

Climate Variability and Rice-Wheat Productivity in the Indo-Gangetic Plains (APN 2002-10)

Project Leader:

Dr. R. K. GUPTA

Regional Facilitator

Rice Wheat Consortium for the Indo-Gangetic Plains

CIMMYT India Office, NASC Complex

DP Shastri Marg, Pusa

New Delhi-110012

INDIA

Tel: +91-11-582-2940, 582-7432

Fax: +91-11-582-2938

Email: r.gupta@cgiar.org

Climate Variability and Rice-Wheat Productivity in the Indo-Gangetic Plains (APN 2002-10)

APN funding

US\$ 40,000

Participating countries

Participants from the following countries were funded: Australia, Bangladesh, Germany, India, Japan, Nepal, New Zealand, Philippines, and USA.

One participant each from Canada and UK were self-funded.

Brief introduction and background

Rice-Wheat Systems are critical to South Asian food security. More than 150 million people support themselves by growing rice in rotation with wheat, but the sustainability of these systems is under threat on several fronts. Climate change and increasing climate variability have raised widespread concern, although the implications of these trends are not well understood.

Recognizing the complications that climate change and variability could bring to rice-wheat productivity, the Rice-Wheat Consortium (RWC) for the Indo-Gangetic Plains had identified a number of researchable issues directly related to improving agronomic management in response to changed climate variability which could be critically examined by developing a “systems analysis” modelling approach which would then be used to conduct scenario based quantitative “yield gap” analysis of changed climate and management. RWC, in collaboration with APN, organized a Research Planning Workshop aimed at developing the systems analysis approach. The workshop, involved about 20 researchers from the IGP and about 15 from other countries. The workshop was hosted by the RWC in New Delhi from 8-10 October 2002.

Outline of activities conducted

For re-orientation of the multidisciplinary participants to resource conserving technologies (RCTs), RWC organised a field visit to 3 villages in Uttar Pradesh, India on 6 October 2002. During the field visit the delegates interacted with the farmers and the consortium scientists. The participants were shown the new tillage and crop establishment options co-evolving with the Agents for changes in system ecology perspectives. These experiments related to site-specific nutrient management, tillage and crop establishment options, competitive cultivars for weed management, DSR rice and crop residue management, and crop diversification. This helped in better understanding the relevance of the RCTs to climate change and water issues. The following day resource persons made presentations, highlighting important issues related to water, quality of the resource base and environment, and climate change. The workshop participants also discussed issues of yield stagnation and declines and constraints in accelerating the pace in adoption of new RCTs.

Outcomes and products

Participants exchanged views on capabilities of the various computer simulation models

and data set requirements for handling issues related to RCTs. A CD-ROM containing all of the presentations made during the workshop was released during the final session of the workshop. The participants of the programme agreed to develop decision support tools for the improved management of the rice-wheat system in the IGP in the context of climate change and variability, and build on existing knowledge of new resource conserving practices in collaboration with the IGBP-GCTE networks.

Future directions and follow-up work

Main areas for future development include geo-referenced data management; cropping system model development; scientific capacity building for model use and interpretation; and developing client-oriented applications. This will be closely coupled with field experimentation specifically designed to improve modelling capacity in relation to new resource conserving technologies (e.g. developing permanent systems of zero-tillage and raised bed planting for rice-wheat, direct seeded rice in unpuddled flats, and crop residue and nutrient management etc.), assessing yield losses due to pests, and their role in promoting yield stability and gains in the face of climate change and variability.

A full proposal for developing systems analysis capability for the rice-wheat rotational system and targeted field research will be formulated. This proposal will be aimed at a number of agencies representing both global change science donors (e.g. APN, national research councils) and development agencies (e.g. those supporting the CGIAR Challenge Programmes).