Professional Services
(Consultancy, Contract Research, Contract Services and Trainings)

Offered by ICAR-CIAE

January, 2019

ICAR-Central Institute of Agricultural Engineering
Nabibagh, Berasia Road, Bhopal-462 038
ICAR-CIAE CAN OFFER

- Improved hand tools, animal, power tiller, tractor drawn and self-propelled agricultural machinery.
- Post-harvest technology, agro-processing and food technology package for promotion of agri-business.
- Technology for Integrated energy management and renewable energy appliances.
- Technology refinement, up-scaling and commercialization.
- Testing of commercial machine as per BIS codes and issue of test reports.
- Support on CAD Drawings & CNC based manufacturing.
- Skill up-gradation for manufacturers/entrepreneurs in CAD/CAM, tooling development, operation of CNC machines, heat treatment techniques, manufacturing technology.
- Scientific support to manufacturers/entrepreneurs in Technology development based on their own novel ideas.
- Extending R & D facilities for research collaborations.
- Consultancy on contractual research / IPR issues.
- Quality evaluation and testing of equipment / products.
- Project appraisal and feasibility studies.
- Training in design, testing and manufacturing technology and operation and management of agricultural machinery.
- Vocational training to farmers, farm women, rural youths and village artisans for self-employment.
- Training to Extension Functionaries and Subject Matter Specialists on various aspects of agricultural engineering and related technologies.
- International Training programmes for foreign nationals in the area of agricultural engineering.
- Agri-business incubation facility to potential and upcoming entrepreneurs.
Professional Services
(Consultancy, Contract Research, Contract Services and Trainings)
ICAR-CIAE Can Offer

Compiled and edited by
Dr. PC Bargale
Head, Technology Transfer Division

Published by
Director
ICAR-CIAE, Bhopal

January, 2019

ICAR-Central Institute of Agricultural Engineering
Nabi Bagh, Berasia Road, Bhopal – 462 038 (M.P.)
ICAR-CIAE : An Introduction

Major Divisions, Their Mandate and Major Areas of Professional Expertise and Services

2.1 Agricultural Mechanization Division [AMD]
   2.1.1 Thrust areas
   2.1.2 Major Areas of R & D and Scientific expertise available for professional Services
       2.1.2.1 Tillage and Soil Dynamics
       2.1.2.2 Seeding and Planting
       2.1.2.3 Plant Protection Machinery
       2.1.2.4 Precision Farming
       2.1.2.5 Ergonomics and Safety in Agricultural Machinery
       2.1.2.6 Agricultural Machinery Testing

2.2 Agro Produce Processing and Division [APPD]
   2.2.1 Thrust areas
   2.2.2 Major Areas of R & D and Scientific expertise available for professional Services
       2.2.2.1 Engineering Properties, Food Grain Processing and Nutritional Analysis of Foods

2.3 Centre of Excellence for Soybean Processing & Utilization [CESPU]
   2.3.1 Thrust areas
   2.3.2 Major Areas of R & D and Scientific expertise available for professional Services

2.4 Agriculture Energy & Power Division [AEPD]
   2.4.1 Thrust areas
   2.4.2 Major Areas of R & D and Scientific expertise available for professional Services
       2.4.2.1 Farm Power cum Solar Energy
       2.4.2.2 Bio-fuels
       2.4.2.3 Value chain on biomass

2.5 Irrigation and Drainage Engineering Division [IDED]
   2.5.1 Thrust areas
   2.5.2 Major Areas of R & D and Scientific expertise available for professional Services
       2.5.2.1 Covered Cultivation Technologies
       2.5.2.2 Agricultural Drainage Technologies for Waterlogged Vertisols
       2.5.2.3 Rainwater harvesting and recycling system for sustainable agriculture in Vertisols
       2.5.2.4 Water Quality Testing
       2.5.2.5 Irrigation and Drainage Engineering

2.6 Technology Transfer Division [TTD]
   2.6.1 Thrust areas
   2.6.2 Major Areas of R & D and Scientific expertise available for professional Services

2.7 CIAE-Regional Centre, COIMBATORE
   2.7.1 Thrust area

Training and Capacity Building Programmes Offered by ICAR-CIAE

Professional Services, Their Scope and Mode

Consultancy Services
Contract Research
Contract Service
Training
Memorandum of Understanding (MoU) for Collaborative Projects
License Agreement

