ICAR-National Agricultural Higher Education Project

Final Project Report

Component 1b: Centre for Advanced Agricultural Science and Technology (CAAST)

Bidhan Chandra Krishi Viswavidyalaya

Conservation Agriculture

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Executive summary

Name of the AU: Bidhan Chandra Krishi Viswavidyalaya

Project Title: Conservation Agriculture

Executive Summary:

<<<<Highlight the broad activities undertaken by your AU under IG (in sentence form) with emphasis on achievements for entire project tenure (restrict the highlights to 2-3 paragraphs)>>>>

Conservation agriculture (CA) entails minimum disturbance of soil, retention of crop residues and judicious crop rotations that helps in conserving natural resources, increasing productivity and curbing global warming even while in practice in small-holder farming systems like Indian conditions. It has, in fact, proved to be useful not only in arresting all-round degradation of the global commons but also their upkeeping for posterity. Bidhan Chandra Krishi Viswavidyalaya, for the last one decade, has been engaged in research on different aspects of CA viz., its agronomy, carbon neutrality, water management and engineering collaborating with a few national and international partners. It has contributed significantly to its present knowledge pool and technological development for adoption at different location in the state of West Bengal. In order to strengthen the programme and generate quality human resources for manning different activities of CA across the country from a long-term sustainability perspective, a centre for advanced agricultural science and technology (CAAST) is established with financial assistance from the World Bank-Govt. of India under the ambit of ICAR-National Agricultural Higher Education Project (NAHEP). The major activities undertaken under this programme are

- ✓ Experiments on fine-tuning conservation agriculture (CA) technologies [on 7 field crops + 3 horticultural crops] carried out and demonstrated for the third year to the farmers of the region in a University Farm dedicated to CA.
- ✓ Three specialized courses on conservation agriculture were taught to the Ph.D. and M.Sc./M.Tech students working on different thematic areas of the centre for the second year; proposed plan of research work for 29 Ph.D. and 15 M.Sc./M.Tech. students finalized.
- ✓ Collaboration made with 21 Universities across 11 countries for training of students/faculties; 8 students already travelled abroad institutes for doing part of their PhD thesis.
- ✓ Conducted lecture series (20), workshops (5), awareness programmes (3) for skill development on CA technologies of faculty, students and farmers.

"Conservation is a state of harmony between man and land"

Introduction

<<<<Background, introduction of the project, title and key objectives, intended benefits (restrict the highlights to 2-3 paragraphs-maximum 2-3 pages)>>>>

Conservation agriculture (CA) represents a set of three crop management principles of minimum disturbance of soil, retention of crop residues and judicious crop rotations that helps in conserving natural resources, increasing productivity and curbing global warming even while in practice in small-holder farming systems like ours Indian conditions.

In India, West Bengal is a typical place for adopting CA technology because of its agricultural settings and the benefits (improved productivity, profitability and resource conservation) already accrued due to its (CA) adoption. West Bengal is the home of second highest rice-fallow area (degraded old alluvial and red-lateritic zones, where CA is the only option for introducing a second crop in cropping system that helps in upkeeping soil health), a seriously degraded intensively cultivated new and old alluvial zones (where adoption of CA technology is found to halt degradation of natural resources) and a coastal area with huge possibility of introducing the said technology harvesting rainwater through land-shaping and selecting suitable crops and cropping systems. Considering the potential of the (CA) technology, Bidhan Chandra Krishi Viswavidyalaya (BCKV) in association with State Directorate of Agriculture (Govt. of West Bengal) has been engaged in multi-disciplinary research in CA for quite some time not only using its own resources but also in collaboration with a few partners including Indian Council of Agricultural Research (ICAR) and some international organizations viz., ICARDA, CIMMYT, RWC-CIMMYT/IRRI (USAID Project), CSISA, UNDP, ACIAR, DAC-ICARDA-ICAR, ICARDA-IFAD and OCPF etc. It justifies that BCKV possesses necessary background and academic competence for hosting an advanced Centre on CA. To disseminate the technology and solving on-farm problems for its wide-scale adoption, qualified and trained technical manpower is a must. However, the graduates and post-graduates who are presently coming out of different universities, either in the state or the country as a whole, are little exposed to the multi-disciplinary science of the (CA) technology, since very few courses (even the taught ones) are dedicated to it. The recently launched ICAR-NAHEP is a befitting avenue for requesting funding to impart such education on CA to all concerned stakeholders *viz*., students, faculties, farmers and policy makers creating a Centre of Excellence through its CAAST component collaborating with global leaders and extension agencies and industries. An attempt is thus made towards this much needed end (requirement) through the present project at BCKV by establishing a multi-disciplinary Innovation Centre on Conservation Agriculture for creating the so called (CA) industry - ready human resources.

