



# RFD

**(Results-Framework Document)**

**For**

**Indian Agricultural Research Institute**

**New Delhi**

**(2011-12)**

# **Section-1**

## **Vision, Mission, Objectives and Functions**

### **Vision**

Generation and extension of innovative technologies to achieve food, nutrition and livelihood security with sustainable agriculture, and economic prosperity along with quality human resource development under dynamic constrained physical and economic environment in the country.

### **Mission**

The primary mission of the Institute is to explore new frontiers of science and knowledge and develop human resource to provide leadership to the country in technology development and policy guidance resulting in a vibrant, responsive and resilient agriculture which must be effectively productive, eco-friendly, sustainable, economically profitable and socially equitable.

### **Objectives**

1. Improving crop productivity and quality through conventional and molecular approaches
2. Enhancing crop production through conservation and efficient management of natural resources; and development of technologies adapted to climate change.
3. Bio security and efficient management of pests, diseases and nematodes through conventional and frontier research
4. Socio-economic & policy research and commercialization of technologies.
5. Technological interventions for enhancing profitability through improved farm machinery, post- harvest management and value addition.
6. Development of globally competitive human resources

### **Functions**

To function on the premise that research is the engine of science-led agricultural growth.

To follow the path of scientific research, technology development and extension and human resource development leading to the realization of new paradigms for achieving the congruence among enhanced productivity, sustainability, ecological and environmental security and socio-economic equity

## 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%	
<b>Improving crop productivity and quality through conventional and molecular approaches.</b>	25	Evaluation of improved varieties for suitable crop husbandry practices	Number of breeding lines evaluated	Number	0.5	18012	16211	14410	12609	10000	
		Evaluation, characterization, registration of germplasm/variety	Number of germplasm/population characterized and evaluated	Number	0.5	9469	8522	7575	6628	5681	
			Number of germplasm/population/ variety registered		0.5	2	2	2	2	2	
		Characterization and evaluation of novel and beneficiary micro-organisms	Microorganisms identified/isolates characterized/registered	Number	0.5	120	112	100	87	75	
		Conservation/maintenance of germplasm	Plants/genetic stocks conserved in situ	Number	0.5	890	806	716	625	535	
			Plants/genetic stocks conserved ex- situ	Number	0.5	6655	5990	5324	4660	3990	
		Pre-breeding and basic activities for genetic improvement	Trait specific crosses attempted	Number	1	4475	4029	3580	3130	2685	
		Evaluation of nutrition, quality and productivity response	Number of varieties tested for quality/ productivity	Number	1	2915	2624	2332	2040	1750	
		Development of varieties/hybrids for field crops	Varieties/hybrids identified	Number	1	7	6	5	5	4	
			Varieties/hybrids released	Number	1	6	5	4	4	3	
		Development of varieties/hybrids for vegetable crops	Varieties/hybrids identified/ released	Number	2	4	4	4	3	3	
		Development of varieties/hybrids for fruit crops	Varieties/hybrids identified/ released	Number	2	4	4	4	3	3	
		Development of varieties/hybrids for flower crops	Varieties/hybrids identified/ released	Number	2	2	2	2	2	1	
		Production of Nucleus seed	Nucleus seed produced								
			Cereals	Tonnes	0.5	32	29.5	26	23	20	
			Pulses	Tonnes	0.5	11	10.0	9	8	7	
Oil Seeds	Tonnes		0.5	0.01	0.01	0.01	0.01	0.01			
Production of Breeder seed	Vegetables	Tonnes	0.5	0.006	0.005	0.004	0.003	0.002			
	Breeder seed produced										
	Cereals	Tones	0.5	330	296.87	264	230	200			
	Pulses	Tones	0.5	20	17.58	16	14	12			
	Oil Seeds	Tones	0.5	5	4.28	4	3	3			