Costing Guidelines for the Conduct of Training Programmes by ICAR-CIAE

Reference for further details on ICAR website
1. ICAR-CIAE: An Introduction

The ICAR - Central Institute of Agricultural Engineering (CIAE), Bhopal was established on 15th February 1976 to develop and popularize technologies for mechanization of production and post-production agriculture. CIAE is now the premier Agricultural Engineering R&D Institute in India, devoted to develop and promote appropriate technologies for land development, farm mechanization, irrigation & drainage and agro-processing & value addition, utilizing renewable, animate and mechanical power sources. The Institute strives to modernize Indian agriculture, increase productivity and promote agri-business with a view to enhance income and generate employment in rural sector through the network of research centres of four AICRPs established all over the country. The Institute is located at Nabi Bagh, about 7 km from Bhopal Railway station and 10 km from Air Port on Bhopal-Berasia Road towards north of Bhopal.

Mandate of CIAE, Bhopal

- Research on agricultural mechanization, post-harvest food processing and energy management in agriculture.
- Human resource development and capacity building through out-reach and training programs; commercialization and utilization of agricultural engineering technologies.

Objectives

- Undertake basic, applied and adaptive research leading to a development, improvement of equipment, technology, process for crop production, irrigation and drainage, post-harvest technology and processing, and energy-use in agriculture and rural industries.
- Develop hardware and technology in cooperation with other ICAR Institutes in the area of crops, horticulture, aquaculture and animal husbandry for production and processing.
- Provide leadership and co-ordinate network of research with state agricultural universities for generating location-specific technologies.
- Provide input to ICAR on policy intervention with respect to agricultural mechanization, energy management in agriculture, irrigation and drainage and post harvest technology.
- Provide consultancy and undertake sponsored research from industry and other organization Act as a repository of information on agricultural engineering.
• Act as a Center for training in research methodologies and technology and conduct post graduate education programme leading to Master’s and Doctoral degrees in Agricultural Engineering.
• Collaborate with relevant national and international agencies in achieving the above objectives.

2. Major Divisions, Their Mandate and Major Areas of Professional Expertise and Services

2.1 Agricultural Mechanization Division [AMD]
The main focus of Agricultural Mechanization Division is to carry out research and development on technology and machinery for tillage, seeding, interculture, plant protection, harvesting and threshing for cereals, oilseeds, pulses, horticultural crops, cash crops and also on specialized technologies for conservation agriculture and precision farming.

2.1.1 Thrust areas
The division has following major thrust areas under which the R&D activities are carried out:
• Horticulture Mechanization
• Precision Farming
• Conservation Agriculture

2.1.2 Major Areas of R&D and Scientific Expertise Available for Professional Services

2.1.2.1 Tillage and Soil Dynamics:
• Study on soil-tool interaction, tool-design optimization and research on soil-tillage system.
• Testing evaluation of agricultural machinery under controlled conditions in soil bin for development of newer machinery and for improvements in existing machinery.
• Traction testing evaluation of small implement tyres and performance testing of non-traction tyres.
• Design, engineering, commissioning and loading of soil bin with Automatic Variable Speed (AVS) drive system and computerized data monitoring.

2.1.2.2 Seeding and Planting
• Testing of seed drill, planter and transplanter for selected seeds/seedlings
• Selection of metering mechanism and devices for different seeds/seedlings.
• Setting up and development of seeding machinery laboratory.
- Design, development, improvements and selection of metering mechanism and devices in sowing machinery including planter/seed drill/transplanter for different seeds/crops.
- Training on design, development, operation, repair maintenance of seeding, planting and transplanting machinery

2.1.2.3 Plant Protection Machinery
- Design, development and testing of different types of sprayers.
- Studies on development of commercial sprayers using droplet size analyser, standard petternator and overhead sprayer trolleys.
- Training on plant protection equipment and machinery for agricultural and horticultural crops”.

2.1.2.4 Precision Farming
- Consultancy and training on interfacing of different sensors with controller, data logger and actuator for monitoring of system performance
- Consultancy, research and training on soil and plant sensor using Spectro radiometer, Green seeker, SPAD meter, thermal imager, RGB imager, EC & pH, Ion-selective electrode and soil moisture sensor, temperature sensor colour sensor, and automatic yield monitor
- Development of precision agricultural machinery using GPS and GIS technology.
- Training on agricultural based application using PLC, Raspberry Pi, Arduino, and MATLAB software and hardware.
- Training on design and development of microcontroller based precise input applicator.