Project title: CAAST on Conservation Agriculture

Key objectives:

To establish a conservation agriculture (CA) centre for empowering students, faculties, farmers, entrepreneurs and other stakeholders including policy makers with the following specific purposes:

- to formulate and implement innovative courses and skill development programs on CA;
- to demonstrate, fine-tune and innovate location specific technologies on CA;
- to collaborate with national and international leaders and also industries for up-gradation of knowledge; and
- to create an ICT-based information hub, think tank and competent human resources on CA for societal causes.

Intended benefits

- Formulating innovative multi-disciplinary courses on smart soil and crop management practices for CA;
- Proposing research on carbon neutral, energy efficient, soil-improving cropping systems, fabricating prototype farm implements and improving rice-fallow system through ingenious management of its stubble-height; and

- Roping in ITI-passing students of rural origin for certificate course for entrepreneurship (on farm machineries) development and creating an ICT-based knowledge hub with MOOCs (massive open online courses) on conservation agriculture.

1. Key activities carried out under the project during the entire period

1.1. Interventions carried out to make AU reform ready and led to ICAR accreditation

Please provide the details about the interventions carried out to make AU reform ready and led to ICAR accreditation. Please write one paragraph for each interventions and/or activities.

Key interventions	*Remarks/Photographs*
Formulation and implementation innovative courses and skill development program on CA for students, faculties, farmers and other stakeholders Formulated and offered three specialized courses on conservation agriculture for the Ph.D. and M.Sc. / M.Tech. students working on different thematic areas of the centre 1. Natural resource management through conservation agriculture (2L+2P) 2. Crop sciences in conservation agriculture (2L+1P) 3. Participatory methods for analyzing social ecology, status and trend of conservation agriculture technology, evaluation and transfer (2L+1P)	 Students attending class of the course
Setting up of experiments on fine-tuning and innovating location specific technologies including ITKs on CA by the students In order to upscale CA technologies for its adoption experiments on fine-tuning CA technologies [on 7 field crops + 3 horticultural crops] carried out for 3rd year and demonstrated to the farmers of the region in a University Farm dedicated to CA. CA tested on ten important cropping/planting systems 1. Rice-mustard-black gram 2. Rice-potato-pumpkin 3. Rice-maize-cowpea 4. Rice-wheat-green gram 5. Rice-lentil-fallow 6. Rice-onion-*dhaincha* 7. Rice-cauliflower-*Boro* rice 8. Arecanut + Carrot-Mint-*Kharif* onion 9. Mango + Arecanut + Frenchbean-Amaranthus- *Kharif* onion Mango+ Guava + Berseem- Pumpkin Mango + Drumstick+ Papaya 10. Dwarf coconut (Gangabondam)+ Malta+ Cabbage East coast tall + Lime + Tomato	  CA experiments in the farm

West coast tall + Ber+ Berseem-Bottle gourd	
Capacity building of students and teachers • 20 lecture were delivered by eminent scientists from across the country and abroad – each lectures were participated by on average 25-30 students and teachers. • Organised five workshops and four awareness programmes (4) for skill development on CA technologies of faculty, students and farmers. • 350 teachers and students participated in the brain storming sessions and workshops. • More than 100 farmers from different blocks participated in the workshops and awareness programmes	 Workshop  Expert and students interaction
International training of students and teachers • Collaboration made with 21 Universities across 11 countries for training of students/faculties; • Eight (8) students visited abroad institutes for doing part of their PhD research. Rest 17 students could not participate in overseas training due COVID 19 pandemic situation. • All 15 faculties could not participate in overseas training due COVID 19 pandemic situation.	 Students' International training

1.2. How the facilitative units helped to enhance learning outcomes

Please provide the details of the facilitative units which helped in enhancing learning outcomes of the students and/or faculties. Please note that we may not need to mention all facilitative units created in the AU here, but focus on those which are open for the students/faculties and other stakeholders.

