

RFD

Results-Framework
Document

for

Directorate of Rice Research

Hyderabad

(2011-12)

Section 1: Vision, Mission, Objectives and Functions

Vision

Welfare of the present and future generations of Indian rice farmers and consumers by ensuring food and nutritional security

Mission

Develop technologies to enhance rice productivity, resource and input use efficiency and profitability of rice cultivation without adversely affecting the environment

Objectives

1. Strengthening frontier research for enhancing rice production, productivity and quality to meet domestic and export demands
2. Improving efficiency of resources and inputs for sustainable production
3. Evaluation of genetic resources/germplasm
4. Integrated management of biotic stresses
5. Identification of technologies suitable for different ecologies/environments
6. Validation, dissemination and commercialization of technologies developed and promoting public-private partnership

Functions

- To conceptualize, initiate, monitor Institutional Research Projects aimed at enhancing rice production and productivity
- To propose, defend/compete and initiate network/single institute research projects with external funding in frontier and emerging areas of rice research
- To organize AICRP on rice studies involving multi-location testing and identification of technologies for diverse rice ecologies
- To coordinate breeder seed production of rice varieties and hybrid parental lines to meet the demands of DAC
- To coordinate front-line demonstrations of proven varietal and production technologies as per the DAC requirements
- To disseminate knowledge and skills through formal training, informal out-reach activities and exploring ICT

Section 2: Inter se Priorities among Key Objectives, Success indicators and Targets

| Objective | Weight | Action | Success indicator | Unit | Weight | Target/ Criteria value | | | | |
|--|--------|---|---|------|--------|------------------------|------------|------------|------------|------------|
| | | | | | | Excellent | Very Good | Good | Fair | Poor |
| | | | | | | 100% | 90% | 80% | 70% | 60% |
| 1. Identification of technologies suitable for different ecological and socio-economic environment | 25 | Organization of coordinated trials in different disciplines | Data receipt and analysis | Date | 5 | 15/01/2012 | 31/01/2012 | 10/02/2012 | 20/02/2012 | 28/02/2012 |
| | | | Report preparation & presentation | Date | 10 | 01/04/2012 | 10/04/2012 | 15/04/2012 | 20/04/2012 | 30/04/2012 |
| | | | Constitution & Conduct of trial | No. | 5 | 75 | 70 | 65 | 60 | 50 |
| | | | Monitoring of trials at centers | No. | 5 | 40 | 35 | 30 | 25 | 20 |
| 2. Strengthening frontier research for enhancing rice production, productivity and quality to meet domestic and export demands | 24 | Development of better hybrids | Identification of maintainers and restorers | No. | 2 | 40 | 30 | 20 | 10 | 5 |
| | | | Handling of backcrosses | No. | 2 | 10 | 9 | 8 | 7 | 6 |
| | | | Evaluation of breeding lines for Rf and wc genes | No. | 2 | 100 | 80 | 60 | 50 | 40 |
| | | Improvement of plant type | Map QTLs / genes for high yield from wild species and tropical japonica | No. | 2 | 5 | 4 | 3 | 2 | 1 |
| | | | Transfer yield enhancing QTLs / genes into elite varieties and hybrids | No. | 2 | 5 | 4 | 3 | 2 | 1 |
| | | | Evaluate introgression lines for agronomically superior traits | No. | 2 | 50 | 40 | 30 | 20 | 10 |
| | | Improvement of aromatic, quality rice and enhancing nutritional quality | Generation and evaluation of breeding material | No. | 2 | 200 | 15 | 100 | 50 | 25 |
| | | | Analysis for quality and nutritional parameters | No. | 2 | 25 | 20 | 15 | 10 | 5 |
| | | | Identification markers for quality traits, Fe, Zn | No. | 2 | 4 | 3 | 2 | 1 | 0 |
| | | Improvement of varieties through biotechnological tools | Biotic stresses | No. | 4 | 20 | 15 | 10 | 5 | 1 |
| Abiotic stresses | No. | | 2 | 10 | 8 | 6 | 4 | 2 | | |
| 3. Improving soil health and water and input use efficiency, and farm machinery and improving processing | 15 | Enhancing productivity of soil, water and energy resources | Identification of suitable rice-based cropping systems for resource conservation, productivity and sustainability | No. | 2 | 4 | 3 | 2 | 1 | 0 |
| | | | Analysis of plant water stress indicators | No. | 3 | 10 | 8 | 6 | 4 | 2 |
| | | | Field survey and analysis of soil quality parameters in intensive rice systems | No. | 1 | 100 | 80 | 60 | 40 | 20 |
| | | | Rhizosphere microbial diversity in relation to soil health | No. | 1 | 10 | 8 | 6 | 4 | 2 |
| | | Improving input use efficiency | Analysis and identification of parameters for efficient input use | No. | 1 | 8 | 6 | 4 | 3 | 2 |