2.1.2.5 Ergonomics and Safety in Agricultural Machinery
- Design and development of safer and ergonomically improved agricultural machinery to be operated by men / women for drudgery reduction
- Design of operator’s workplace of tractor, combine harvester, power tiller and other self-propelled machines
- Measurement and reduction of noise and vibration of tractors, combine harvester, power tiller, self-propelled machines and other agricultural equipment.
- Ergonomic evaluation and suggestion for improvements in existing machinery
- Professional training on ergonomics, ergonomically improved agricultural equipment, farm safety, workplace design and gender friendly tools and equipment
2.1.2.6 Agricultural Machinery Testing

- Commercial and confidential testing of manual, animal and tractor operated tools/equipment/machinery for tillage, sowing, planting, fertilizer application, interculture, harvesting, threshing and straw management.
- Commercial and confidential testing of knapsack (manual/battery/solar operated) and tractor operated sprayers.
- Training on testing and evaluation of agriculture machinery.

2.2 Agro Produce Processing and Division [APPD]

The Agro Produce Processing Division conducts research and development related to primary and secondary processing of agricultural commodities such as cereals, pulses, oilseeds, millets, fruits, vegetables, medicinal plants etc. The activities aim at reduction of post-harvest losses, value addition and additional income generation to the farmers. Training of stakeholders is also one of the activities of the division.

2.2.1 Thrust areas

The Division has following three major thrust areas under which R&D activities are carried out:

- Improve nutritional security by developing value chains for food grains with focus on millets
- Value chain for post-harvest management of fresh fruits and vegetables
- Protocols for food quality and safety

2.2.2 Major Areas of R&D and Scientific Expertise Available for Professional Services

2.2.2.1 Engineering Properties, Food Grain Processing and Nutritional Analysis of Foods

**Contract services in the area of:**

- Storage and quality evaluation,
- Product and process design,
- Laboratory services like determination of physical properties, texture analysis, rheology, colour analysis, particle size analysis, machine vision applications, etc. (details of services available in two laboratories given in annexure)
- Testing of post harvest processing machinery and mobile applications,
- Providing technical guidance for establishment of small enterprises viz., ripening chamber and cold storage, dal mill, agro processing centre, millet
processing center, drying of fruit & vegetable, minimal processing of vegetable, production of carbonated fruit juices.

- A list of testing services with proposed testing charges has been submitted for approval of competent authority (list enclosed)

**Consultancy in the area of:**

- Product design for products like spreads, bakery items, dried items, powders, selection of packaging materials, etc. design of storage structures, dryers.

### 2.3 Centre of Excellence for Soybean Processing & Utilization [CESPU]

#### 2.3.1 Thrust area

To develop and disseminate technology for processing and utilization of soybean to promote its use in daily diet for nutritional security and health benefits to Indian population.

#### 2.3.2 Major Areas of R&D and Scientific Expertise Available for Professional Services

- Development of soy based, nutritionally balanced innovative products, recipes to suit to Indian tastes for different segments of population, different age groups, their acceptability and sensory evaluation.
- Consultancy and entrepreneurship development programmes for soy based processing plants including soy milk and soy paneer [tofu], full fat soy flour, soy nuts, soy snacks, extruded and bakery products, soy butter, soy spread, soy sattu, soy protein isolate using membrane technology etc.
- Capacity building of extension functionaries for promotion of soy based products and their processing technologies for adoption in rural areas through different Government sponsored programmes specially focusing on women and children to address protein – calorie malnutrition.

### 2.4 Agriculture Energy & Power Division [AEPD]

The main focus of Agricultural Energy and Power Division is to carry out research on energy management in production, post production agriculture and allied activities to enhance use efficiency and development of technologies for second and third generation bio-fuels.

#### 2.4.1 Thrust areas

- Energy management in agriculture to enhance use efficiency
- Technologies for second and third generation bio-fuels
2.4.2 Major Areas of R&D and Scientific Expertise Available for Professional Services

2.4.2.1 Farm Power cum Solar Energy
- Engine performance testing using bio-oil blends with fossil fuel.
- Testing of solar panels efficiency, characterization of solar panel / cell, maintenance of the system.
- Testing of solar pumps, solar refrigeration and solar drying systems.

2.4.2.2 Bio-fuels
- Torrefaction system to study the lignin and other bio-polymeric configurations and characterization of bio-fuels.
- Process for production of liquid bio-fuels from crop residues and non-edible oils.
- Bio-char production system, characterization, and its application for domestic sector and soil amendment.

