised sea surface.

The simulations also hint at a reduction in rainy days by 5-10 days in western India which, when viewed with the scenario of increased rainfall, suggest increased soil erosion by water in arid areas. There is also a greater threat of wind erosion and dust emission in northern half of arid Rajasthan due to decreased rainfall, and expansion of desert-like conditions.



Predicted change in number of rainy days by 2080, using PRECIS model.
Source: IITM, 2004.

Such climatic changes, when viewed in the perspective of trends in human and animal population growth, expansion of cropland, faulty land uses, fast declining water resources due to over-irrigation, etc., in the arid region, suggest a major threat to livelihood security of farming communities, and food security of the region. Since bio-physical resources of the region are already in a delicate balance with prevalent climate, the predicted changes in temperature and rainfall regime, as well as occurrence of high-magnitude droughts and floods would reflect sharply on soil quality as well as performance of the existing plant species, including crops. Yields of some crops may decline by 20-30% unless remedial interventions are made. Yield opportunities of increased CO₂ may be available for a shorter period when the rise in temperature will be small, but this will be lost with higher temperature.

To mitigate the impacts of perceived climate change, it is necessary to re-adjust our R&D efforts as best as possible, with more focus on conservation agriculture, product processing, value chain, energy use efficiency, and livestock-based industries in drier areas, as well as robust policy frameworks on natural resource use.

Amal Kar

Events held by ENVIS Centre on Desertification World Environment Day, 2007

ENVIS Centre on Desertification at CAZRI, Jodhpur celebrated the World Environment Day with joy and enthusiasm on 5th June 2007. The theme for this year's World Environment Day was announced by UNEP as **Melting Ice - A Hot Topic**, and ENVIS Centre at CAZRI organised a Brain Storming Session on this topic. Dr. Amal Kar, Head of Division, delivered a lecture on "Ice is Melting - Time to

Take Guard". Dr. K.P.R. Vittal, Director, CAZRI presided over the session. More than 50 scientists and other officers participated in the discussion and suggested scientific solutions to the problem. Dr. Manjit Singh, Chairman ENVIS Sub-committee, welcomed the guests and briefed about ENVIS activities at CAZRI. Dr. D.C. Ojha, ENVIS Coordinator proposed the Vote of Thanks.

World Day to Combat Desertification

Like in previous years, ENVIS Centre on Desertification at CAZRI celebrated the World Day to Combat Desertification on 18th June 2007 (17th June was a Sunday) by organising a lecture, followed by a group discussion in which more than 60 scientists and other officers from CAZRI and other institutes participated. Dr. Amal Kar, Head of Division, delivered the lecture on "Desertification in Arid

Rajasthan: Current Status, Control Measures and Likely Future Scenario". Dr. K.P.R. Vittal, Director, CAZRI, presided over the function. Dr. Manjit Singh, Chairman ENVIS Sub-Committee, welcomed the Chief Guest, the Speaker and the participants. Scientists from CAZRI and RRSSC, Jodhpur, actively participated in the discussion.

Forthcoming Conferences and Events

Eighth Session of the Conference of the Parties (COP 8) to the United Nations Convention to Combat Desertification (UNCCD): 3 to 14 September 2007, Madrid, Spain. Website: <http://www.unccd.int>

UNCCD Conference on Youth and Desertification, from 4 to 6 September 2007, Mali.

Website: <http://www.unccd.int>

International UNESCO-MAB Workshop on Ensuring the Future of Drylands Towards Implementing the MAB Agenda for a Sustainable Future of Drylands: 12-15 November 2007, Jodhpur, India (CAZRI and AFRI).

Website: <http://www.unesco.org/mab/ecosyst/drylands>

International Workshop on Environmental Changes and Sustainable Development in Arid and Semi-arid Regions: 10-17 September 2007, Alashan Left Banner, Inner Mongolia, China.

Website: www.igccas.ac.cn/iw07/index.htm

2nd International Conference of GIS/RS in Hydrology, Water Resources and Environment (ICGRHWE'07): 17-23 September 2007, Guangzhou, China.

Website: <http://www.hydroinform.sysu.edu.cn/>

International Conference on Groundwater and Climate in Africa: 25-28 June 2008, Kampala, Uganda.

Website: <http://www.gwclim.org/>

Recent CAZRI publications

Impact of Shelterbelts in Arid Region of Western Rajasthan. Eds. R.S. Mertia, Rajendra Prasad, B.L. Gajja, J.S. Samra and Pratap Narain. 76p. 2006. CAZRI, Jodhpur.

Drought Assessment and Management in Arid Rajasthan. Eds. Pratap Narain, L.S. Rathore, R.S. Singh and, A.S. Rao. 64p. 2006. CAZRI, Jodhpur.

Production Technology for Horse Gram in India. Eds. D. Kumar. 20p. 2007. CAZRI, Jodhpur.

Rodent Newsletter. Vol. 30 (1-4). Eds. R.S. Tripathi, V.R. Prasad, M. Idris and Vipin Choudhary. 16p. 2006. AINP on Rodent Control, CAZRI, Jodhpur.

Rodent Pest Management in North East India. Eds. T. P. Rajendran, R.S. Tripathi, B.C. Dutta, D.K. Bora and A.M.K. Mohan Rao. 34p. 2007. AINP on Rodent Control, CAZRI, Jodhpur.

The Lesser Bandicoot Rat *Bandicota bengalensis* Gray and Hardwicke 1833. Eds. V.R. Prasad, Neena Singla, D.K. Kocher and Rajinder Kaur. 32p. 2007. AINP on Rodent Control, CAZRI, Jodhpur.

Improved Sheep and Goat Farming in Arid Zone (in Hindi). Eds. P. P. Rohilla, B.L. Jangid, Khemchand and Y.V. Singh. 22p. 2005. CAZRI.

VISIT ABROAD

P.B.L. Chaurasia, to Birmingham, U.K., from 4.6.2007, for research on a project "Power Generation from Solar Energy Based on PEM Fuel Cell".

O.P. Yadav, to Ithaca, USA, 25.11.2006 to 25.5.2007, for research on "Development of PCR-based Markers derived from Sorghum/Rice Gene Sequence Information Use in Pearl Millet Breeding Programme".

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