| | | | | | | | | | | |
|--|----|---|---|------|---|------------|------------|------------|------------|------------|
| | | | Testing and identification of promising genotypes for higher nutrient use efficiency | No | 2 | 30 | 20 | 15 | 10 | 5 |
| | | Sustaining rice productivity under changing climate | Analysis and identification of crop parameters for heat tolerance and elevated CO ₂ | No | 3 | 8 | 6 | 5 | 3 | 2 |
| | | | Testing of crop, land and climatic parameters for validation/development of crop growth models for climate change | No | 2 | 12 | 10 | 8 | 6 | 4 |
| 4. Integrated pest management | 15 | Identification of new sources of resistance | Screening advanced breeding lines for resistance | No. | 5 | 500 | 400 | 300 | 200 | 100 |
| | | Evaluation of new molecules and formulation of pesticides / weedicides for bio-efficacy and safety | Screening of pesticides in greenhouse and field trials | No. | 5 | 30 | 25 | 20 | 15 | 10 |
| | | Identification and evaluation of new biocontrol agents | Studies on promising/novel biocontrol agents | No. | 2 | 4 | 3 | 2 | 1 | 0 |
| | | Evaluation of novel methods of pest population regulation | Studies on novel methods of pest population regulation | No. | 1 | 4 | 3 | 2 | 1 | 0 |
| | | Integration of control methods | Demonstration of IPM technology through MLT trials | No. | 2 | 4 | 3 | 2 | 1 | 0 |
| 5. Validation and Commercialization of technologies developed and promoting public-private partnership | 5 | Organization of FLDs | Laying out FLDs | No. | 1 | 100 | 75 | 50 | 30 | 20 |
| | | Organization of Breeder seed production | Multi-location breeder seed production for varieties and parental lines | No. | 1 | 250 | 200 | 150 | 100 | 50 |
| | | Organization of sponsored and need based training programmes | Conducting training programmes on rice production technologies | No. | 2 | 9 | 7 | 5 | 3 | 2 |
| | | Maintenance of rice knowledge portal | Web articles updated/added to the portal | No. | 1 | 400 | 300 | 200 | 100 | 50 |
| 6. Evaluation of Genetic resources/ germplasm for sustainable use | 5 | Characterization of germplasm and evaluation for biotic stresses | Agro-morphological characters | No. | 3 | 3000 | 2500 | 2000 | 1500 | 1000 |
| | | | Biotic stresses | No. | 2 | 350 | 300 | 250 | 200 | 150 |
| 7. Efficient functioning of RFD system | 11 | Timely submission of draft for approval | On-time submission | Date | 2 | 10/06/2011 | 14/06/2011 | 16/06/2011 | 20/06/2011 | 22/06/2011 |
| | | Timely submission of results | On-time submission | Date | 1 | 01/05/2012 | 03/05/2012 | 04/05/2012 | 05/05/2012 | 06/05/2012 |
| | | Finalize a strategic plan for RSC | Finalize the strategic plan for next 5 years | Date | 2 | 10/12/2011 | 15/12/2011 | 20/12/2011 | 25/12/2011 | 31/12/2011 |
| | | Identify potential areas of corruption related to organization activities and develop an action plan to mitigate them | Finalize an action plan to mitigate potential areas of corruption | Date | 2 | 10/12/2011 | 15/12/2011 | 20/12/2011 | 25/12/2011 | 31/12/2011 |
| | | Implementation of Sevottam | Create a Sevottam compliant system to implement, monitor and review citizens charter | Date | 2 | 10/12/2011 | 15/12/2011 | 20/12/2011 | 25/12/2011 | 31/12/2011 |
| | | | Create a Sevottam compliant system to redress and monitor public grievances | Date | 2 | 10/12/2011 | 15/12/2011 | 20/12/2011 | 25/12/2011 | 31/12/2011 |

