

National Rainfed Area Authority

Brainstorming Workshop on
“ **Prioritization of Rainfed Districts in India** ”
Organized by National Rainfed Area Authority & ICAR – CRIDA

Date: 11th-12th Dec, 2018

Venue : Training hall 2nd floor, NASC Complex, New Delhi

Proceedings of the Workshop

1. The two day Brainstorming workshop on **Revisiting Prioritization of Rainfed Districts in India** started with welcome address by Dr. V. P. Sharma, Technical Consultant, NRAA. Dr. Sharma welcomed CEO, NRAA, Dr. Ashok Dalwai, IAS, Dr.KPR Vittal, Former Director, CAZRI; Dr. B. Venkateshwarlu, former Vice-Chancellor, Vasant Rao Naik Marathwada Krishi Vidyapeeth, Parbhani; Dr. S.K. Choudhary, ADG(S&WM), ICAR; Dr. Ravindra Chary, Director (I/C) CRIDA and all the delegates from CRIDA, MNCFC, CAZRI, IMD, CWC, IASRI, SLUSI, IGFRI, IISWC, WOTR and BAIF, as also the participants from DAC&FW and NRAA for the two-day Brainstorming Workshop. The list of participants is annexed.
2. Dr Ashok Dalwai, C.E.O, NRAA, in his inaugural address thanked all the delegates at the workshop. He stressed the importance of speedy & special focus on development of rainfed areas which are prone to extreme climatic events and are vulnerable to agrarian distress. Dr. Dalwai mentioned that the major purpose of the Brainstorming exercise was to understand the meaning and dimensions of rainfed agriculture; identify parameters for rainfed area delineation; and generation of information and authentic data for effective planning process. He complimented CRIDA and IASRI for developing a comprehensive combined Rainfed Areas Prioritizing Index (RAPI). He requested the delegates to revisit these parameters with proper rationalization of Natural Resource and Livelihood Indices which are more relevant in the current scenario and in line with the government’s vision and approaches for agricultural growth.
 - 2.1 He also emphasized that there is need to go beyond crop/cropping systems based livelihood to integrated farming systems so as to enhance economic resilience among farming community in rainfed areas. He stressed the need for greater focus and interventions in animal husbandry sector particularly the dairy including small ruminants in the rainfed ecosystem.
3. Explaining the workshop objectives further, Sh. B. Rath, Technical Expert (WM), NRAA re-emphasized the three major objectives of the workshop, namely- to identify the clear dimensions and boundaries of rainfed areas, parameters to identify and delineate rainfed districts in the country to

prioritize 150 most vulnerable rainfed districts and generate good data base and information for rainfed districts so as to facilitate NRAA to suggest/adopt suitable policy interventions. He observed that the CRIDA - IASRI exercises prioritizing rainfed districts based on RAPI was done way back in 2012 using 2001 census data, wherein, only 499 districts were considered. On account of various factors including increase in the number of districts to 718, the area under irrigation increasing substantially during last 5-6 years, increased frequency of droughts in some parts of the country and significant ground water development in the recent years, and climate change outcomes, this needs to be revisited. He also requested the workshop delegates to relook at the parameters set under Natural Resource Index (NRI) and Integrated Livelihood Index (ILI), considering present climatic trend, social & economic status and practical considerations like availability and collection of reliable data on the same.