Socio-economic & policy research, capacity building and commercialization of technologies	15	Policy research in agricultural marketing and trade	Policy documents prepared	Number	0.5	2	2	2	2	1
		Market intelligence/Impact assessment	Commodities covered	Number	0.5	3	3	3	2	2
		Development of strategies and models in extension	Strategies/models developed	Number	1	3	3	3	2	2
		Transfer of knowledge	Capacity building of farmers, extension professionals and other stakeholders	Number	2	22143	19929	17715	15500	13286
		Advisory service (including, farmers contacted in melas).	Farmers contacted/advised	Number	1	177389	159650	141911	124172	106433
		Empowerment of rural women	Farm women skill developed	Number	2	1987	1788	1589	1391	1192
		Organization of demonstration	Demonstration organized	Numbers	1	3956	3560	3164	2769	2373
		Products/Processes development and commercialization	Products/Processes developed and commercialized	Number	2	20	18	16	14	12
			MOUs signed	Number	2	56	50	44	39	33
			Patents filed	Number	2	10	9	8	7	6
Business incubation	Number		0.5	3	3	3	2	2		
		Revenue generated	Rs.(lakh)	0.5	123	111	99	86	74	
Technological interventions for enhancing profitability through improved farm machinery, post- harvest management and value addition	6	Development of design/implements/ technology/machinery	Designs developed and tested	Number	1	1	1	1	1	1
			Machinery validated and commercialized	Number	1	1	1	1	1	1
	Development of post-harvest technologies	Technologies tested and validated	Number	2	2	2	2	2	1	
		Technology for drying, milling, and packaging developed	Number	1	1	1	1	1	1	
	Development of nutraceuticals and value added food products	Protocols standardized/process developed/commercialized	Number	1	2	2	2	2	1	
Development of globally competitive human resources	20	M.Sc. Programme	No. of students admitted	Number	3	120	108	96	84	72
			No of students awarded degrees	Number	3	120	120	107	93	80
	Ph.D Programme	No. of students admitted	Number	3	142	128	114	100	85	
		No of students awarded degrees	Number	3	91	82	73	64	55	
	AHRD Trainings & offshore support	No of trainings conducted	Number	2	19	17	15	13	11	
		No of participants trained	Number	3	3150	3159	2808	2457	2106	
		HRD support provided to foreign countries	Number	1	8	7	6	5	5	
		Faculty provided advance trainings	Number	1	34	31	28	24	21	
		International/National Seminar/workshop etc. organised	Number	1	24	22	20	17	15	

## Mandatory success indicators (For 2011-2012)

Objective	Weight	Action	Success Indicator	Unit	Weight	Target/Criteria value				
						Excellent	Very Good	Good	Fair	Poor
						100%	90%	80%	70%	60%
Efficient Functioning of the RFD System	7	Timely submission of Draft for approval	Timely submission of RFD for 11-12	Date	2	12/03/12	13/03/12	15/03/12	20/03/12	25/03/12
		Timely submission of Results	Timely submission of results for 11-12	Date	1	01/05/12	05/05/12	10/05/12	15/05/12	20/05/12
		Finalize a Strategic Plan(After meeting all intermediate deadlines)	Finalize a strategic plan for next five year plan	Date	2	05/12/11	10/12/11	15/12/11	20/12/11	25/12/11
		Identify potential areas of corruption related to organization activity and develop an action plan to mitigate them	*Areas identified	Number and action plan	2	No complaint or 100% redressal	80% redressal and 100% action taken	60% redressal and 100% action taken	50% redressal and 80% action taken	50% redressal and 70% action taken
Improving Internal Efficiency /responsiveness service delivery of Ministry /Department	4	Implementation of Sevottam	**Create a Sevottam compliant system to implement, monitor and review citizen's charter	Date	2	Dec. 10, 2011	Dec. 15, 2011	Dec. 20, 2011	Dec. 25, 2011	Dec.30, 2011
			***Create a Sevottam compliant system to redress and monitor public grievances	Date	2	Dec. 10, 2011	Dec. 15, 2011	Dec. 20, 2011	Dec. 25, 2011	Dec.30, 2011

