

Format for Application for Agri-CRP Projects

1. **Title of Platform:** Consortium Research Platform (CRP) on Conservation Agriculture (CA)
2. **Title of the Platform Project:** Development and validation of CA practices for rainfed production systems of India
3. **Location**
Institute's Name: ICAR- Central Research Institute for Dryland Agriculture
Place: Hyderabad
District: Ranga Reddy
State: Telangana
4. **Principal Investigator (PI)**
Name: Dr Ch Srinivasa rao
Designation: Director
Date of Birth: 04-10-1965
Experience: (Years): 22 years
5. **Co-Principal Investigator (Co-PI)**
Name: Dr K.L.Sharma
Designation: Principal Scientist
Date of Birth: 5-1-1959
Experience: (Years): 25 years
Number of Scheme handled: 9
Number of important research publications: 70
Number of other Research Schemes (being carried out by PI):
Title of Scheme (s): Conservation tillage farming strategies and crop residue management for soil health improvement and higher crop productivity in Sorghum-Blackgram in rainfed Alfisol
Name of the funding Agency: CRIDA
Period from 2013 to 2020 Grant: Rs.
6. ***Collaborative Investigator (s) (separate set for each)**
Name: G. Pratibha
Designation: Principal Scientist
Date of Birth: 24-8-1965
Experience: 20 Years
Number of research publications: 45

Number of other Research Schemes (being carried out by PI): 1

Title of Scheme (S): Crop residue management for enhancing soil quality, crop productivity and mitigation of climate change

Name of the funding Agency: DST, New Delhi

Period from 2012 to 2015 Grant: Rs. 56 Lakhs

i. Collaborative Investigator (s) (separate set for each)

Name: Dr JVNS Prasad

Designation: Principal Scientist

Date of Birth: 28-04-1969

Experience: 19 Years

Number of research publications: 49

Number of other Research Schemes (being carried out by PI):1

Title of Scheme (S): Development of green house gas emission coefficients for climate resilient technologies

Name of the funding Agency: NICRA

Period from 2015 to 2019: Grant: Rs. Lakhs

ii. Collaborative Investigator (s) (separate set for each)

Name: Dr G.R.Chary

Designation: Principal Scientist

Date of Birth: 6-6-1964

Experience: 25Years

Number of research publications: 45

Number of other Research Schemes (being carried out by PI):1

Title of Scheme (S) Adaptation strategies through cropping systems at selected soil bench marked sites

Name of the funding Agency: NICRA

Period from 2012 to 2017 Grant: Rs.

ii. Collaborative Investigator (s) (separate set for each)

Name: Dr Sumantha Kundu

Designation: Scientist

Date of Birth: 26-11-1979

Experience: 5Years

Number of research publications: 30

Number of other Research Schemes (being carried out by PI):1

Title of Scheme (S) Conservation agriculture for productivity enhancement and mitigating GHG emissions in Maize-Horsegram system in Alfisols of Semi Arid Tropics

Name of the funding Agency: NICRA

Period from 2012 to 2017 Grant: Rs.

7. ***Objectives (in brief):**

The objectives for the rainfed production system are

- Adapt and mainstream available best bet location specific CA practices for enhanced productivity and profitability in rainfed and irrigated eco-systems.
- Development and validation of location specific CA technologies for sustainable intensification of cropping systems across agro-ecologies.
- Quantify impact of CA on soil health, pest dynamics, input use efficiency, carbon sequestration and greenhouse gas emissions
- Capacity building, knowledge management, institutional arrangement and enabling policies for accelerated adoption of Conservation Agriculture for rainfed crops and cropping systems

8. ***Practical/Scientific Utility:**

It is expected that the Indian population will reach 1.6 billion by 2050 and the food grain demand is expected to reach 385 mt which calls for significant enhancement in productivity from rainfed systems in the years to come. Declining resource productivity, unabated land degradation, declining organic carbon status, variable rainfall and climate change are some of the constraints impacting the productivity of rainfed agriculture. Conservation agriculture is an emerging approach for sustainable agricultural production without excessively disturbing the soil, while protecting it from the processes that contribute to soil degradation like erosion, compaction, aggregate breakdown, loss of organic carbon, leaching of nutrients etc. Conservation agricultural systems are gaining increased attention worldwide as an effective option to enhance productivity and profitability in a sustainable way without compromising on resource quality and have potential to address the emerging issues of climate change. Reducing the tillage intensity, residue retention and crop rotation are important components of conservation agriculture. Since, the CA practices are dependent on resource endowments of the location and on the prevalent crops and cropping systems, site specific research is essential for the development of CA practices. Besides the influence of various conservation tillage

practices on water and nutrient availability, root growth pattern of crops, carbon sequestration potential is required to be studied in detail for successful development and scaling up of conservation agricultural practices in the country.