2.4.2.3 Value chain on biomass
- Value chain for biomass collection, transport, briquetting, gasification and decentralised power generation system.
- Technology for briquetting of paddy straw and its thermal application.
- Biogas plant installation, purification and electricity generation system

2.5 Irrigation and Drainage Engineering Division [IDED]
The main focus of Irrigation and Drainage Engineering Division is development of appropriate management technologies of irrigation and drainage equipment/ systems for improving systems efficiency to save water and energy.

2.5.1 Thrust areas
- Development of micro irrigation based fertigation system.
- Development and demonstration of package of systems for agricultural drainage and rainwater harvesting and utilization of harvested water for sustainable cultivation of high value crops using MIS.
- Improvements in design and selection of irrigation pumps for energy efficient operation.
2.5.2 Major Areas of R&D and Scientific Expertise Available for Professional Services

2.5.2.1 Covered Cultivation Technologies
- Covered cultivation Structures: site selection, material selection, design considerations for constructing covered cultivation structures (on & off the site) and allied training programmes.

2.5.2.2 Agricultural Drainage Technologies for Waterlogged Vertisols
- Drainage investigations, drainage material selection, design and layout of surface and sub-surface drainage systems for waterlogged vertisols and conduct allied training programmes.

2.5.2.3 Rainwater Harvesting and Recycling System for Sustainable Agriculture in Vertisols
- Site selection, hydrological investigations, design and layout of water harvesting pond and associated structures in Semi-arid region of vertisols and conduct allied training programmes

2.5.2.4 Water Quality Testing
- Assess quality parameters including EC, pH, Turbidity, TDS, Ca, Mg, CO3, HCO3

2.5.2.5 Irrigation and Drainage Engineering
- Testing of electric monoblock centrifugal pumps, diesel engine pumpset, drippers and micro sprinklers
- Drainage envelope materials testing: Equipment / Instruments for surveying, determination / measurement of soil physical and chemical properties
- Training programmes on precision irrigation systems including micro irrigation

2.6 Technology Transfer Division [TTD]
The main focus of the Division is popularization and commercialization of ICAR-CIAE developed technologies, through industrial liaisoning, capacity building of stakeholders including entrepreneurship development and business incubation and IPR management.

2.6.1 Thrust areas
- Technology Transfer, commercialization and IP Management: Management of ICAR-CIAE devolved technologies through promotion, commercialization through licensing and management of Intellectual Property Rights (IPRs).
• Industrial Liaisoning and linkages with stakeholders: Liaisoning with industries / manufacturers involved in manufacturing and marketing of agricultural machinery, agro & food processing, renewable energy for application in agriculture and agro-industries, irrigation and water management for promotion of ICAR-CIAE and NARS developed technologies. Also develop linkages [Govt. line departments, ICAR Institutes, SAUs, KVKs] for technology information dissemination, promotion, transfer and commercialization.

• Co-ordinate Institute Professional Services: Coordinate and process the proposals for professional services including technology licensing, collaborative and consultancy projects, contract research and contract services in line with ICAR Guidelines.

• Human Resource Development / Capacity building of stakeholders: For extension functionaries, manufacturers, students, entrepreneurs, agri-business planning, incubation and development.

• Information Repository for Agricultural Engineering Technologies: For Information dissemination of agricultural engineering equipment & technologies through participation in out-reach programmes including farmers’ fairs, demonstrations, field trails and on-line technology information portal and directory of manufacturers etc.

2.6.2 Major Areas of R&D and Scientific Expertise Available for Professional Services

• Sensitize and assist stakeholders on potential CIAE technologies and professional services that ICAR-CIAE can offer
• Organize need and demand based Entrepreneurship development programmes on different aspects of agricultural engineering for national and international clients.
• Preparation of Business Models as per client needs for setting up of business / enterprises based on agricultural engineering technologies [such as custom hiring centres, agro and food processing enterprise and advisory on other potential agri-business opportunities based on
• Impact / feasibilities studies of public funded schemes such as custom hiring of agricultural machinery.
• Intellectual Property and Technology Management
• Technology demand and forecasting in agricultural machinery sector.
2.7 CIAE-REGIONAL CENTRE, COIMBATORE

The major focus of Industrial Extension Project of ICAR-CIAE (1983) is to provide manufacturing and marketing assistance to small manufacturers in commercializing small farm equipment developed by research institutions and to liaise with farmers and manufacturers for adoption of these equipment.