Facilitative unit	Activity/achievement	Remarks/Photographs
Farm facilities	The facilities have been expanded and improved which promote the scope and opportunity for modern and relevant research.	  Farm facilities
Laboratory facilities	The facilities have been expanded and improved which promote the scope and opportunity for modern and relevant research.	   Laboratory facilities
Smart classroom facilities	The facilities have initiated and encouraged execution of digitally interactive platforms	 Digital classroom facility

1.3. Out-of-box initiatives undertaken by the AU

Please provide the details on out-of-box initiatives undertaken by the AU in one-two paragraph.

Out-of-box initiative	*Activity/achievement*	*Remarks/Photographs*
Installation of solar energy driven micro-irrigation system and operation of 10 HP pump using solar energy	Micro-irrigation has the potential to reduce excess amount of water application. Application efficiency of water through drip and sprinkler irrigation system can reach up to 90 and 70%, respectively. Irrigation system operated by solar power has been installed under CAAST on CA at Balindi Farm, BCKV, West Bengal. Three 1.0 hp and one 10 hp submersible pumps are operated by solar system. For 1.0 hp pump 1200 Wp solar panel (4 panel each 300 Wp) and for 10 hp pump 10800 Wp solar panel (36 panel each 300 Wp) is installed. The 1.0 hp and 10 hp solar pumps have the capacity to discharge of about 1800 l h-1 and 20000 l h-1, respectively. The 1.0 hp pumps are used for operating drip irrigation and 10 hp pump for sprinkler irrigation. Drip irrigation is operated at 1.5 kg pressure with 85 to 90% uniformity. Drip irrigation system is used for irrigating broccoli, tomato and cabbage covering an area of 3000 m^2. Two set of portable sprinklers are used. Each set can irrigate 4000 m^2 of land at 2 kg pressure at a time with 65-70% uniformity. Sprinkler system is used for irrigating wheat, maize, mustard, lentil, black gram, green gram, cowpea covering an area of 4 ha. Irrigation is given as per the scheduling based on crop evapotranspiration. Using solar driven pump electricity consumption and labour requirement is reduces significantly.	  Solar energy driven micro-irrigation system

Inclusion of horticultural crops under conservation agriculture	Horticultural crops are coming up strongly in this part of India for ensuring not only food but also nutritional security of people. To upscale CA with horticultural crops, we are perfecting technologies with three platforms – one with mango-arecanut based orchard utilizing its interspaces with intercrops viz., French bean-amaranthus-onion with berseem, lathyrus, cowpea and blackgram as live and straw as dead mulches; second one with arecanut-based orchard intercropped with carrot, mint and *Kharif* onion with berseem and straw mulches; and the last one with coconut-based orchard intercropped with lime (filler crop) and cabbage (Rabi)-cowpea (pre-*Kharif*). These are on establishment stage with generation of all necessary databases.	 
Establishment of a dedicated farm as demonstration unit on CA in the University	The Balindi farm of BCKV is dedicated to grow up as a model technology park on CA on 2018 for demonstration, training and extension purposes. A sum of forty acres land is engaged for running different trials on three different tillage practices with five different treatments under seven different cropping sequences making seven platforms. The performance of different trials clearly show the differences between CA and conventional practices. Twenty five Ph.D. and 30 M.Sc/M.Tech students are collecting all sorts of data from each of the platforms to evaluate their performances for upscaling. A large number of farmers from adjoining villages already visited the farm and participated in training programme on-field. The iconic farm will be very useful for upscaling the CA technologyamong the farmers.	 

1.4. Collaborations with industry and other HEIs for bringing relevancy and improving research effectiveness

Please provide the details on relevant collaboration with industry for bringing relevancy and improving research effectiveness in the AU in one-two paragraph.

Collaborations	***Activity/achievement/purpose***	***Remarks/Photographs***
The proposed collaboration mentioned in the DPR for development farm machinery and training for their repairment with the fresh Diploma holders of the ITI was not materialized because of non-cooperation of the Vice-Chancellor. However, collaboration with HEIs was materialized through visits of number of PhD students to the best of the bests laboratories overseas Institutions namely University of Milan (Italy), The Ohio University (USA), Cornell University (USA), Texas A&M University (USA), NEOMA Business School (France), University of Nottingham (UK), Kansas State University (USA). The other such visits for collaboration could not be materialized because of onset of COVID 19 although all the preliminary activities like selection and placement of teachers and students were completed		