9. ***Research work conducted**

i. **At sponsoring institutions:**

Research on development of reduced tillage systems was initiated at various centers of the All India Coordinated Research Project for Dryland Agriculture during 1999 and found that reducing tillage intensity adversely influences the crop yields but the differences got reduced in subsequent years. Due to less biomass productivity and reduced availability of biomass under rainfed conditions and competing uses of crop residues, the scope of using crop residues for conservation agriculture is limited in dryland ecosystems. However, experiments conducted at CRIDA, Hyderabad, has shown that in dryland ecosystems, where only a single crop is grown in a year, it is possible to raise a second crop with residual soil moisture by retaining crop residues. There is a need for comprehensive studies to develop crop specific CA practices which can retain residues and can contribute to cropping intensification and productivity under rainfed conditions.

ii. **In other institution of the country:**

Unlike, in the rest of the world, in India spread of CA technologies is taking place mostly in the irrigated regions of the Indo-Gangetic plains where rice-wheat cropping system dominates. CA practices were also developed for irrigated rice fallows where maize is commonly grown after paddy. CA systems have not been extensively tried or promoted in other major agro-ecoregions like rainfed semi-arid tropics, the arid regions or the mountain agro-ecosystems. Experience at IISS, Bhopal showed that reduced tillage in soybean-wheat system is a suitable option for successfully growing soybean and wheat crops with saving of energy and labour and improvement of soil carbon content and soil physical properties in Vertisols under sub-humid regions. Considering the severe problems of land degradation due to excess runoff induced soil erosion, rainfed areas

particularly in arid and semi-arid regions require the practice of CA more than the irrigated areas in order to ensure a sustainable production.

iii. **Other countries:**

CA systems, comprising minimum mechanical soil disturbance, organic mulch cover, and crop species diversification, in conjunction with other good practices of crop and production management, are now practiced globally on about 125 M ha in all continents and all agricultural ecologies, including in the various temperate environments. While in 1973/74 CA systems covered only 2.8 M ha worldwide, the area had grown in 1999 to 45 M ha, and by 2003 to 72 M ha. In the last 11 years CA systems have expanded at an average rate of more than 7 M ha per year showing the increased interest of farmers and national governments in this alternate production method. Adoption has been intense in North and South America as well as in Australia and New Zealand, and more recently in Asia and Africa where the awareness and adoption of CA is on the increase. Globally much of the area under CA systems is under rainfed systems and in temperate regions.

10. **Technical Programme:** Items of Investigation:

The items of investigation are as follows:

- (i) Development of residue management practices for the selected rainfed crops and systems without compromising the fodder availability
- (ii) Development of reduced tillage practices for various rainfed production systems
- (iii) Exploring the feasibility of cropping intensification with CA practices
- (iv) Development of appropriate machinery for simultaneous sowing, fertilizer application and herbicide application
- (v) To determine the influence of CA practices on soil carbon buildup, soil physical, chemical and biological properties in various rainfed production systems of the country
- (vi) To assess the performance of proven CA practices under farmers' fields and fine tune these practices for large scale adoption.

The technical programme will be implemented 4 AICRPDA centers representing rainfed sorghum, finger millet, soybean, and rainfed rice systems which are the predominant rainfed systems of the country distributed in significant area.

Apart from the above the KVKs representing Tumkur (Karnataka), Nalgonda (Telangana), Baramati (Maharashtra), Sonitpur (Assam) and one selected district from Gujarat will be involved in the project to adapt and to mainstream available best bet location specific CA practices for enhanced productivity and profitability in rainfed systems in these districts.

The ongoing long term experiments at CRIDA on sorghum-pulse, castor-pigeonpea, maize-horsegram will be continued and used for intensive data collection and to assess the soil health, pest dynamics, input use efficiency, carbon sequestration and greenhouse gas emissions and also for capacity building on rainfed systems.

11. Facilities Available:

Equipments/instruments/ apparatus:

- (1) Total carbon analyser
- (2) Nitrogen analyser
- (3) Gas chromatograph for quantification of green house gases
- (4) Soil respiration unit
- (5) AAS
- (6) Core samplers for measuring bulk density and root biomass
- (7) Leaf area and root area analyser
- (8) Infrared thermometer for quantification of canopy temperature

Area of experimental fields (hectares):

Laboratory: At CRIDA a well established and fully functional soil physical laboratory which can assess the soil physical properties, and a well established chemistry laboratory for assessing the soil chemical and biological properties and soil enzymes exists. In addition to the above, a central laboratory is in place which has the state of the art equipment for quantification of carbon in plants, soils, water samples and green house gases from soils. These facilities will be used for the CRP on conservation agriculture.