## Results Framework Document (RFD) for Indian Agricultural Research Institute, New Delhi

### Section 3:

#### Trend Values of the Success Indicators

Objective	Action	Success Indicator	Unit	Actual value for FY 09/10	Actual value for FY 10/11	Actual value for FY 11/12	Targeted Value for FY 12/13	Projected Value for FY 13/14	
<b>Improving crop productivity and quality through conventional and molecular approaches.</b>	Evaluation of improved varieties for suitable crop husbandry practices	Number of breeding lines evaluated	Number	14020	11605	16211	12746	12880	
	Evaluation, characterization, registration of germplasm/variety	Number of germplasm/population characterized and evaluated	Number	6692	8499	8522	8400	8500	
		Number of germplasm/population/ variety registered	Number	1	2	2	24	25	
	Characterization and evaluation of novel and beneficiary micro-organisms	Microorganisms identified/isolates/ characterized/resistered	Number	130	82	112	75	80	
	Conservation/maintenance of germplasm	Plants/genetic stocks conserved in situ	Number	585	646	806	1138	1338	
		Plants/genetic stocks conserved ex- situ	Number	3379	4395	5990	6250	6800	
	Pre-breeding and basic activities for genetic improvement	Trait specific crosses attempted	Number	2989	3186	4029	3785	4084	
	Evaluation of nutrition, quality and productivity response	Number of varieties tested for quality/ productivity	Number	2108	2382	2624	2032	2156	
	Development of varieties/hybrids for field crops	Varieties/hybrids identified	Number	12	11	6	9	9	
		Varieties/hybrids released	Number	4	12	5	5	5	
	Development of varieties/hybrids for vegetable crops	Varieties/hybrids identified/ released	Number	1	1	4	2	2	
	Development of varieties/hybrids for fruit crops	Varieties/hybrids identified/ released	Number	4	4	4	3	3	
	Development of varieties/hybrids for flower crops	Varieties/hybrids identified/ released	Number	5	5	2	2	2	
	Production of Nucleus seed	Nucleus seed produced							
		Cereals	Tonnes	25.00	27.60	29.50	30.86	34.57	
		Pulses	Tonnes	8.93	9.97	10.00	10.55	11.41	
		Oil Seeds	Tonnes	0.01	0.01	0.01	0.01	0.01	
		Vegetables	Tonnes	0.004	0.005	0.005	0.007	0.008	
	Production of Breeder seed	Breeder seed produced							
		Cereals	Tones	457.45	284.70	296.87	320.95	359.47	
Pulses		Tones	11.02	8.59	17.58	17.75	19.96		
Oil Seeds		Tones	12.55	3.91	4.28	4.49	5.17		
Vegetables		Tones	0.25	0.60	0.60	0.69	0.80		
Production of quality seed	Quality seed produced								





Socio-economic & policy research, capacity building and commercialization of technologies	Policy research in agricultural marketing and trade	Policy documents prepared	Number	1	1	2	2	2
	Market intelligence/Impact assessment	Commodities covered	Number	1	1	3	3	3
	Development of strategies and models in extension	Strategies/models developed	Number	3	3	3	4	4
	Transfer of knowledge	Capacity building of farmers, extension professionals and other stakeholders	Number	13892	19626	19929	21804	22805
	Advisory service (including farmers contacted in melas).	Farmers contacted/advised	Number	128508	134191	159650	204820	225400
	Empowerment of rural women	Farm women skill developed	Number	685	1098	1788	1650	1850
	Organization of demonstration	Demonstration organized	Numbers	1295	2930	3560	1000	1000
	Products/Processes development and commercialization	Products/Processes developed and commercialized	Number	1	15	18	10	12
		MOUs signed	Number	1	12	50	10	12
		Patents filed	Number	1	2	9	4	5
Business incubation		Number	-	5	3	5	5	
	Revenue generated	Rs.(lakh)	41	93	111	119	132	
Technological interventions for enhancing profitability through improved farm machinery, post-harvest management and value addition	Development of design/implements/technology/machinery	Designs developed and tested	Number	-	1	1	1	1
		Machinery validated and commercialized	Number	-	-	1	1	1
	Development of post harvest technologies	Technologies developed/ tested and validated	Number	-	-	2	6	4
		Technology for drying, milling, and packaging developed	Number	-	-	1	1	1
	Development of nutraceuticals and value added food products	Protocols standardized/process developed/commercialized	Number	-	-	2	2	2
Development of globally competitive human resources	M.Sc. Programme	No. of students admitted	Number	107	110	108	115	115
		No of students awarded degrees	Number	75	99	120	100	100
	Ph.D Programme	No. of students admitted	Number	128	128	128	128	128
		No of students awarded degrees	Number	69	73	82	75	75
	AHRD Trainings & offshore support	No of trainings conducted	Number	22	25	17	15	15
		No of participants trained	Number	477	527	3159	250	250
		HRD support provided to foreign countries	Number	-	-	7	2	2
		Faculty provided advance trainings	Number	37	45	31	30	30
		International/National Seminar/workshop etc. organised	Number	53	24	22	20	20

## **Section 4:**

### **Description and Definition of Success Indicators and Proposed Measurement Methodology**

#### **Objective 1: Improving crop productivity and quality through conventional and molecular and approaches**

With respect to objective -1, the following are the success indicators to measure the outcome.