2. Achievements made through IG under NAHEP

2.1. Output-outcome monitoring

S. N.	Particulars	Apr'2018 to Mar'2022	
		Plan	Achievement
1.	% increase in number of technologies commercialized		
2.	% increase in faculty research effectiveness		
3.	Number of direct beneficiaries of the project		390
4.	Number of female beneficiaries		198
5.	% increase in JRF / SRF / ARS		
6.	% increase in number of students who were admitted in foreign universities		
7.	% increase in PG student placements		
8.	Number of industry- sponsored projects and positions in cutting-edge areas of agri-science		
9.	Number of faculty training programmes (national) undertaken by AU	Nil	0
10.	Number of faculty training programmes (international) undertaken by AU	15	0
11.	Number of student training programmes (national) undertaken by AU	Nil	0
12.	Number of student training programmes (international) undertaken by AU	25	8

2. At least 40 teachers and 40 students were directly involved with the project. Almost equal number of teachers and students benefited from the laboratory and other facilities created out of this NAHEP fund. Further the farm machineries purchased were used by most of the University Farms because of almost non-existence of these facilities in the Farms. This has created almost new dimension in the overall research activities of the University.

5. the project was mainly meant for Post Graduate research and faculty development through creating the CAAST on CA and as such there was little scope for improving the Under Graduate students. However, there was a new impetus on part of the students associated with CAAST for appearing ARS/SRF examinations of ICAR.

7. Tt is very difficult to record exact placement number of the University. It is however, note-worthy that almost all students engaged in CAAST were employed in different organization e.g., Bank, State Department, University etc. on completion of their Ph.D. and M.Sc./M,Tech. degrees.
8. There was no such additional sanction of cutting edge because of turmoil iin execution of the project at its later period which is known to the NAHEP for the non-cooperation of Vice-Chancellor and Administration.

9. Because of non-cooperation these programmes were slated during the 2nd year onwards. However, because of non-cooperation of Vice-Chancellor in releasing funds they could not be materialized.

10. There was no such provision for organizing international training programme.

11. A large number of UG and PG students in addition to those associated with the project were allowed to do M.Sc. and Ph.D. dissertation, practical classes of different disciplines.

12. There was no such provision for organizing international training programme for students

Observation
<<Please provide the explanation on the progress made against the output-outcome monitoring indicator and highlight the key initiatives which attributed to the overall outcome/potential impact of the project-Maximum 2-3 paragraphs>>

The exposure given to the faculties and students through different activities of the centre will help them to be the experts for conservation agricultural practices. They will be the resource person for promoting the technology of conservation agricultural practices amongst policy makers, scientists, government officials and above all the farmers for upscaling the technology. With their expertise, the centre would be a centre of excellence in conservation agriculture and become a reference institute not only in the country but also at least for the South-Asian countries.

Few very specific impacts are

- Renewed vigor and reengineered agenda setting shall be effective in quality upgradation as well as capacity building.
- International collaboration and work climate will be triggering up new sets of academic and empirical interventions.
- Course modules created through discussions and workshops shall add value with existing course and curriculum with more and more ELC based pedagogic exercises.
- Skills earned by the scholars, at home and from abroad, have already started generating new way of thinking and doing in ground truth realities.

2.2. Knowledge Management Collaterals

I. Knowledge Collaterals	Apr'2018 to Mar'2022
1. Publications	
2. Research Articles	20
3. Annual Reports	4
4. Books	1 (book) and 5 (book chapter)
5. Success Stories	4
6. Newsletter	
7. Magazines	
8. Blogs	

II. Mobile and Web Applications	Apr'2018 to Mar'2022
1. Mobile Applications Developed	The was no such objective
2. Web Applications Developed	The was no such objective

III. Number of IPR (Intellectual Property Rights) Registered/Obtained	Apr'2018 to Mar'2022
1. Copyrights	There was no such avenues/news for dissemination. However, the visits of the students abroad were covered by their local media including radio broadcasting

2. Patents	
3. Others	

IV. Dissemination and Outreach	Apr'2018 to Mar'2022
1. No. of Posts on Social Media	
2. No. of Posts on Newspaper	
3. No. of Posts on Magazines	
4. No. of Unique Promotional or Outreach Collaterals	

2.3. Input and activity monitoring

Total funds received during 2018-2022 by PIU (INR Lakhs)	1776.71
Total funds received till 2018-2022 (Cumulative) (INR Lakhs)	1776.71
Total expenditure during the year 2018-2022 (INR Lakhs)	
Total expenditure till 2018-2022 (Cumulative) (INR Lakhs)	

