CAPP-6

Format for Application for
Agri-CRP Projects

1. **Title of Platform:** ICAR Agri-Consortia Research Platform (Agri-CRP)

2. **Title of the Platform Project:** Development of integrated weed management techniques for conservation agriculture systems

3. **Location**
   Instituteôs Name: ICAR - Directorate of Weed Research
   Place: Jabalpur
   District: Jabalpur
   State: Madhya Pradesh

4. **Principal Investigator (PI)**
   Name: Dr. A.R. Sharma_____ (30 Chrs)
   Designation: Director_____ (30 Chrs)
   Date of Birth: 13 April, 1960_____ (30 Chrs)
   Experience: (Years): 28 years_____ (30 Chrs)
   Number of Scheme handled: None
   Number of important research publications: More than 150_____ (30 Chrs each)
   Number of other Research Schemes (being carried out by PI)
   Title of Scheme (s): None _____ (30 Chrs)
   Name of the funding Agency: Not applicable_____ (30 Chrs)
   Period from_____/_____ to_____ Grant: Rs. Nil_____

5. **Co-Principal Investigator (PI)**
   Name: Dr. Raghwendra Singh_____ (30 Chrs)
   Designation: Senior Scientist (Agronomy) _____ (30 Chrs)
   Date of Birth: 22.11.1975 (30 Chrs)
   Experience: (Years) 15 Yrs
   Number of Scheme handled: 2
   Number of important research publications: 15 (30 Chrs each)
   Number of other Research Schemes
   Title of Scheme (s): _____ (30 Chrs)
   Name of the funding Agency: _____ (30 Chrs)
   Period from_____ to_____ Grant: Rs. _____

6. ***Collaborative Investigator - 1**
   Name: Mr. Dibakar Ghosh
   Designation: Scientist (Agronomy)
   Date of Birth: 25.01.1985
   Experience: 3 ½ Years
   Number of research publications: Nil

Number of other Research Schemes:
Title of Scheme (S) _____ (30 Chrs)
Name of the funding Agency: _____ (30 Chrs)
Period from_____ to _____Grant: _____Rs.

Collaborative Investigator – 2
Name: Dr. (Mrs.) C. Sarathambal_____ (30 Chrs)
Designation: Scientist (Microbiology) _____ (30 Chrs)
Date of Birth: 13-07-1983
Experience: 6 Years
Number of research publications: 15
Number of other Research Schemes:
Title of Scheme (S) _____ (30 Chrs)
Name of the funding Agency: _____ (30 Chrs)
Period from_____ to _____Grant: _____Rs.

Collaborative Investigator – 3
Name: Dr. P.P. Choudhury
Designation: Senior Scientist (Residue Chemistry)
Date of Birth: 14.11.1963
Experience: 13 Years
Number of research publications: 22
Number of other Research Schemes: Nil
Title of Scheme (S) _____ (30 Chrs)
Name of the funding Agency: _____ (30 Chrs)
Period from_____ to _____Grant: _____Rs.

Collaborative Investigator – 4
Name: Mr. Subhash Chander Singariya
Designation: Scientist (Economic Botany
Date of Birth: 14.08.1985
Experience: 1Year
Number of research publications: 3
Number of other Research Schemes: Nil
Title of Scheme (S) _____
Name of the funding Agency: _____)
Period from_____ to _____Grant: _____Rs.

Collaborative Investigator – 5

Name: Dr. (Mrs.) Yogita Gharde_____ (30 Chrs)
Designation: Scientist (Agricultural Statistics)_____ (30 Chrs)
Date of Birth: 04.01.1981
Experience: 4 ½ Years
Number of research publications: 8 Nos
Number of other Research Schemes:
Title of Scheme (S) _____ (30 Chrs)
Name of the funding Agency: _____ (30 Chrs)
Period from_____ to _____Grant: _____Rs.