2.7.1 Thrust areas

- Design, development and testing and promotion of production and post-production agricultural machinery for field and horticultural crops.
- Development of business model and entrepreneurship programmes on agri business.

3. Training and Capacity Building Programmes Offered By ICAR-CIAE

ICAR-CIAE regularly organizes training and capacity building programmes for local, national and International personnels on different aspects of agricultural engineering for different stakeholders including scientists, researchers, academicians, test engineers, manufacturers, industries, entrepreneurs, state and central Govt extensions functionaries, students, skill and vocational training programmes etc. The courses are tailored as per the client requirements, objectives and scope of the programme, duration. Highly qualified and experienced scientific faculty and technical expertise is available at the Institute. Guest faculty and experts are invited as per the need and demand of the clients from nearby research organizations, academic institutions, financial and management institutions and industries for these training programme. Following is the suggestive and tentative list of training programme and its duration. The courses in these major areas can be organized as per need and demand of client. The cost and fee of these training programmes decided based on ICAR Guidelines provided as Annexure of this publication. A few training programmes have been listed under different professional services under section 3 of this book let.
# List of training programmes under different professional services

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Title</th>
<th>Duration (weeks)*</th>
<th>Max. Intake ** (Nos.)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Agricultural Mechanization / Production Agriculture Mechanization</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.</td>
<td>Production Technology of Agricultural Equipment for quality up-gradation and standardization</td>
<td>03</td>
<td>10-20</td>
</tr>
<tr>
<td>2.</td>
<td>Computer Aided Designing (CAD) of Agricultural Machinery</td>
<td>3-4</td>
<td>10 – 15</td>
</tr>
<tr>
<td>3.</td>
<td>Testing and Evaluation of Agricultural Machinery</td>
<td>3-4</td>
<td>10 – 15</td>
</tr>
<tr>
<td>4.</td>
<td>Resource Conservation Technologies for Sustainable Agricultural Production</td>
<td>2</td>
<td>10 – 15</td>
</tr>
<tr>
<td>5.</td>
<td>Design Methodology of Ergonomically Sound Agricultural Machinery</td>
<td>1</td>
<td>10 – 15</td>
</tr>
<tr>
<td>6.</td>
<td>Tractor-implement Dynamics and Ergonomics</td>
<td>1</td>
<td>10</td>
</tr>
<tr>
<td>7.</td>
<td>Precision agriculture machinery for enhancing input application efficiency.</td>
<td>2</td>
<td>10 – 15</td>
</tr>
<tr>
<td><strong>Agricultural Processing and Value addition</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8.</td>
<td>Machine vision applications in agriculture and food processing</td>
<td>2</td>
<td>10 – 15</td>
</tr>
<tr>
<td>9.</td>
<td>Equipment and technology for processing and value addition to agro produce at small scale / rural level.</td>
<td>2</td>
<td>10 – 15</td>
</tr>
<tr>
<td>10.</td>
<td>Soybean processing for food uses for soy milk/paneer, soy flour, soy based bakery products, soy butter, soy satu, soy spread and soy cheese, soy nuts and snacks etc.</td>
<td>2</td>
<td>10 – 15</td>
</tr>
<tr>
<td>11.</td>
<td>Nutritional security though plant &amp; dairy ingredients based functional foods</td>
<td>2</td>
<td>10 – 15</td>
</tr>
<tr>
<td>12.</td>
<td>Entrepreneurship development training in the area of millet/ processing, Soybean processing/ and other selected agro produce processing</td>
<td>1-2*</td>
<td>15-20</td>
</tr>
<tr>
<td><strong>Agricultural Energy and Power</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>13.</td>
<td>Renewable Energy Technology for Production &amp; Post Production Agriculture and Rural Entrepreneurship</td>
<td>1</td>
<td>10 – 15</td>
</tr>
<tr>
<td><strong>Irrigation and Drainage Engineering</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15.</td>
<td>Recent advances in irrigation and drainage systems for precision agriculture and sustainable production in semi-arid conditions</td>
<td>2</td>
<td>10 – 15</td>
</tr>
<tr>
<td>16.</td>
<td>Precision Irrigation System for Horticulture &amp; Field crops</td>
<td>2</td>
<td>10-15</td>
</tr>
<tr>
<td>17.</td>
<td>Protected cultivation as an enterprise</td>
<td>1</td>
<td>15-20</td>
</tr>
<tr>
<td><strong>Technology Transfer Division</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>18.</td>
<td>Technopreneurship of Engineering Technologies for Agribusiness</td>
<td>3</td>
<td>10-15</td>
</tr>
<tr>
<td>19.</td>
<td>Entrepreneurship development programmes on Custom Hiring of Agricultural Machinery</td>
<td>1</td>
<td>30</td>
</tr>
<tr>
<td><strong>Krishi Vigyan Kendra</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>20.</td>
<td>Technical Officers training from Tractor / Machinery Industry — Operation and Measurement for Optimal Performance</td>
<td>1</td>
<td>10-15</td>
</tr>
<tr>
<td>21.</td>
<td>Operation/maintenance of agricultural machinery</td>
<td>1</td>
<td>20-25</td>
</tr>
</tbody>
</table>