Section 3: Trend Values of the Success Indicators

| Objective | Weight | Action | Success indicator | Unit | Actual value | Actual value | Target value | Projected value | Projected value |
|--|--------|---|---|------|--------------|--------------|--------------|-----------------|-----------------|
| | | | | | FY 09/10 | FY 10/11 | FY 11/12 | FY 12/13 | FY 13/14 |
| 1. Identification of technologies suitable for different ecological and socio-economic environment | 25 | Organization of coordinated trials in different disciplines | Data receipt and analysis | Date | 10/02/2010 | 10/02/2011 | 31/01/2012 | 31/01/2013 | 31/01/2014 |
| | | | Report preparation & presentation | Date | 03/04/2012 | 08/04/2012 | 10/04/2012 | 10/04/2013 | 10/04/2014 |
| | | | Constitution & Conduct of trial | No. | 60 | 60 | 70 | 65 | 65 |
| | | | Monitoring of trials at centers | No. | 25 | 30 | 35 | 35 | 35 |
| 2. Strengthening frontier research for enhancing rice production, productivity and quality to meet domestic and export demands | 24 | Development of better hybrids | Identification of maintainers | No. | 10 | 12 | 20 | 22 | 25 |
| | | | Handling of backcrosses | No. | 6 | 6 | 9 | 10 | 10 |
| | | | Evaluation of breeding lines for Rf and wc genes | No. | 50 | 50 | 80 | 90 | 100 |
| | | Improvement of plant type | Map QTLs / genes for high yield from wild species and tropical japonica | No. | 2 | 2 | 4 | 5 | 6 |
| | | | Transfer yield enhancing QTLs / genes into elite varieties and hybrids | No. | 0 | 2 | 4 | 5 | 6 |
| | | | Evaluate introgression lines for agronomically superior triats | No. | 20 | 25 | 40 | 50 | 55 |
| | | Improvement of aromatic and quality rice | Generation and evaluation of breeding material | No. | 75 | 75 | 150 | 175 | 200 |
| | | | Analysis for quality and nutritional parameters | No. | 10 | 15 | 20 | 20 | 20 |
| | | | Identification markers for quality, Fe and Zn traits | No. | 1 | 1 | 1 | 1 | 2 |
| | | Improvement of varieties through biotechnological tools | Biotic stresses | No. | 5 | 10 | 15 | 16 | 18 |
| Abiotic stresses | No. | | 2 | 3 | 4 | 5 | 6 | | |
| 3. Improving soil health and water and input use efficiency, and farm machinery and improving processing | 15 | Enhancing productivity of soil, water and energy resources | Identification of suitable rice-based cropping systems for resource conservation, productivity and sustainability | No | 1 | 2 | 3 | 4 | 5 |
| | | | Analysis of plant water stress indicators | No | 4 | 5 | 8 | 9 | 9 |
| | | | Field survey and analysis of soil quality parameters in intensive rice systems | No | 0 | 30 | 80 | 90 | 90 |
| | | | Rhizosphere microbial diversity in relation to soil health | No | 4 | 5 | 8 | 9 | 10 |
| | | Improving input use efficiency | Analysis and identification of parameters for efficient input use | No | 2 | 3 | 6 | 7 | 8 |

| | | | | | | | | | |
|--|----|--|---|------|------|------------|------------|------------|------------|
| | | | Testing and identification of promising genotypes for higher nutrient use efficiency | No | 10 | 10 | 20 | 25 | 30 |
| | | Sustaining rice productivity under changing climate | Analysis and identification of crop parameters for heat tolerance and elevated CO ₂ | No | 8 | 6 | 6 | 7 | 8 |
| | | | Testing of crop, land and climatic parameters for validation/development of crop growth models for climate change | No | 6 | 6 | 10 | 12 | 14 |
| 4. Integrated pest management | 15 | Identification of new sources of resistance | Screening advanced breeding lines for resistance | No. | 200 | 250 | 400 | 450 | 500 |
| | | Evaluation of new molecules and formulation of pesticides/weedicides for bio-efficacy and safety | Screening of pesticides in greenhouse and field trials | No. | 10 | 15 | 25 | 30 | 35 |
| | | Identification and evaluation of new biocontrol agents | Studies on promising/novel biocontrol agents | No. | 2 | 2 | 3 | 4 | 5 |
| | | Evaluation of novel methods of pest population regulation | Studies on novel methods of pest population regulation | No. | 1 | 1 | 3 | 4 | 5 |
| | | Integration of control methods | Demonstration of IPM technology through MLT trials | No. | 0 | 1 | 3 | 4 | 5 |
| 5. Validation and Commercialization of technologies developed and promoting public-private partnership | 5 | Organization of FLDs | Laying out FLDs | No. | 40 | 45 | 75 | 100 | 125 |
| | | Organization of Breeder seed production | Multi-location breeder seed production for varieties and parental lines | No. | 100 | 125 | 200 | 250 | 300 |
| | | Organization of sponsored and need based training programmes | Conducting training programmes on rice production technologies | No. | 8 | 5 | 7 | 10 | 12 |
| | | Maintenance of Rice Knowledge portal | Web articles updated/added to the portal | No. | - | 100 | 300 | 500 | 700 |
| 6. Evaluation of Genetic resources/ germplasm for sustainable use | 5 | Characterization of germplasm and evaluation for biotic stresses | Agro-morphological characters | No. | 1000 | 1500 | 2500 | 2750 | 3000 |
| | | | Biotic stresses | No. | 200 | 200 | 300 | 350 | 400 |
| 7. Efficient functioning of RFD system | 11 | Timely submission of draft for approval | On-time submission | Date | -- | 08/03/2010 | 11/06/2011 | 10/06/2012 | 10/06/2013 |
| | | Timely submission of results | On-time submission | Date | -- | -- | 03/05/2012 | 01/05/2013 | 01/05/2014 |

