



**Results-Framework Document (RFD)**  
**for**  
**National Research Centre on Plant Biotechnology**  
**(2011-12)**

**LBS Building, Pusa Campus, New Delhi - 110 012**

**[www.nrcpb.org](http://www.nrcpb.org)**

## **Section 1: Vision, Mission, Objectives and Function**

### **Vision:**

Contributing to sustainable food, nutritional, ecological and livelihood security of the country through development and deployment of tools and techniques of modern plant biotechnology

### **Mission:**

Enhancing and sustaining crop productivity and quality by generating and harnessing the genomic, bioinformatic and trained human resources in harmony with ecology and environment

### **Objectives:**

- Strengthening frontier molecular biology research for enhancing agricultural production and productivity
- Identification and isolation of useful genes and promoters for the development of transgenics
- Designing and deploying high throughput SNP genotyping assays for molecular breeding
- Intellectual property protection and commercialization of molecular tools and protocols
- Capacity building in Plant Biotechnology

### **Functions:**

- To undertake plant molecular biology research for understanding molecular mechanisms underlying basic biological processes
- To devise tools and techniques of biotechnology for crop improvement
- To apply the knowledge of genomics and bioinformatics for advancing agricultural production
- To serve as a national lead centre for plant molecular biology and biotechnology research and create trained manpower in the area of plant biotechnology.

## Section 2: *Inter se* priorities among Key objectives, Success Indicators and Targets

S. N.	Objectives	Wt	Action	S. I.	Unit	Weight	Target criteria value				
							Excellent	V. Good	Good	Fair	Poor
							100	90	80	70	60
1.	Strengthening frontier molecular biology research for enhancing agricultural production and productivity	40	Generation of genomic resources base for gene discovery and crop genetic enhancement	Sequencing of 100 fosmid clones for gap filling between contigs of assembled genome sequence of <i>M. ciceri</i>	Date	10	25/2/11	10/3/11	20/3/11	25/3/11	31/3/11
				Completion of sequencing and assembly of long arm of tomato Chromosome 5	Date	15	15/2/11	10/3/11	15/3/11	25/3/11	31/3/11
				Re-sequencing of genomes of rice genotypes with contrasting levels of abiotic stress tolerance	Number	10	Six	Five	Four	Three	Two
			Initiating a new programme on Plant Phenomics research for abiotic stress tolerance	Initiating the programme for establishment and use of a centralized Plant Phenomics facility for precision phenotyping of moisture deficit and low temperature stress tolerance in rice	Date	5	10/03/11	20/03/11	30/03/11	07/04/11	15/03/11
2	Development of transgenics for biotic stress tolerance	20	Genetic transformation of female parent of brinjal variety Pusa Hybrid 6	Molecular validation of transgenicity of the female parent for Bt gene cry2Aa	Date	10	28/02/11	10/3/11	20/3/11	25/3/11	31/3/11
			Genetic transformation of male parent of brinjal variety Pusa Hybrid 6	Molecular validation of transgenicity of the male parent for Bt gene cry1F	Date	10	28/02/11	10/3/11	20/3/11	25/3/11	31/3/11
3	Intellectual property protection and commercialization	20	Protection of intellectual property related to novel genes, promoters and technologies for crop improvement	Filing of complete patent application for protection of innovations	Number	20	6	5	4	3	2
4	Capacity	15	Human resource	M. Sc. degree	Number	4	4	3	2	1	0

	building in Plant Biotechnology		development by imparting post-graduate teaching and training	Ph.D. degree	Number	4	3	2	1	0	0
				Medium/Long term trainees	Number	7	10	5	4	3	2
5	Efficient functioning of RFD system	5	Timely submission of draft for approval	On-time submission	Date	2	16/03/11	23/03/11	30/03/11	07/04/11	14/04/11
			Timely submission of results	On-time submission	Date	3	25/03/11	30/03/11	07/04/11	14/04/11	21/04/11

### Section 3: Trend Values of the Success Indicators

S. N.	Objective	S. I.	Unit	Actual Value for FY 08-09	Actual Value for FY 09-10	Target Value for FY 10-11	Projected Value for FY 11-12	Projected Value for FY 12-13
1.	Strengthening frontier molecular biology research for enhancing agricultural production and productivity	Sequencing of 100 fosmid clones for gap filling between contigs of assembled genome sequence of <i>M. ciceri</i>	Date	-	-	25/2/11	-	-
		Completion of sequencing and assembly of long arm of tomato Chromosome 5	Date	-	-	15/2/11	-	-
		Re-sequencing of genomes of rice genotypes with contrasting levels of abiotic stress tolerance	Number	-	-	Six	Four	-
		Initiating a programme for establishment and use of a centralized Plant Phenomics facility for precision phenotyping of moisture deficit and low temperature stress tolerance in rice	Date	-	-	10/03/11	-	-
2	Development of transgenics for biotic stress tolerance	Molecular validation of transgenicity of the female parent for Bt gene cry2Aa	Date	-	-	28/02/11	-	-
		Molecular validation of transgenicity of the male parent for Bt gene cry1F	Date	-	-	28/02/11	-	-
3	Intellectual property protection and commercialization	Filing of complete patent application for protection of 6 innovations	Number	2	7	6	3	4
4	Capacity building in Plant Biotechnology	M. Sc. degree	Number	4	3	4	4	4
		Ph.D. degree	Number	3	6	3	3	3
		Long term trainees	Number	80	80	100	100	100
5	Efficient functioning of RFD system	Timely submission of draft for approval	Date	-	-	16/03/11	-	-
		Timely submission of results	Date	-	-	25/03/11	-	-

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

**Objective 1:** With respect to strengthening frontier research for generating genomic resources and utilizing them for enhancing agricultural production and productivity, it is envisaged to sequence genome of crop plants and microbes to accelerate gene discovery and marker development which can subsequently be employed for crop genetic manipulation. The extent of sequence generation in the target species and date of completion would be used to measure success.

**Objective 2:** When genetic variation for the trait of interest is not available in the species or an already existing gene needs to be over or under expressed to obtain the desirable phenotype, it becomes essential to resort to genetic engineering route for genetic enhancement of crops. This objective therefore aims to develop transgenics for genetic enhancement of crops for selected traits. Development of a set of transgenics and their characterization including molecular and phenotypic evaluation within a specified time frame are success indicators.

**Objective 3:** Designing of novel tools/techniques in biotechnology and discovery of new genes and promoters are capital intensive and involve considerable intellectual inputs. For protection of such biotechnological innovations, it is required to protect them and regulate their use for the benefit of poor farmers, consumers, and innovators. Therefore, the novel genes and promoters, and technologies developed at the centre will be protected by patenting. The success indicators would be the number of provisional or complete patent applications filed and the number of patents granted in a specific time frame.

**Objective 4:** With regard to capacity building in agricultural biotechnology in the country, it is essential to generate a critical mass of trained human resource particularly in the frontier areas. This objective aims at skill development through post-graduate teaching and imparting training. The number of M.Sc. and Ph.D. students receiving their degrees and the number of students undergoing medium/long-term trainings will be used to evaluate success and monitor progress.

### **Section 5: Specific Performance requirement from other department**

- For field and phytotron experiments, support from IARI, New Delhi is essential round the year.
- The time taken to grant patents will be linked to the efficiency of the concerned agency
- HRD through post-graduate teaching will depend upon the number of students allotted through IARI and ICAR.