Number of breeding lines evaluated (for field and horticultural crops), varieties tested for quality/productivity (varieties of all crops tested), germplasm/population collected/introduced (all crops), germplasm /population characterized and evaluated(all crops), germplasm/population/ variety registered(all crops), plants/genetic stocks conserved in situ (Horticultural crops), plants/genetic stocks conserved ex- situ (all crops), trait specific crosses attempted (all crops), varieties/hybrids identified (all crops), varieties/hybrids released (all crops), quantity of Nucleus, Breeders, and Quality seed produced(for Cereals, Pulses, Oil Seeds and Vegetables and flowers), number of quality planting material produced (Horticultural crops), number of genes identified, incorporated/validated, and number of genes sequenced and deposited in data bank.

#### **Objective 2: Enhancing crop production through conservation and efficient management of natural resources and development of technologies adapted to climate change.**

Number of technologies developed and tested/validated for various activities viz., INM, Water management, increase production, conservation agriculture, improvement of soil health, protected agriculture, GHG and promoting carbon sequestration, and waste water management are the success indicators for this objective. The term tested/validated here refers to the developed technologies to be tested and validated before the final release of the same to the end users.

#### **Objective 3: Bio-security and efficient management of pests, diseases and nematodes through conventional and frontier research**

Success indicators under this objective are - number of technologies developed, tested and validated for agrochemicals including nano-formulations, bio-control strategies, IPM, diagnostics, pest dynamics worked out, number of new pest population collected, characterized and evaluated and registered, genes sequenced, sequences deposited in data bank, and Nano formulations developed /validated.

#### **Objective 4: Socio-economic & policy research and commercialization of technologies.**

The success indicators under this objective are- number of policies recommended, crops covered under market intelligence, extension modules developed, capacity building/skill development of farmers/ farm women, demonstration organized, simulation models developed/validated, products/processes developed and commercialized, MOUs signed, Patents filed, business incubated, and revenue generated(in Rs. lakhs).

#### **Objective 5: Technological interventions for enhancing profitability through improved farm machinery, post- harvest management and value addition.**

The success indicators under this objective are – number of designs developed and tested, farm machinery validated and commercialized, number of technologies developed, tested and validated for post-harvest management and value addition, number of protocols standardized, processes developed/commercialized for nutraceuticals and value added foods, technologies developed for drying, milling, and packaging.

#### **Objective 6: Development of globally competitive human resources**

The success indicators under this objective are - number of M.Sc. and Ph.D students admitted, number of M.Sc. and Ph.D students awarded degrees, trainings conducted, technological support provided to foreign countries, number of International/National Seminar, Conferences organized, number of faculty provided advance trainings .

## **Section 5:**

### **Specific Performance Requirements**

#### **1. Improving crop productivity and quality through conventional and molecular and approaches**

Collection of information on genotypes of various crops and selection of genotype for mapping population of agriculture & horticulture crops, land for experimentation, scientific and technical manpower, interdisciplinary and inter institutional linkages, infrastructure and equipments for testing & analysis, glass houses for experimentation availability of inputs, labour, library services and funds for achieving goals. Land breeders/quality seed production. Phytotron facility further helps in controlled environment experimentation.

#### **2. Enhancing crop production through conservation and efficient management of natural resources and development of technologies adapted to climate change.**

The specific requirement are the equipments and infrastructure for analysis of soil for the macro & micro nutrients, collecting information on the beneficial microbes for their characterization and experimenting for their activities, to study their effects on plants and yield, availability of irrigation water and equipments for water gauging and moisture testing and other infrastructure needed for optimal use of water and fertilizer, equipments and material to design and develop protected cultivation technologies, scientific & technical man power, availability of land, funds, labour and chemicals.

#### **3. Bio security and efficient management of pests, diseases and nematodes through conventional and frontier research**

The requirement for this will include collecting information on pests, equipments needed to identify pests, pest rearing infrastructure and inputs, equipments and infrastructure needed for to test/study environment pollution components, scientific & technical manpower, skilled labour, glass houses, chemicals and library services.

The specific requirement for this will include equipments machines/tools used in identification of genes for QTL, pest resistance, biotic & abiotic stress and also the equipments needed for incorporation of the same. Other requirements are chemicals, scientific & technical man power and library services besides funds.

#### **4. Socio-economic & policy research and commercialization of technologies.**

The requirement for policy research is basically the primary and secondary data, information on models, computers facility, library facility besides scientific man power. Technology dissemination will require the developed technologies, physical inputs needed for demonstration, land and scientific and technical manpower. For training purpose audio-visual aids and accessories associated with it are important.

For commercialization we need technologies for commercialization, information on stakeholders and their needs, linkage with farmers and NGO's, associations, information on quality tests conducted, information for procedure for patents facilities, legal experts, available at ITMU for private companies for experimentation, besides management manpower.

