



# **Results-Framework Document (RFD)**

**for**

## **National Institute of Abiotic Stress Management (2013-2014)**

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

### **Vision**

Management of abiotic stresses of crop plants, animals, fishes and micro-organisms through genetic, biotechnological and nano-technological tools and agronomic methods for enhanced sustainable productivity, food/feed quality and farm profitability adopting integrated interdisciplinary approaches.

### **Mission**

To develop insight into background, hypotheses to mitigate, strategies to incorporate with a foresight and constitutionally acceptable policy issues with practice of climatically adaptable farming systems to build sustainable and profitable livelihood in stressed environments.

### **Objective**

- Develop screening techniques, evolve stress tolerant genotypes/ breeding stocks and stress mitigation technologies.
- Develop database on abiotic stressors and their management

### **Functions**

- To develop a Global Center of Excellence by establishing linkages and networking with national and international institutes/ agencies.
- To act as repository of information on abiotic stresses and management.
- To act as the Centre of Academic Excellence.
- To coordinate network research on location specific problems of national importance, to achieve higher production and productivity.
- To promote human resource development and transfer of technology.

## Section 2: Inter Se Priorities among Key Objectives, Success Indicators and Targets

| S. No. | Objectives                                                                                                        | Weight | Actions                                                                                                                   | Success indicators                                                                               | Unit   | Weight | Target/Criteria Value |           |      |      |      |
|--------|-------------------------------------------------------------------------------------------------------------------|--------|---------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|--------|--------|-----------------------|-----------|------|------|------|
|        |                                                                                                                   |        |                                                                                                                           |                                                                                                  |        |        | Excellent             | Very good | Good | Fair | Poor |
|        |                                                                                                                   |        |                                                                                                                           |                                                                                                  |        |        | 100%                  | 90%       | 80%  | 70%  | 60%  |
| 1      | Develop screening techniques, evolve stress tolerant genotypes/breeding stocks and stress mitigation technologies | 81     | Development of infrastructure for research                                                                                | Research farm facilities created                                                                 | Number | 11.0   | 4                     | 3         | 2    | 1    | 0    |
|        |                                                                                                                   |        |                                                                                                                           | Controlled environmental chambers created                                                        | Number | 9.0    | 2                     | 1         | 0    | 0    | 0    |
|        |                                                                                                                   |        |                                                                                                                           | Lab equipment's procured                                                                         | Number | 8.0    | 10                    | 9         | 8    | 7    | 6    |
|        |                                                                                                                   |        | Screening genotypes /breeding stock/ strains of crops, horticulture, animals, fish and microorganism for stress tolerance | Germplasm of crops evaluated                                                                     | Number | 15.0   | 400                   | 300       | 200  | 100  | 50   |
|        |                                                                                                                   |        |                                                                                                                           | Breeds of animals/fishes screened/tested                                                         | Number | 8.0    | 3                     | 2         | 1    | 0    | 0    |
|        |                                                                                                                   |        | Development of technologies for mitigation of drought, other edaphic and atmospheric stresses                             | Resource conservation practices developed to increase input use efficiency                       | Number | 10.0   | 3                     | 2         | 1    | 0    | 0    |
|        |                                                                                                                   |        |                                                                                                                           | Screening of zeolites for nano-bioremediation of microbial and nitrogenous contaminants in water | Number | 6.0    | 3                     | 2         | 1    | 0    | 0    |
|        |                                                                                                                   |        |                                                                                                                           | Bio-regulators evaluated to mitigate stress                                                      | Number | 6.0    | 6                     | 5         | 4    | 3    | 2    |