Input / Activity indicator	Sub- head / category	Apr'2018 to Mar'2022 Expenditure / input in INR lakhs Utilization	Planned	Activity elaboration
Goods and equipment	Equipment, Plant & Machinery		**150.00**	
	Office equipment		**15.00**	
	Laboratory equipment		**403.36**	
	Furniture & fixtures		**25.00**	
	Computers and Peripherals		**15.00**	
	Books and Journals		**10.00**	
Civil works	Minor repair and renovation work		**87.39**	
Human capacity building	National level training		**0.00**	
	International level training		**68.00**	
	Short visit/ seminars		**8.64**	
	Meetings and workshops		**7.00**	
Consultancy	National level consultancies		**87.39**	
	Travel		**20.00**	

Input / Activity indicator	Sub- head / category	Apr'2018 to Mar'2022 Expenditure / input in INR lakhs Utilization	Planned	Activity elaboration
Recurrent cost / Miscellaneous	Contractual services		**373.22**	
	Operational costs		**583.00**	
	Institutional charges		**146.50**	
Total			**1999.50**	

Observation

<<Please provide the explanation on the progress made against the input and activity monitoring parameters>>

The latest expenditure figure is available with the Comptroller and Vice-Chancellor of the University. However, as PI, I can confirm that payments of a few bills (Civil, Electrical, Farm implement) and adjustment of advances for students' visits to abroad, civil renovation works and others were not made.

2.4. NAHEP outreach and other unique initiatives undertaken

Please provide the brief progress undertaken against the different categories placed below along with the suitable photographs/links/documents etc. Please note that only significant activities/initiatives are to be incorporated in this document

a) Case studies/success stories developed under NAHEP

(establishment of own enterprise by beneficiary student/high-impact research carried-out by AU under NAHEP/enhanced students learning outcomes due to establishment of modern facilities under NAHEP etc.)

Illustrative: Success story

Success Story-1: Establishment of CA technology park, Balindi, BCKV

The Balindi farm of BCKV is dedicated to grow up as a model technology park on CA on 2018 for demonstration, training and extension purposes. A sum of forty acres land is engaged for running different trials on three different tillage practices with five different treatments under seven different cropping sequences making seven platforms. The performance of different trials clearly show the differences between CA and conventional practices. Twenty five Ph.D. and 30 M.Sc/M.Tech students are collecting all sorts of data from each of the platforms to evaluate their performances for upscaling. A large number of farmers from adjoining villages already visited the farm and participated in training programme on-field. The iconic farm will be very useful for upscaling the CA technology among the farmers.

Success Story-2: Inclusion of horticultural crops under conservation agriculture

In a first, four model platforms on CA is created to test feasibility of introducing CA for horticultural crops. Different crops like mint, onion, carrot, berseem, French bean, malta, moringa, pumpkin are incorporated as intercrops with plantation crops like mango, ber, coconut, arecanut, guava, lemon etc. In different combinations and their impacts on soil moisture retention, yield behaviour and nutrient response are monitored for promotion among farmers. Preliminary response is excellent. It arouses a great deal of enthusiasm and interest among the visiting farmers and some practices have already been transferred to the farmers successfully.

Success Story-3: Installation of solar energy driven micro-irrigation system and operation of 10 HP pump using solar energy

One of the objectives of CA is to reduce the coercive effect of conventional agriculture. The entire farm has been brought under solar energy system, even the fencing are mildly electrified with solar energy to deter trespassers and grazing animals. Ten solar pumps are installed for managing the whole irrigation system of the farm to run both the micro and macro irrigation devices. The entire lighting systems have also been supported through a array of solar panels. A large number of school children and progressive farmers from adjoining areas visited this non-conventional energy system and the impact was both effective and emphatic.

Success Story-4: Innovative Taught Course on CA developed

Three innovative taught courses are developed as followed

(a) Natural resource management through conservation agriculture (2L+2P),

(b) Crop sciences in conservation agriculture (2L+1P),

(c) Participatory methods for analyzing social ecology, status and trend of conservation agriculture technology, evaluation and transfer (2L+1P)

The Ph.D. (total 25) and M.Sc./M.Tech. (total 25) students have been selected from different states of India with best of minds and mettle.

They successfully completed or undergoing different CA courses, as approved by University Executive and Academic council. The courses are proved to be very popular among the students.

b) Knowledge management and outreach initiatives (development of collaterals, newsletter, social media outreach activities, creation of website, experiential learning workshop, exposurevisits, (provide the details of the documents/articles/reports/modules/social media outreach/ website creation/experiential learning workshop/exposure visits etc. developed under NAHEP along with the suitable photograph of the cover-page and web-link (if available) – brief summary, cover page,

S.N	Category of the collateral	Brief summary	Snapshot/cover page	Weblink (if any)
1				
2				
3				
4				
..				

c) Unique initiatives undertaken due to <u>Covid-19 disruption</u>

1. Digital infrastructure
(development of digital/smart classroom, virtual reality facility, digital library system, other digital education and administrative infrastructure etc.)