4. Dr. K. V. Rao, Principal Scientist, ICAR - CRIDA mentioned that under RAPI, 7 Parameters, namely, Rainfall, Drought, Available Water Content of Soil, Area under degraded and waste lands, Rainfed Areas, Status of Ground Water and Irrigation intensity, were considered for NRI and the integrated livelihood Index comprised a set of three indices, viz., Socio-Economic Index, Health and Sanitation Index and Infrastructure Index. The RAPI Rainfed Area Prioritization Index was arrived at by using a formula $RAPI = (2/3^{\text{rd}} \text{ Natural Resource Priority Index} + 1/3^{\text{rd}} \text{ Livelihood Priority Index})$.
5. Thereafter, Dr. M. Osman, Principal Scientist, CRIDA explained the RAPI methodology in detail and the process that was adopted developing the Natural Resource Index and Integrated Livelihood Index by CRIDA and IASRI during 2010 after a national consultation held on 18th May, 2010. He further, explained that the principle component analysis was used to identify the most important parameters for Natural Resource Priority Index using Eigen Values as weights.
6. Dr. Ranjeet Singh, Scientist F, from Indian Meteorological Department made a presentation on Weather Observation and Monitoring. He informed that IMD is providing short range, medium range and long range weather forecasts and advisories for the benefit of agriculture community. He informed that IMD is providing these forecasts to all districts and states through AMFU to KVK's and Extension System of Departments of Agriculture in the States. He further, informed that about the weather based Products of IMD, namely, Grid Level Daily Observed data for Rainfall 25*25 km resolution, Temperature 50 * 50 km resolution, Soil Moisture Monitoring with Soil Moisture forecasts for next 5 days using soil water balance at 25 km resolution and soil moisture climatology using Land Data Assimilation Systems (LDA's).
- 6.1 Dr Singh informed that IMD is providing SMS advisories through Farmers Portal at biweekly interval on every Tuesday and Friday to 3.91 Crores farmers. IMD is also providing water information through farmer's portal, IMD-Agrimet website State Agriculture University(SAU) website and KVK

portal. They are also disseminating the same information through television on DD Kisan on daily and weekly basis.

7. Dr. C.V. Rama Rao, Principal Scientist, CRIDA made a presentation on “Vulnerability to Climate Change: A District Level Assessment”. Dr. Ramarao explained the risk of adverse outcomes resulting from Climate Change as one the serious issues to be addressed. He informed that vulnerability is captured by identifying relevant indicators, determining their relationships, normalizing them and then aggregating these into an index. The latest data was collected for this index for 572 districts and were grouped into Very low vulnerability (114), Low vulnerability (114), medium vulnerability (114), high vulnerability (114) and very high vulnerability (115). The Adaptive Capacity of the area was captured by considering poverty, SC/ST population, agriculture workforce, literacy rate, Gender Gap, accessibility of Markets, Rural Electrification, Livestock Population in, Fertilizer Consumption, Ground water availability and Agricultural GDP as per percentage of overall GDP etc. He also explained the commonality and differences in the parameters considered for constructing RAPI and Vulnerability Index.
8. Dr. Shibendu S. Roy, Director, MNCFC, Delhi, made a presentation on monitoring vulnerable districts through remote sensing approach. Dr. Shibendu Roy presented a comparison of drought frequency, as declared by the States vis-a-viz as assessed under NADAMS Project using rainfall, satellite data, soil moisture, sown area and irrigation for the period 2012-15. MNCFC is undertaking regular agricultural monitoring through satellite data since then. Dr. Shibendu Roy, further informed that since 2017-18, it has become mandatory to use NADAMS assessment for declaration of drought by the States.
9. Dr. C.S. Murthy, Head Agricultural Sciences and Applications, National Remote Sensing Centre (NRSC), Hyderabad made a presentation on Geospatial approach to vulnerability assessment and prioritization for agricultural drought. Dr. Murthy informed that NRSC has been releasing satellite based crop area mapping since 1973-74. They are also releasing integrated land use and land cover (LULC) maps using Multi-temporal AWiFS data every year. NRSC is delineating rainfall sensitive zones using daily gridded rainfall data since 1971. Dr. C.S. Murthy explained all the three methods for vulnerability assessment namely, physical modeling, empirical modeling and index based approach. He indicated that index based approach is most popular globally as it is transparent and multidimensional and hence, it is recommended for rainfed area assessment also. He assured that NRSC would provide necessary support NRAA for on any data requirements for vulnerability assessment purposes.
10. Dr. G. Murali, from ICRISAT, Hyderabad, made a brief presentation on Geospatial inputs to vulnerability. He shared ICRISAT experiences on

identifying most vulnerable districts using satellite data. At ICRISAT, they have developed climate exposure index to undertake climate analysis.