#### **5. Technological interventions for enhancing profitability through improved farm practices machinery, post- harvest management and value addition.**

Post harvest management will require the material inputs, equipments, machines for making products, modified storages, chemicals, equipments for quality tests, availability man power, funds, packing, packaging material and associated equipments & machines and bottling and tin sealing equipments.

Improving output through farm machinery and agricultural processing, requires lot of funds, space for workshop, equipments for processing & designing, equipments to judge compactness & moisture testing etc. besides scientific, technical and skilled labour, land for conducting experiments.

#### **6. Development of globally competitive human resources and capacity building of stakeholders.**

The requirement would be scientific faculty strength, land, for lab, lab with equipments, glassware and other infrastructure, audio-visual aids, computers, library facility, funds, hostel facility and recreation facility.

## Result Framework Document (RFD) for Indian Agricultural Research Institute, New Delhi (2011-12)

### Section 6:

#### Outcome /Impact of Institute

Outcome /Impact of Institute	Jointly responsible for influencing this outcome/ impact with the following department (s)/Ministry(ies)	Success Indicators	Unit	FY 09/10	FY 10/11	FY 11/12	FY 12/13	FY 13/14
Improvement in crop productivity and quality through conventional and molecular breeding approaches	DARE, DAC	Trait specific improvement of genetic material	Number	2984	3186	4029	3785	4084
		New varieties of field crops identified	Number	12	11	6	9	9
		New varieties horticultural crops developed	Number	10	8	7	6	6
		Nucleus seed produced	Tonnes	33.944	37.585	39.515	41.427	45.998
		Breeder seed produced	Tonnes	481.57	297.8	319.33	343.88	385.4
		Quality seed produced	Tonnes	618.38	867.92	947.19	980.34	1078.36
		Planting material produced	Number	20,000	38,000	45,000	60,000	80,000
Frontier research in biochemical/physiological processes for enhanced crop productivity	NRC on Plant Biotechnology	Genes identified	Number	11	6	20	23	11
		Genes incorporated	Number	11	9	17	18	19
		Processes identified (Physiological aspects)	Number	-	-	3	1	1
Improvement in soil health, eco sustainable natural resource management and production technologies for different agro-eco systems	DARE, DAC	Technology for improvement of soil health	Number	2	3	4	6	8
		Water management technologies developed	Number	8	8	6	7	10
		Technology developed for Conservation Agriculture	Number	2	4	8	9	10
		Technology developed for waste water management	Number	-	2	3	3	4
		Improved nutrient use efficiency technologies developed	Number	6	8	11	12	13
		Technologies for protected agriculture, dry land and precision farming developed		2	5	5	6	7
		Strategies/technologies developed for mitigation / adaptation of Climate Change Effects and promoting carbon sequestration	Number	-	-	1	2	4

Reduction in yield losses in crops due to pests and diseases	NRCPB, NCIPM	Agrochemicals/nano-formulations, developed/ tested & validated	Number	2	4	2	3	5
		Development of diagnostics	Number	119	73	72	67	67
		IPM technologies tested and validated	Number	4	4	3	5	5
		Bio control technologies tested and validated	Number	10	10	11	13	14
Reduction in post-harvest losses and enhanced value addition	DARE, DAC, MOFPI	Technologies for Post- harvest management and value addition developed	Number	-	-	2	6	4
Improved and affordable farm machinery and protected agriculture	DARE	Farm machines validated and commercialized	Number	-	-	1	1	1
Human resource development in teaching and research	DARE, DAC	Students awarded M.Sc. degree	Number	75	99	120	100	100
		Students awarded. Ph.D degree	Number	69	73	82	75	75
		Number of trainings conducted	Number	22	25	17	15	15
		No of participants trained	Number	477	527	3159	250	250
Policies and improvement in rural livelihood security	KVKs, SAUs, NGOs, DARE,DAC	Economic policies developed	Number	1	1	2	2	2
		Demonstrations conducted	Number	1295	2930	3560	958	960
		Capacity building of farmers, extension professionals and other stakeholders	Number	13892	19626	19929	21804	22805
		Farm women skill developed	Number	685	1098	1788	1650	1850
		Farmers contacted/advised	Number	128508	134191	159650	204820	225400
Commercialization of technologies	Private and public industries	Products/Processes developed and commercialized	Number	1	15	18	10	12
		MOUs signed	Number	1	12	50	10	12
		Patents filed	Number	1	2	9	4	5
		Business incubation	Number	-	5	3	5	5
		Revenue generated	Rs.(lakh)	41	93	111	119	132