*Note: All these courses and be designed as per the requirements of the client. This list is not exhaustive and courses can be organized as per requirement of the client through mutual discussion.

** These are suggested batch size and is flexible and may also depend on availability of the accommodation at CIAE Guest House / Hostel.

The costing of these training programmes is done based on the ICAR guidelines.
4. Professional Services, Their Scope and Mode

4.1 Consultancy Services

Consultancy shall mean professional services rendered to external agencies in terms of scientific, technical, engineering or other professional advice/assistance based on the expert knowledge and skill available in the ICAR system. All consultancy services in ICAR shall be institutional and shall be in the area of expertise of the individual(s) and shall preferably be in the thrust areas of ICAR.

Technical advice in the form of one time assistance to help in trouble shooting or problem solving, including pilot plant/up-scaling trials for technology validation and commercialization. Preparation of feasibility of project / technology design & forecasting/ evaluation reports.

Consultancy services can inter alia include:

i. Preparation of literature/survey/feasibility studies/technology forecasting etc.

ii. Interpretation of test results and data, advising on risks and hazards.

iii. Advisory tasks in preparation, evaluation and implementation of a project.

iv. Advisory tasks in design engineering related to agriculture and allied sciences.

v. Assistance in management of biotic and abiotic stress issues and other problems.

vi. Technical advice to help in trouble shooting for technology commercialization.

4.2 Contract Research

Contract research undertaken should results in terms of new knowledge, skills or technologies. The contracting party could be government departments, public or private sector, autonomous organization, international organizations/institutions, for mutual short- or long-term benefits.

Contract Research may be undertaken in the ICAR system inter alia for following purpose:

i. Development and/or evaluation of the technology/process/product including economic and techno-feasibility evaluation of new crop and animal germplasm, farming practices and conservation, utilization and management of natural resources.

ii. Refinement and up-gradation of new package of practices, pilot plant development, marketing/ policy research etc.
iii. Social science research for report preparation, improvement in technology transfer or agriculture extension.

iv. Preparatory research work with the objective of development and formulation of detailed project proposals wherein perceptible and significant use of ICAR/Institute facilities in terms of computation and/or other infrastructure are required.

v. Futuristic basic, strategic and applied research.

vi. Environmental impact of processes, products, technologies and their sustainability.

**Sponsored projects:** These projects would be fully funded by the client with specified objectives, and well-defined expected project outputs/results. Such projects may be multi-client also, with more than one sponsor sharing the project funding and research results.

**Collaborative projects:** Collaborative projects would involve partial/full funding by the client, or may be supplemented by provision of inputs, such as, expert manpower, production/fabrication of product in bulk for testing/trials, infrastructural facilities, etc. Such projects may be for up-scaling/improving of laboratory level knowhow, variety development and evaluation,