11. Prof. U. C. Mohanty, IIT Bhubaneswar, shared the project report of "Development and Application of Extended Range Forecast System" (ERFS) for climate risk management in agriculture. The project was undertaken by IIT Bhubaneswar in collaboration with IMD, NCMRWF and IITM, Pune. For their ERFS Project used satellite data for assessing vulnerable districts.
12. The last presentation of day was made by Shri. N.S. Gahlot, from Soil and Land Use Survey of India (SLUSI) on prioritization assessment based vulnerability to soil erosion. SLUSI has developed two Models using Sedimentary Yield Index (SYI) and Run-off Potential Index (RPI) Models to determine the relative priority of smallest hydraulic units which are yielding relatively higher run-off within the Flood Prone River (FPR) catchments. They have used remote sensing approach and a weighted index for calculating SYI and RPI to identify prioritization of Micro-Watershed.
13. Dr Venkateswarlu, Chairman of the technical session while summarizing the proceedings of the session observed that there is need to relook into the broad contours of rainfed agriculture. He suggested that the delegates may come up with their views and draft definition which can be further deliberated in the next technical session. He observed that various valuable parameters and their relevance in prioritization have been gathered during the course of discussion and the members may share their views on the important parameters which have been presented by different agencies and additional parameters, if any. He also suggested that in case of non availability of data source particularly on water front, the India Waris portal and with respect to crop water requirement, CV of NDVI may be used. He also mentioned that the presentation on water and SLUSI are very much relevant in strategizing interventions in the priority districts.
14. A Team from DD Kissan visited the Brainstorming workshop, in the afternoon and recorded a discussion show with select participants. These included Dr. Ashok Dalwai, C.E.O, NRAA, Shri. B. Rath, Technical Expert (WM),NRAA, Dr. K.P.R Vittal, Former Director, CAZRI, Dr. B. Venkateswarlu, Former Director, CRIDA and Dr. N. Ravindra Chary, Director (I/C), CRIDA. DD Kissan crew interviewed all the five officers on the issues related to rainfed areas and proposed interventions by NRAA to address these. Other Delegates from the workshop also interacted with DD Kissan crew.
15. An open house discussion was held for around one hour on definition and extent of rainfed areas, as the closing session of the day. CRIDA suggested that rainfed areas may be defined as "The Agricultural area which is fully dependent on rainfall for crops / Livestock". The area may include life saving irrigation which is fully supported by rainfall only.

16. The Day two of the workshop started with presentation by Dr. S.K. Chaudhary, ADG, (S & WM), ICAR, New Delhi. Dr. Chaudhary highlighted the critical importance of livelihood systems while considering interventions in rainfall areas, he shared the experiences of NICRA across 100+ villages, wherein, Integrated Farming Systems (IFS) approach has been successfully used with active support of participating communities. He indicated that participation and ownership of the community will be the key for sustainable agricultural development.
17. Shri. Shashank Ranjan, Deputy Director, Central Water Commission (CWC) made the final presentation of the workshop. He shared about the data being regularly collected by CWC from all the States. He agreed that there were gaps in the data and also some inconsistencies and overlaps in total irrigated area due to data inconsistency as reported by States.
18. Dr. B M K Raju, CRIDA suggested the need for a relook at the parameters for the Integrated Livelihood Index parameters. He suggested that the parameters like availability of mobile phones, cycles, televisions etc. may be replaced with the percentage of Agricultural GDP to the GDP of the district to capture the dependence of population on agriculture. He further suggested that all the parameters of NRI and ILI may be finalized by a small group consisting Scientists from CRIDA, NRAA and other concerned agencies.
19. Dr. Vittal in his concluding observations as the Chairperson of the session said that Dr. Raju has very effectively captured the important parameters along with additional ones from the deliberations. However, some of the bio-physical parameters need to also focus on the spatial variability aspects like distribution of rainfall during the season and soil type to align appropriate weight-age to pre-season, mid season and terminal droughts.
20. The conclusive session of the workshop was chaired by Dr. Ashok Dalwai, C.E.O, NRAA. He summarized the proceedings of the two days workshop and thanked all the delegates for their meaningful contributions to the prioritization exercise. He proposed a small Task Force to undertake this task further and to come up with logical parameters and definition for rainfed areas. He suggested the necessity for evolving a generic definition of 'Rainfed Agriculture', and specific definition for different rainfed system delineated under the generic rainfed system. Further, he suggested that the definition should lead to delineation of different systems and prioritization of districts within each of these. The intervention response should be specific to each of these.