Collaborative Investigator – 6

Name: Dr. P.K. Singh_____ (30 Chrs)
Designation: Principal Scientist (Agricultural Extension)_____ (30 Chrs)
Date of Birth: 31.12.1964
Experience: 25 Years
Number of research publications: More than 60
Number of other Research Schemes:
(i)Title of Scheme (S) Socio-economic survey of maize growers in Karnataka and Bihar with special reference to weed management (30 Chrs)
Name of the funding Agency: Monsanto India (P)Limited (30 Chrs)
Period from 2006 to 2008 Grant: ضر10.0 Lakh.

7. *Objectives (in brief):

- Study of weed dynamics and biology of major weeds in diversified cropping systems under conservation agriculture
- Development of efficient weed management technologies involving cultural, mechanical and chemical methods including new herbicide molecules, mixtures and rotations
- Monitoring of herbicide resistance in weeds, herbicide residues and soil health under long-term conservation agriculture systems
- Transfer of technology to the farmers

8. *Practical/Scientific Utility:_____(300 Chrs)

Conservation agriculture is a system designed to achieve agricultural sustainability by improving the biological functions of the agro-ecosystem with limited mechanical practices and judicious use of chemical inputs (FAO, 2010). It involves minimum soil disturbance, providing a soil cover through crop residues or other cover crops, diversification of species and sensible crop rotations. The conventional agricultural systems involve intensive tillage and these results in gradual decline in soil organic matter through accelerated oxidation and burning of crop residues. When the crop residues are retained on soil surface in combination with zero tillage, several changes occur that lead to improved soil quality and overall resource enhancement. Therefore, the conservation agriculture technologies lead to sustainable

improvement in the efficient use of water and nutrients by improving nutrient balances and availability, infiltration and retention by soils reducing water losses, and improving the quality and availability of ground and surface water.

Weed control in agricultural crops was primarily achieved through mechanical cultivation of the soil. Since 1940s and 1950s, an increasing number of effective herbicide options, paired with tillage operations, have allowed farmers to significantly increase crop yields while reducing labour demands. Tillage influences weed infestation, and thus interactions between tillage and weed control practices are commonly observed in crop production. In response to continued soil depletion and other environmental impacts from agricultural production, conservation agriculture has been promoted as a means of maintaining high crop productivity and increasing economic potential while preserving natural resources and limiting future environmental damage. To achieve goals proposed with conservation agriculture, innovative weed control strategies including chemical methods are and will continue to be an essential component in the development of sustainable agricultural practices. An understanding of the fundamental components of conservation agriculture is imperative in order to appreciate the necessity for weed control strategies in these practices as well as the difficulties associated with their development. Therefore, it is necessary to identify the key components of conservation systems and the evaluation of herbicides within these practices, and secondly, the strategy for utilization of high residue cereal cover crop in conjunction with chemical weed control methods to address the changes in weed control requirements.

Despite both environmental and production advantages offered through conservation systems, adoption rates have previously lagged in many countries due to several factors including weed control issues. Although weed control in tilled systems is no small task, conservation agriculture systems have presented an even greater challenge to achieve the same results. Many weed species within agricultural settings are able to flourish when intense tillage operations are minimized. Therefore, conservation systems have been characterized by greater weed densities than conventionally-tilled agricultural productions. The shift from conventional tillage practices, where the soil is turned prior to planting, to conservation agriculture practices, where tillage is reduced to a minimum, can be particularly difficult with respect to weed control. Weed shift and herbicide-resistant weeds are already becoming more common on zero-till farms in some countries. Therefore, the continued adoption of zero-tillage based farming system is highly dependent on the development of new herbicide formulations and integrated weed management options.

Conservation agriculture systems are necessary to preserve agricultural productivity and meet future global food demands. To implement these systems, adequate weed control is crucial in their success. Herbicide use has been a valuable asset when adopting conservation practices; however, prudent use of chemical weed control is essential to fulfilling the goals of conservation agriculture, reducing

detrimental environmental impact, and reducing herbicide resistance development. Further development and testing of alternative weed management practices that can be utilized along with herbicide applications must be pursued in order for conservation practices to remain successful. Hence, launching of a platform on conservation Agriculture by the ICAR is the most timely and innovative step for sustainability of Indian agriculture. Since weed management will be the key issue in conservation agriculture systems, it is proposed to initiate under this platform a project on ñDevelopment of integrated weed management techniques for conservation agriculture systemsò.