|   |                                                                           |   |                                                                                                                                                            |                                                                          |        |     |              |               |               |               |                |
|---|---------------------------------------------------------------------------|---|------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------|--------|-----|--------------|---------------|---------------|---------------|----------------|
|   |                                                                           |   |                                                                                                                                                            | District wise vulnerability to climate change                            | Number | 8.0 | 25           | 20            | 15            | 5             | 0              |
| 2 | Develop database on abiotic stressors and their management                | 8 | Assessment and quantification of the effects of major abiotic stresses on agriculture and develop a repository of information on abiotic stress management | State-wise drought stress maps prepared                                  | Number | 8.0 | 2            | 1             | 0             | 0             | 0              |
|   | Efficient Functioning of the RFD System                                   | 3 | Timely submission of Draft RFD (2013-14) for approval                                                                                                      | On-time submission                                                       | Date   | 2.0 | May 15, 2013 | May 16, 2013  | May 17, 2013  | May 20, 2013  | May 21, 2013   |
|   |                                                                           |   | Timely submission of Results for RFD (2012-13)                                                                                                             | On-time submission                                                       | Date   | 1.0 | May 1 2013   | May 2 2013    | May 5 2013    | May 6, 2013   | May 7, 2013    |
|   | Administrative Reforms                                                    | 4 | Implement ISO 9001 as per the approved action plan                                                                                                         | % implementation                                                         | %      | 2.0 | 100          | 95            | 90            | 85            | 80             |
|   |                                                                           |   | Prepare an action plan for innovation                                                                                                                      | On-time submission                                                       | Date   | 2.0 | Jul 30, 2013 | Aug. 10, 2013 | Aug. 20, 2013 | Aug, 30, 2013 | Sept. 10, 2013 |
|   | Improve internal efficiency/responsiveness/service of Ministry/Department | 4 | Implementation of Sevottam                                                                                                                                 | Independent audit of implementation of Citizen's Charter                 | %      | 2.0 | 100          | 95            | 90            | 85            | 80             |
|   |                                                                           |   |                                                                                                                                                            | Independent audit of implementation of public grievance redressal system | %      | 2.0 | 100          | 95            | 90            | 85            | 80             |

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

| S. No. | Objectives                                                                                                         | Actions                                                                                                                 | Success indicators                                                                               | Unit   | Actual Value for FY 11/12 | Actual Value for FY 12/13 | Target Value for FY 13/14 | Projected Value for FY 14/15 | Projected Value for FY 15/16 |
|--------|--------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|--------|---------------------------|---------------------------|---------------------------|------------------------------|------------------------------|
| 1      | Develop screening techniques, evolve stress tolerant genotypes/ breeding stocks and stress mitigation technologies | Development of infrastructure facilities for research                                                                   | Research farm facilities created                                                                 | Number | -                         | -                         | 3                         | 3                            | 1                            |
|        |                                                                                                                    |                                                                                                                         | Controlled environmental chambers created                                                        | Number | -                         | -                         | 1                         | 1                            | 1                            |
|        |                                                                                                                    |                                                                                                                         | Lab equipments procured                                                                          | Number | -                         | 5                         | 9                         | 10                           | 10                           |
|        |                                                                                                                    | Screening genotypes/ breeding stock/strains of crops, horticulture, animals, fish and microorganism for stress tolerant | Germplasm of crops evaluated                                                                     | Number | -                         | 80                        | 300                       | 400                          | 600                          |
|        |                                                                                                                    |                                                                                                                         | Breeds of animals/ fishes screened/ tested                                                       | Number | -                         | 2                         | 2                         | 5                            | 5                            |
|        |                                                                                                                    | Development of technologies for mitigation of drought, other edaphic and atmospheric stresses                           | Resource conservation practices developed to increase input use efficiency                       | Number | -                         | 5                         | 2                         | 3                            | 4                            |
|        |                                                                                                                    |                                                                                                                         | Screening of zeolites for nano-bioremediation of microbial and nitrogenous contaminants in water | Number | -                         | -                         | 2                         | 2                            | 2                            |
|        |                                                                                                                    |                                                                                                                         | Bio-regulators evaluated to mitigate stress                                                      | Number | -                         | -                         | 5                         | 5                            | 12                           |