Section 4: Description and Definition of Success Indicators and Proposed Measurement Methodology

Objective 1: With respect to strengthening frontier research for enhancing rice production, productivity and quality to meet domestic and export demands, it is envisaged to intensify research on development of hybrids with better grain and cooking quality aimed at expansion of area under hybrids mainly in southern India. At least one new hybrid will be developed during this period.

Objective 2: With respect to evaluation of genetic resources/germplasm for sustainable use, the large collection of rice germplasm maintained at NBPGR, New Delhi is being characterized for tolerance/resistance to biotic and abiotic stresses and also for agromorphological traits. These well characterized accessions will be a resource in breeding programme. It is envisaged to evaluate at least 10,000 lines during this plan period.

Objective 3: Our endeavors in improving soil health and enhancing water and input use efficiency, and develop farm machinery and improving processing are aimed at reduction of the cost of cultivation, to increase profits for the farmer and to sustain rice farm system productivity.

Objective 4: With respect to integrated pest management, research efforts are focused on strengthening of components of IPM like host-plant resistance, need based chemical control, identification and effective utilization of biocontrol agents, identification and evaluation of novel methods of pest population regulation and synthesis and demonstration of site specific IPM package.

Objective 5: Identification of technologies suitable for different ecological and socio-economic environment through the largest AICRP network on rice aims at rapid identification of varietal and other rice production technologies and facilitate rapid dissemination of seeds of promising varieties. The network caters to all the rice ecologies, and socio-economic environment of the rice farmers.

Section 5:

Specific Performance Requirements from other Departments

- Our germplasm evaluation programme is linked to the availability of the germplasm from NBPGR, New Delhi.
- Conduct of Frontline Demonstrations is in collaboration and cooperation of the Department of Agriculture and Cooperation.
- Breeder seed production is taken up at the behest of indents received from DAC, and seed will be produced by our cooperators.
- Part of our germplasm evaluation depends on receipt of INGER nurseries from IRRI, Philippines.

Section 6: Outcome/Impact of RCs

| S.No. | Outcome/Impact of RCs | Jointly responsible for influencing this outcome/impact with the following RCs/ Departments | Success indicator | Unit | FY 09/10 | FY 10/11 | FY 11/12 | FY 12/13 | FY 13/14 |
|-------|------------------------------|---|---|------|----------|----------|----------|----------|----------|
| 1 | Enhanced rice productivity | DAC/line Departments | Release of new varieties/hybrids | No. | 0 | 0 | 10 | 12 | 15 |
| | | | Front-line Demonstrations | No. | 0 | 0 | 75 | 100 | 125 |
| | | | Breeder seed production in Qtls | No. | 0 | 0 | 200 | 250 | 300 |
| | | | Dissemination of information to farmers through ICTs and training | No. | 0 | 0 | 1000 | 1500 | 2000 |
| 2 | Improved breeding efficiency | Null | Availability of molecular markers for important agronomic traits | No. | 0 | 0 | 5 | 10 | 12 |
| 3 | Reduced cost of cultivation | Line departments | Improved crop management practices | No. | 0 | 0 | 3 | 4 | 5 |
| | | | Technologies to save on cost of inputs | No. | 0 | 0 | 5 | 5 | 10 |
| | | | Technologies to save on cost of labour | No. | 0 | 0 | 3 | 4 | 5 |