<table>
<thead>
<tr>
<th>Kind of contract Research</th>
<th>Funding source</th>
<th>Modes of IP and commercial Sharing</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Contract Research</strong> (objectives set by the Contract party)</td>
<td>Fully funded by contracting party, at no cost to ICAR whatsoever</td>
<td>Full ownership and commercialization rights to Contracting party</td>
</tr>
<tr>
<td><strong>Sponsored Research</strong> (objectives set by the ICAR)</td>
<td>fully funded by the sponsoring agency</td>
<td>Joint IP ownership rights and exclusive commercialization rights to sponsoring agency for limited period with appropriate revenue sharing arrangements with ICAR.</td>
</tr>
<tr>
<td>Partly Funded by sponsoring agency</td>
<td>Joint Ownership and commercialization rights</td>
<td></td>
</tr>
<tr>
<td><strong>Collaborative Project (Objectives set by contracting party)</strong></td>
<td>Fully Funded by External Agency:</td>
<td>Full IP ownership and commercialization rights to External Agency.</td>
</tr>
<tr>
<td>Partly Funded by External Agency</td>
<td>Joint IP Ownership and commercialization rights</td>
<td></td>
</tr>
<tr>
<td><strong>Grant-in-aid projects</strong></td>
<td>for supporting strategic or exploratory research, or for maintaining large / nationally important research and development programmes From Govt. Semi Govt agencies</td>
<td>Full ownership rights to ICAR Institutes</td>
</tr>
<tr>
<td><strong>Joint Project / programme</strong></td>
<td>As per agreed mutual terms &amp; conditions</td>
<td>The rights of the joint IP arising from the project/programme will be shared equally, or in any other proportion, or otherwise, which will be expressed mentioned in the Joint IP agreement [JIPMP]</td>
</tr>
<tr>
<td>Within each partner entity</td>
<td>The respective partner shall be free to determine the sharing of the rights, interests and royalties as well as the liabilities between itself and its employees as per its internal practices / guidelines.</td>
<td></td>
</tr>
</tbody>
</table>
technology/product/ process development, etc. Like sponsored projects, the collaborative projects will also have well-defined project outputs/results.

**Grant-in-aid projects:** These projects would involve grant by way of financial inputs, either in full or in part; and assistance in kind, e.g., equipments, training etc., to supplement the institutional efforts in ongoing or new research projects or for creating new capabilities/facilities. Such projects would normally be undertaken for supporting strategic or exploratory research, or for maintaining large/nationally important research and development programmes, or developing infrastructural facilities. The funds for grants would generally be sought from government departments/organisations or international organisations. However, well-established industrial and business houses may also provide such grant-in-aid.

**Kinds of Research Collaboration project / Contract research, IP & commercial rights sharing**

### 4.3 Contract Service

Contract Service would mean services rendered to the external organizations /clients/ customers, or assistance of minor nature based on available knowledge, expertise, skills and facilities of the Institute; involve only routine laboratory testing and would not require any technical advice. Contract service may include various kinds of routine services, some of which are enumerated below:

1. Testing and analysis of samples of soil, water, fertilizer, food, feed, produce, farm tools, implements, etc.
2. Testing of agrochemicals and microbial formulations.
3. Quarantine services, referral diagnosis for diseases/pests, pregnancy in animals.
4. Identification of biological specimen, natural and cultural techniques.
5. Making customized feed/prophylactic/therapeutic formulations.
6. Fabricating analytical and field equipment.
7. Certification/quality testing for seed (including e.g. fish seed); planting materials (including e.g. cell and tissue cultures), semen, other products, etc.
8. Renting of tools, instruments and equipments.
10. Forensic analysis e.g. DNA analysis of animals/plants/microbes.
11. Field demonstration of technologies and products, if for a business/commercial proposition.
xii. Multiplication and supply of germplasm, seed, other products viz., planting material, starter cultures, frozen semen, fish seed spawn, artificial insemination services etc..

xiii. Synthesis of organic molecules, viz. pesticides, raw materials and intermediates, etc.

xiv. Making new formulations of pesticides and drugs.

4.4 Training

CIAE execute training for national and international clients on the basis of ICAR guidelines. The details of above is available on website www.icar.org.in, in the menu section of Intellectual Property (IP & TM). The manuals on above can be downloaded from IP & TM section.

4.5 Memorandum of Understanding (MoU) for Collaborative Projects

Memorandum of Understanding [MOU] is executed mainly for partnership projects for taking up a joint Research & Development (R&D), promotion and commercialization of technology / farm equipment between ICAR-CIAE and the Industry / Manufacturer for further Development. The IPR issues in such cases are decided on the basis of ICAR guidelines applicable under collaborative research.