|   |                                                                                      |                                                                                                                                                            |                                                                          |        |   |   |               |    |    |
|---|--------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------|--------|---|---|---------------|----|----|
|   |                                                                                      |                                                                                                                                                            | District wise vulnerability to climate change                            | Number | - | - | 20            | 20 | 20 |
| 2 | Develop database on abiotic stressors and their management                           | Assessment and quantification of the effects of major abiotic stresses on agriculture and develop a repository of information on abiotic stress management | State-wise drought stress maps prepared                                  | Number | - | - | 1             | 1  | 1  |
|   | Efficient Functioning of the RFD System                                              | Timely submission of draft RFD (2013-14) for approval                                                                                                      | On-time submission                                                       | Date   | - | - | 16 May, 2013  | -  | -  |
|   |                                                                                      | Timely submission of Results for RFD (2012-13)                                                                                                             | On-time submission                                                       | Date   | - | - | 2 May, 2013   | -  | -  |
|   | Administrative Reforms                                                               | Implement ISO 9001 as per the approved action plan                                                                                                         | % implementation                                                         | %      | - | - | 95            | -  | -  |
|   |                                                                                      | Prepare an action plan for innovation                                                                                                                      | On-time submission                                                       | Date   | - | - | 10 Aug., 2013 | -  | -  |
|   | Improving internal efficiency/responsiveness/service delivery of Ministry/Department | Implementation of Sevottam                                                                                                                                 | Independent audit of implementation of Citizen's Charter                 | %      | - | - | 95            | -  | -  |
|   |                                                                                      |                                                                                                                                                            | Independent audit of implementation of public grievance redressal system | %      | - | - | 95            | -  | -  |

#### Section 4: Acronyms

| S. No. | Acronym    | Description                                                      |
|--------|------------|------------------------------------------------------------------|
| 1      | CGIAR      | Consultative Group on International Agricultural Research        |
| 2      | ICAR       | Indian Council of Agricultural Research                          |
| 3      | ICRISAT    | International Crops Research Institute for the Semi-Arid Tropics |
| 4      | NBSS & LUP | National Bureau of Soil Survey and Land Use Planning             |
| 5      | NRSC       | National Remote Sensing Centre                                   |
| 6      | SAU        | State Agricultural University                                    |

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

| S. No. | Success Indicator                         | Description                                                                              | Definition                                                          | Measurement                                                                                                                                                        | General Comments                                                       |
|--------|-------------------------------------------|------------------------------------------------------------------------------------------|---------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------|
| 1      | Research farm facilities created          | Development of experimental fields for screening germplasm for abiotic stress tolerance. | Infrastructure development for mandated research in the farm fields | It is the number of field facilities for four different types of crop plants viz. 1. Cereals and pulses, 2. Forage crops, 3. Horticultural crops and 4. Tree crops | Priority to create farm facilities for conducting research is given    |
| 2      | Controlled environmental chambers created | Creation of controlled conditions including phenomics platform                           | Facilities for screening under controlled conditions                | Establishment of 1. Top green house and 2. Installation of instrument                                                                                              | Testing under controlled conditions are required for initial screening |
| 3      | Lab equipment procured                    | Development of laboratory facilitated for research                                       | Procurement of various equipment needed for testing the concepts    | Development of laboratory facilities, including procurement of ten high end instruments that defines the success indicators individually                           | Emphasis is to create laboratory facilities for conducting research    |