9. *Research work conducted

At sponsoring institutions:

A flagship programme on ñWeed management under long-term conservation agriculture systemsò has been launched at the Directorate since 2012. Following experiments have been conducted under this programme, which are continuing:

i. Weed management in rice-based cropping systems under conservation agriculture
ii. Weed management in maize-based cropping systems under conservation agriculture
iii. Weed management in soybean-based cropping systems under conservation agriculture
iv. Weed management in cotton-based cropping systems under conservation agriculture

- In other institutions of the country: At 17 centres of AICRP on Weed Management____(100 Chrs)
- Other countries: None_____(100 Chrs)

10. **Technical Programme**: (100 Chrs)

Experiments will be conducted in the field, laboratory and greenhouse on different aspects including tillage, residue management, cover cropping, weed control and other production factors in diversified cropping systems. Detailed investigations will be made on crop performance, weed dynamics and soil health.

Major activities will be as follows:

- Appraisal of weed dynamics (density and diversity) and monitoring of weed flora shift in rice- and soybean- based cropping systems
- Assessment of growth behavior of prominent weeds and crops in rice- and soybean- based cropping systems
- Assessment of weed seed bank
- Evaluation of different mechanized seeding equipments on weed growth
- Estimation of yield and yield attributing characters of crops
- Development of IWM modules employing different methods
- Screening and evaluation of new herbicide molecules, herbicide combinations /rotations
- Studies on persistence and degradation of herbicides in soil environment.

- Monitoring of herbicide resistance in weeds
- Assessing herbicide residues in food chain
- Estimation of carbon sequestration
- Assessment of soil physico-chemical and biological properties
- The outcome (technologies emerged) will be demonstrated at the farmers field in large scale

11. Facilities Available:
    - Laser levelller
    - Happy Seeder
    - CO_2 analyzer
    - Nitrogen Auto Analyser
    - LC-MS/MS

12. **Additional facilities required:** Renovation of the laboratories of soil / plant analysis, microbiology, and herbicide residues

13. Equipment & apparatus:

- CNS analyzer
- Soil CO_2 flux chamber
- Tractor, power sprayer and power weeder
- Seeding equipments, viz. happy seed drill, easy seed drill, zero-till drill, double disc planter and laser leveler etc. (One each)
- HPLC and its accessories and consumables for and GC, viz. Columns, solid phase extraction kits, etc
- Multi channel soil temperature measurement system
- Misc. equipments and accessories, viz. tensiometers, infiltrometer, penetrometer, RF stable access tubes for use with AquaPro moisture meter etc.

13. Duration: 3 years _____

14. Staff Requirements (Scientific, Technical etc.)

15. Designation of Post: Research Associates / Research Fellows_____
    Number of Post: 5 (Agronomy / Weed Science ï 2, Microbiology ï 1, Soil Science / Organic Chemistry -1, Agricultural Economics / Extension ï 1) _____
    Scale of Pay: As per norms of the ICAR_____
    Qualification Prescribed: M.Sc. or Ph.D. in the relevant subject_____

16. Estimation of Costs:

i) Sr. Research Fellows: 3
ii) Other contractual services: As per requirement

17. Recurring and Non-recurring contingencies: ₹25.0 Lakhs

Recurring and Non-recurring contingencies	Year-I (2015-16)#
Capital	
Equipment/ Machinery/ Apparatus/ Misc. items[@]	3.0
Revenue	
Contractual service (SRF 3 & other contractual services)	11.0
TA	1.0
Other recurring contingencies including institutional charges*	10.0
Total	**25.0**

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 : ₹90.0 Lakhs

UNDERTAKING

19. Certified that:

i. The research work proposed in the Platform Project (**Development of integrated weed management techniques for conservation agriculture systems**) 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**