4.6 License Agreement

ICAR-CIAE licenses CIAE developed technologies by signing license agreement with manufacturing firm. The licensing fee as institutional fee is charged by the ICAR- CIAE on the basis of commercial potential of developed technology. The technology license fee is decided and finalized by Institute Technology Management Committee (ITMC) for MSME and NON MSME firms separately after its final release for technology adoption. The decision body in regard to release of newly developed technology, which can be transferred and commercialized is finalized by Institute Technology Release Committee (ITRC). The license agreement is signed with manufacturer for 03 years from the date of licensing and after expiry if manufacturer demands it may be renewed for further 03 years.
### 5. Costing Guidelines for The Conduct of Training Programmes By ICAR-CIAE

<table>
<thead>
<tr>
<th>Operational Head</th>
<th>For Indian clients ((\text{\textdollar}))</th>
<th>For foreign clients (US$)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Travel cost</strong> (if provision has to be kept)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>a. Travel for trainees and resource persons</td>
<td>Actuals</td>
<td>Actuals</td>
</tr>
<tr>
<td>b. DA/per diem for trainees and resource persons</td>
<td>As per entitlement</td>
<td>As per approved rates</td>
</tr>
<tr>
<td>c. Travel costs for educational tours, study visits, etc., where applicable.</td>
<td>Actuals</td>
<td>Actuals</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Boarding and lodging</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>a. For trainees</td>
<td>Actuals, subject to a minimum of (\text{\textdollar} 500/\text{trainee/day})</td>
<td>Actuals, subject to a minimum of $ 75/\text{trainee/day} for all foreign nationals, except in case of Asia Pacific, SAARC and other developing or least developed countries @ $50/\text{trainee/day}</td>
</tr>
<tr>
<td>b. For outstation resource persons</td>
<td>Actuals</td>
<td>Actuals</td>
</tr>
</tbody>
</table>

| Training material (including resource material, stationery, etc.) to be provided to the trainees | Actuals | Actuals |

| Consumables/chemicals/glasswares/raw materials/components | Actual costs | Actual costs |

<table>
<thead>
<tr>
<th>Resource person fee/Honorarium</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Resource persons</td>
<td>(\text{\textdollar} 2500/\text{lecture})</td>
<td>$100/\text{lecture}</td>
</tr>
<tr>
<td>b. Programme Director and Programme Coordinator (s)</td>
<td>(\text{\textdollar} 30000/\text{programme (in total)})</td>
<td>$1000/\text{programme (in total)}</td>
</tr>
<tr>
<td>c. All other Staff involved in organising the programme</td>
<td>(\text{\textdollar} 500/\text{trainee})</td>
<td>$50/\text{trainee}</td>
</tr>
</tbody>
</table>

| External payment envisaged (cost of outsourcing for transport and other services) | Actual costs | Actual costs |

| Contingencies | 5% of total cost | 5% of total cost |

| Institutional Charges* (Cost of physical inputs/services/utilities provided by the Institute) | \(\text{\textdollar} 2000/\text{trainee}\) | $500/\text{trainee} for all foreign nationals, except in case of Asia Pacific, SAARC and other developing or least developed countries @ $300/\text{trainee} |

| Service tax/any other tax | Actuals on grand total | Actuals on grand total |

*As indicated or 20% of the total cost, depending upon the number of trainees and duration of the programme.

### 6. Reference:

For details please see following Guidelines available on ICAR web site

- [ICAR Guidelines for Intellectual Property Management and Technology Transfer/Commercialization (Revised 2018)]
- [ICAR Rules and Guidelines for Professional Service Functions (Training, Consultancy, Contract Research and Contract Service)]
STRENGTHS OF CIAE

- Availability of agricultural engineering and allied scientists from various disciplines to undertake multi-disciplinary research projects.
- Well developed laboratories for tillage and soil dynamics, seeding and planting, plant protection, animal energy and ergonomics for design refinement and testing of agricultural machinery, instrumentation, bio-fuel test set up, irrigation equipment testing, material testing, biomaterial properties testing and pilot plant for soy milk and aqua feed plant.
- Computer Aided Design facilities for design of agricultural machinery.
- Training facilities for manufacturers and village artisans in the fabrication of agricultural and agro processing machinery.
- Liaisoning with manufacturers and Research and Development Institutions in Southern region through IEP Centre, Coimbatore.
- Prototype Production Centre with modern workshop machine tools to undertake manufacture of proven agricultural machines for multi-location evaluation and feed back.
- Close linkage with State Departments, Manufacturers, other Research & Development organization and Department of Agriculture & Co-operation and Farmers welfare, Govt. of India.
- State-of-the-art Library in agricultural engineering.
For Further Information, Please Contact

Director

ICAR-Central Institute of Agricultural Engineering
Nabibagh, Berasia Road, Bhopal-462 038
Tel.: 0755-2521133/39/41/44 Fax: 0755-2734016, 2733308
E-mail: director.ciae@icar.gov.in; directorciae@gmail.com; headittd@gmail.com
Website: www.ciae.nic.in