The workshop ended with a vote of thanks to the Chairpersons of all the technical sessions, speakers and participants of the workshop.

List of participants in the two Days Brain Storming Workshop / Sessions to finalize the most vulnerable districts of the country held on 11th & 12th December, 2018

S.No	Name & Designation
1.	Dr. Ashok Dalwai, CEO, NRAA
2.	Dr. B. Venkateswarlu, Former VC
3.	Dr. C.S. Murthy, Head Agriculture Division, NRSC
4.	Dr. Shibendhu S. Roy, Director, MNCFC
5.	Shri Sandeep Ranjan, Director, CWC
6.	Dr. Ravindra Chary, Director I/C, CRIDA
7.	Dr. K.V. Rao, Principal Scientist, CRIDA
8.	Dr. B.M.K. Raju, Principal Scientist, CRIDA
9.	Dr. C.A. Rama Rao, Principal Scientist, CRIDA
10.	Dr. K.P.R Vittal (Ex Director, ICAR
11.	Dr. M.M. Nageswara Rao, Scientist, IIT Bhubaneswar
12.	Dr. D.R Sena, Principal Scientist, ICAR, IISWC, Dehradun
13.	Shri R.K. Thapliyal, DES, DAC&FW
14.	Shri Rishu Garg, WOTR, Delhi
15.	Shri Sandeep Batra, DES, DAC&FW
16.	Dr. G. Murali, Principal Scientist, ISD, ICRISAT, Hyderabad
17.	Mr. Vijay Deshpande, PD,BAIF, Pune
18.	Prof. U.C. Mohanty, Professor & Head, SEOCS, IIT Bhubaneswar
19.	Dr. Sunil Kumar, HOD, CP DIV.,IGFRI, ICAR
20.	Dr. M. Osmam, Principal Scientist, ICAR-CRIDA
21.	Dr. P. Vijaya Kumar, Principal Scientist, ICAR-CRIDA
22.	Dr. M. Satyanarayana, UNDP
23.	Dr. Shalini Saxena, Consultant, MNCFC
24.	Dr. S.P.S Tanwar, Scientist, ICAR, CAZRI
25.	Dr. M. Mohanty, Scientist, ICAR-IISS
26.	Dr. V. Rangarao, SLUSI
27.	Shri N.S. Gahlot, SLUSI H.Q., New Delhi
28.	Shri R.L. Meena, SLUSI, Noida
29.	Dr. S.K. Chaudhary, ADG(S&WM), ICAR
30.	Dr. Ranjeet Singh, Scientist 'G', IMD
31.	Dr. Naveen Singh, ICAR-NIAP
32.	Dr. Divya Shah, Consultant, NRM, DAC&FW
33.	M. Asukan, Deputy Director, Government of Tamilnadu
34.	Manoj Kumar, Scientist, FRI, Dehradun
35.	Shri S. Rama Mohan, Agriculture Director, Govt. of Andhra Pradesh
36.	Dr. K.K. Singh, Scientist 'G', IMD
37.	Dr. Ranjeet Paul, Principal Scientist, IASRI, New Delhi
38.	P.K. Ghosh, Director, ICAR
39.	Anup Kumar Srivastava, NDMA
40.	Dr. Nirmal Kumar, ICAR-NBSS&LUP, Nagpur
41.	Shri B Rath, Technical Expert (WM), NRAA
42.	Dr. M K Srivastava, Director (AH&F), NRAA
43.	Dr. V P Sharma, Technical Consultant, NRAA
44.	Shri Pankaj Kumar, STA, NRAA
45.	Dr. Alka Samuel, Consultant, NRAA
46.	Dr. Eazhilkrishna N. Young Professional (WM), NRAA
47.	Dr. Yendrembam Mery Chanu , Young Professional (AH&F), NRAA
48.	Shri Tarun Maggo, Young Professional (IT), NRAA
49.	Sh. Mohit, Young Professional (Forestry), NRAA