Other facilities:

- (1) Two large experimental farms for conducting field experiments with established farm machinery fabrication unit for development/ modification of farm machinery
- (2) Facilities for measuring the runoff from various experimental plots with various levels of tillage
- (3) CRIDA has various research centers representing predominant rainfed crops and systems of the country which operate in network mode. These network centers will be used for technology development and validation on CA practices which in turn will be released as proven technologies by the concerned state governments.

(4) In addition to the above technology demonstrations for climate resilient practices are being taken up in 100 climatically vulnerable districts of the country. Some of these districts will be used to mainstream available best bet location specific CA practices for enhanced productivity and profitability in rainfed eco-systems

12. Additional facilities required:

Equipment & apparatus:

- (1) _____ (50 Chrs)
- (2) _____ (50 Chrs)
- (3) _____ (50 Chrs)

Area of land for Experimentation (hectares):

Laboratory: --

Office facilities: ----

13. Duration: 2 years

14. Staff Requirements (Scientific, Technical etc.)

Designation of Post: NIL: Number of Post: NA: Scale of Pay: NA: Qualification Prescribed: NA

15. Estimation of Costs:

- i) Sr. Research Fellows: 6
- ii) Other contractual services: As per requirement

16. Recurring and Non-recurring contingencies: Rs. 45 lakhs (details given below)

17.

Recurring and Non-recurring contingencies	Year-I (2015-16)#
Capital	
Equipment/ Machinery/ Apparatus/ Misc. items [@]	6.0
Revenue	
Contractual service (SRF 6 & other contractual services)	22.0
TA	2.0
Other recurring contingencies including institutional charges*	15.0
Total	45.0

*Institutional charges @10% of RC for lead institute and 5% of RC for cooperating institutes

As per the new BE (2015-16). Original sanctioned total project budget is 63 crore.

@Computer/Air Conditioner/ Furniture as per absolute requirement of the budget.

18. Receipts anticipated

The following are the deliverables from the project

- “ Identification of best bet location specific CA practices for various rainfed production systems
- “ Developed component technologies of CA for rainfed crops and systems
- “ Information on the impact of CA on soil health, input use efficiency, carbon sequestration and greenhouse gas emissions
- “ Enhanced capacity of AICRPDA centers on technology development and also refinement of CA practices and mechanisation
- “ Development / modification of machinery for zero till sowing

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19. Certified that:

- i. The research work proposed in the **Platform Project on Conservation Agriculture** does not in any way duplicate the research work already done and being carried out elsewhere on the subject.
- ii. The present scheme cannot be combined with any scheme financed by the Council, Central and State Governments, Universities or Private Institution of their own funds.
- iii. Necessary financial provision for the platform project will be made in the Institution/ University/ State budget in anticipation of the sanction to the scheme by the council.
- iv. We undertake to abide by the guidelines provided by the Council for the implementation of the Platform Project.

Principal Investigator

Signature

Name

Certified that:

- i. Project is in line with the approved mandate of the implanting institute.
- ii. Platform Project Investigator/ Co-investigators are competent technically to undertake the project.
- iii. Research work will not amount to duplication of efforts and In-house projects, handled by me will not suffer.
- iv. Equipment and other infrastructure proposed under the project are either not available with the institute or the available facility cannot be extended to the project activities.
- v. Basic facilities such as Telephone/ Fax/ photocopies/Generators etc. will be provided by the implementing agency. However, operational cost for these activities will be met from the institutional charges sanctioned under the scheme.
- vi. The cost of equipment and other infrastructure requested for under the project is realistic and based on the prevailing market rates.
- vii. Justifications and clear specifications for the equipment and other infrastructure asked for are reflected in the proposal.
- viii. For collaborative projects with other institutions, the administrative/ financial/ technical issues related to implementation of the project shall be addressed between the two implementing agencies.
- ix. The institutions has already furnished to the ICAR, full accounts and Utilization Certificates in respect of the grants received by it previously, as per the following details:

ICAR's amount	UC & Accounts furnished

Communication of Grant by the Institution and date of (Please indicate the Sanctioning Grant number and date of the communication with which ASAs, etc. are sent)

(1) _____ (2) _____ (3) _____

It is certified that the Institution has not received any grant from the ICAR previously.

Date:

Executive Authority of the Institution