|   |                                                                                                  |                                                                                                                                                                                      |                                                                                                                                                                                                                                 |                                                                               |                                                                               |
|---|--------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------|-------------------------------------------------------------------------------|
| 4 | Germplasm of crops evaluated                                                                     | Source material for the improved varieties to be evaluated                                                                                                                           | Material generated from the basic germplasm                                                                                                                                                                                     | Number of germplasm of different crops evaluated                              |                                                                               |
| 5 | Breeds of animals/fishes screened/ tested                                                        | Source material for the improved breeds to be evaluated                                                                                                                              | Material generated from the breeds                                                                                                                                                                                              | Number of breeds of animals and fishes tested                                 |                                                                               |
| 6 | Resource conservation practices developed to increase input use efficiency                       | Conservation of resources in agriculture aims to achieve sustainable and profitable agriculture and subsequently aims at improved livelihoods of farmers                             | Evolution of resource conservation methods through different approaches including water management, yield modeling, microbiological methods, brood stock management and designing of structures for heat stress management etc. | Number of resource conservation practices developed during the period         | To ensure increased input efficiency through conservation measures            |
| 7 | Screening of zeolites for nano-bioremediation of microbial and nitrogenous contaminants in water | Zeolite is a source material for bioremediation in aquaculture                                                                                                                       | Material generated from natural zeolite for exchange reactions                                                                                                                                                                  | Number of zeolites tested for bioremediation                                  | Priorities to give zeolite with maximum exchange reaction with silver nitrate |
| 8 | Bio-regulators evaluated to mitigate stress                                                      | Evaluation of efficacy of bio-regulators in alleviating drought stress in crop plants.                                                                                               | Minimization of yield losses by crop growth promoters.                                                                                                                                                                          | It is the number of such bio-regulators tested during the period under report | To enhance the crop water balance and yield under drought conditions          |
| 9 | District wise vulnerability to climate change                                                    | Assessment of vulnerability of various districts to climate change to prioritise various interventions and adaptation strategies, a district wise analysis of vulnerability is being | Vulnerability is the degree to which a system is susceptible to or unable to cope with, adverse effects of climate change including climate variability and extremes.                                                           | Number of districts covered during the period is the success indicator        |                                                                               |



|    |                                         |                                                                                                                |                                                                                                                                                                                                 |                |                                                                            |
|----|-----------------------------------------|----------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|----------------------------------------------------------------------------|
|    |                                         | undertaken                                                                                                     |                                                                                                                                                                                                 |                |                                                                            |
| 10 | State-wise drought stress maps prepared | Repository of information on abiotic stresses at regional level is a pre-requisite for research and management | Drought is one of the major abiotic stresses causing substantial crop loss necessitating assessment and quantification of effects to develop a repository of information for drought management | Number of maps | It is a stepwise progression in mapping abiotic stresses at regional level |

**Section 5 : Specific performance requirements from other departments**

| <b>Location Type</b> | <b>State</b> | <b>Organization Type</b> | <b>Organization Name</b> | <b>Relevant Success Indicator</b> | <b>What is your requirement from this organization</b> | <b>Justification for this requirement</b> | <b>Please quantify your requirement from this Organization</b> | <b>What happens if your requirement is not met</b> |
|----------------------|--------------|--------------------------|--------------------------|-----------------------------------|--------------------------------------------------------|-------------------------------------------|----------------------------------------------------------------|----------------------------------------------------|
| Nil                  | Nil          | Nil                      | Nil                      | Nil                               | Nil                                                    | Nil                                       | Nil                                                            | Nil                                                |

**Section 6: Outcome / Impact of activities of organization**

| <b>S. No.</b> | <b>Outcome / Impact of organization</b> | <b>Jointly responsible for influencing this outcome / impact with the following organisation (s) / departments/ ministry(ies)</b> | <b>Success Indicator (s)</b>                                       | <b>Unit</b> | <b>2011-12</b> | <b>2012-13</b> | <b>2013-14</b> | <b>2014-15</b> | <b>2015-16</b> |
|---------------|-----------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------|-------------|----------------|----------------|----------------|----------------|----------------|
| 1             | Reduction of crop loss                  | CGIAR institutes and SAUs                                                                                                         | Enhancement in crop productivity under abiotic stressed conditions | %           | -              | -              | 2              | 2              | 3              |