Four smart/digital classrooms developed.

2. Digital initiatives:
(organizing trainings through online, conducting online examinations, administering attendance, developing of web applications, e-learning modules etc.

S.N	Category of the collateral	Digital initiative	Practice before introduction of the initiative	Practice after introduction of the initiative
1	Specialized taught course on "Natural resource management through conservation agriculture"	Online mode	Both theory and practical of the courses were taught in offline mode	Difficult to conduct field and laboratory based practical classes.
2	Specialized taught course on "Crop sciences in conservation agriculture"	Online mode		
3	Specialized taught course on "Participatory methods for analyzing social ecology, status and trend of conservation agriculture technology, evaluation and transfer"	Online mode		
4				
..				

Please provide maximum 5 photographs with high quality (minimum 1-2MB) and label with suitable caption. Attach the photographs separately in the mail.

3. Potential impact of the intervention:

Observation

<<Please provide the explanation on potential impact of the intervention in short and long term while illustrating the key initiative/activity. Also, relate how input turned into output→outcome→impact in brief sentence or graphical way. Consider one or two examples/cases etc, >>

1. The centre has contributed to the restructuring of educational management by introducing Management Information System; broader and diverse area of interaction amongst and between individual and institutions across geo-social distributions. Hence, the arena of higher education of agriculture and allied sciences has become more pragmatic, innovative and comprehensive,
2. Research agendas are now set more comprehensively and driven to a well designed target and accomplishment,
3. The opportunity for exposure to National and International institutes through exchange and collaborative academic and research interaction by the faculties and PhD scholars, have generated renewed vigour and impetus. This has created an excellent academic climate at BCKV.
4. Directly or indirectly about 200 students, 50 teachers and more than 100 farmers, 40 workers are benefited from the Centre. Out of which more than 50% is female, >15% SC and >10% ST.

4. Challenges faced and lessons learned while implementing the project at AU:

Challenges	
1	Problem faced to engage contractual manpower;
2	Insufficient support from administration;
3	International training of faculty/students and procurement processes is badly affected due to COVID 19 lockdown.
4	COVID 19 also disrupted field and laboratory works. The SRFs and JRFs were not allowed to stay in hostels and sent back home disrupting the main research components of the project.
5	
Lessons learned	
1	University administration MUST be sensitize before sanctioning/launching such a project
2	Sometimes it is felt that some other high-end official of the University should be the PI, NOT even a Professor of eminence for such project – may not be for the science sake, but at least for its administration!
3	
4	
5	

5. Sustainability Plan

5.1. Sustainability plan for reform ready interventions for the AU

- *Does the AU has any sustainability for reform ready interventions in future? (Yes / No)*
- *If yes, How the AU is planning to sustain the reform ready interventions in future?*

1	The outcome of the project is in the form of establishment of a dedicated farm for showcasing conservation agriculture. It may be used for empowering/training farmers/policy makers and other stakeholders for upscaling
2	. This will be unique self-sustaining unit with huge revenue earning potential and adds value to the University infrastructural facilities. This will also help the PG and UG students for undertaking their research/practical classes and other issues for empowering them.
3	The creation of farm machinery assets with huge investment for the Farm could be used across for bringing efficiency of overall performance of University Farms, which were essentially loss-making enterprises. The assets created bring a complete transformation in the Directorate of Farms of the University for executing its mandates efficiently which could bring sustainability to the Directorate.
4	The other assets created in the form of advanced laboratories with almost all essential equipment doing research for NRM, plant sciences and social sciences. The facilities could be used with little maintenance cost for decades together for the benefits of numerable teachers and students which the University during its 50 years of existence could not build.
5	The maintenance charge for the Laboratories for its sustainability could be run analysisng outside samples with payments.

5.2. Sustainability plan to continue ICAR accreditation

- *Does the AU has any sustainability plan to continue ICAR accreditation in future? (Yes / No)*
- *If yes, How the AU is planning to sustain the ICAR accreditation in future?*

1	The assets created will no doubt impart sustainability and help University earn points for accreditation.
2	
3	
4	
5	