QUALITY MANUAL

of the
Quality Management System
[Compliant to IS/ISO 9001:2015 Standard]

ICAR-CTRI

Central Tobacco Research Institute

(Indian Council of Agricultural Research)
Rajahmundy, Pin Code -533105
Andhra Pradesh, India

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AUTHORISATION

This document titled, Quality Manual (QM) is the apex level manual for the ICAR-Central Tobacco Research Institute (CTRI). It describes the research practices of the Institute and addresses its alignment with the requirement of the Quality Management System (QMS) as per IS/ISO 9001:2015 international standard. The Institute has set goals of maximizing customer satisfaction through quality research and development outputs and technology transfer.

The manual is written in English language. All revisions and amendments of this document are controlled by the Management Representative (MR).

The contents of this manual are approved by the undersigned

The Management Representative is responsible for issue and control of this manual

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Date 01/09/2018

Director

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RECORDS FOR AMENDMENTS

Version 02; Effective Date 01/09/2018

Amendments to the current issue

Change Order	Section(s) affected	Pages affected	Brief reason for change	Version/Issue	Effective Date
1	All	All	First issue as per ISO 9001:2008	01	04/09/2015
2	All	All	Revised in line with ISO 9001:2015	02	01/09/2018

	CTRI	QUALITY MANUAL ISO 9001:2015

INDEX TO THE CONTENTS

1.0 MANDATE

The CTRI has the following mandates to honour

- *Basic and strategic research on domestic and exportable types of tobacco, improvement in quality and value added products*
- *Coordination of tobacco research and developing alternate usage of tobacco*
- *Identification of alternative crops/cropping systems for tobacco growing regions of the country*
- *Dissemination of technologies and capacity building*

2.0 VISION

Provide vibrant research back-up for Indian tobacco to be safe, remunerative and globally competitive in the changing milieu of national and international policy regimes.

3.0 MISSION

Developing environmentally sustainable agro-technologies for production efficiency, product quality and diversified uses of tobacco.

4.0 QUALITY POLICY

ICAR-CTRI shall strive to provide vibrant research back-up for Indian tobacco to be less harmful, remunerative and globally competitive in the changing milieu of national and international policy regimes.

We shall focus on:

- *Ensuring production of "quality tobacco" with reduced levels of harmful constituents (TSNA, Tar, Pesticide residues, Heavy metals etc.)*
- *Enhancing farm returns through innovative interventions for sustainable resource use and production efficiency*
- *Exploring and effective use of green energy sources for tobacco curing to reduce dependency on forest fuel wood*
- *Exploiting tobacco for diversified uses (phytochemicals and value added products)*
- *Effective technological solutions/ consultancy services to address the stakeholders needs*

Rajahmundry

The 9th September, 2018

Director

1.0 Background

Unique feature of tobacco production in India is that varied styles of FCV and different types of non-FCV tobacco are produced under diverse agro-ecological situations spread all over the country. About 15 states in the country grow tobacco, significantly influencing the economy and prosperity of the farming community. FCV, *Bidi*, Hookah, Chewing, Cigar-wrapper, Cheroot, Burley, Oriental, HDBRG, Lanka, Pikka, *Natu, Motihari, Jati* etc. are the different types of tobacco grown in the country. FCV, Burley and Oriental tobacco are the major exportable types. According to one estimate, the tobacco sector provides livelihood security to 45.7 million people in different categories, around 70 percent of whom are in the agriculture sector (Tobacco Institute of India, 2017). The main beneficiaries are the small and marginal farmers, rural women, tribal youth and weaker sections of the society. The average tobacco exports increased from 142 million kg during 2001-05 to 253 million kg during 2011-16. During 2016-17, tobacco made a significant contribution of Rs. 28,712 crore to the Indian economy in terms of excise revenue (Rs. 22,737 crore) and export earnings (Rs. 5975 crore) besides providing livelihood security to millions of people.

Indian tobacco has an edge over the leading tobacco producing countries in terms of availability of different styles produced with relatively low production costs. Presently, tobacco is being cultivated in an area of about 4.50 lakh hectares, covering different varieties of tobacco viz. FCV tobacco, bidi tobacco, chewing tobacco, hookah tobacco, cheroot tobacco, cigar wrapper tobacco, cigar filler tobacco, oriental tobacco, dark fire cured tobacco etc., with an annual production of 761 m.kg. Out of this, around 190 million kg is the Flue-cured Virginia [FCV] tobacco which is produced in an area of 1.45 lakh hectares, mainly in the states of Andhra Pradesh and Karnataka. The annual tobacco exports from the country increased by 78 percent in volume and 351 percent in value during previous decade. UK, Germany, Belgium, the erstwhile USSR, South Korea and South Africa are the major importers of Indian FCV tobacco accounting for more than 60% of our exports. At present, Brazil, Zimbabwe, Turkey, China and Indonesia are the competitors to India in the export market. India's share in the world cigarette exports is less than 1% only. However, the exports of scented *Bidis*, Hookah tobacco paste, scented chewing tobacco and Zarda are noteworthy and there is a scope for augmenting the exports of these products in the near future.

Botanically, tobacco belongs to the genus *Nicotiana,* which is one of the five major genera of the family Solanaceae. *Nicotiana tabacum L.* and *Nicotiana rustica L.* are the two commercially cultivated species in the world. The tobacco is a unique crop and can easily come up even on infertile soils unsuitable for other crops, and withstands vagaries of weather to a larger extent. Further, the crop is less prone to pest and disease attack. It is a model plant for biological research and a valuable source of many phyto-chemicals useful to mankind. Today, tobacco cultivation is a family business in many countries, providing livelihood security to millions of people world over. Some of the positive features of Indian tobacco are the lower levels of heavy metals, TSNAs and

pesticide residues compared to other tobacco producing countries. Thus, the situation presents a significant opportunity for the Indian tobacco industry to expand and consolidate its position in the world market.

2.0 **About the Institution**

Tobacco crop is cultivated in an area of 0.45 M ha (0.31% of the net cultivated area) producing about 761 M kg of tobacco leaf. India is the 2nd largest producer and exporter after China and Brazil, respectively. The production of Flue-Cured Virginia (FCV) tobacco is about 190 million kg from an area of 0.15 M ha while 571 M kg non-FCV tobacco is produced from an area of 0.30 M ha. In the global scenario, Indian tobacco accounts for 11% of the area and 9% of the total production.

By virtue of the dominant role played by this commercial crop, the Indian Central Tobacco Committee (ICTC) established Central Tobacco Research Institute (CTRI) in Rajahmundry (Andhra Pradesh) in 1947. The Institute was under the administrative control of ICTC, Madras from 1947 to 1965 and subsequently transferred to the Indian Council of Agricultural Research (ICAR), New Delhi.

ICAR acts as a repository of information and provides consultancy on agriculture, horticulture, resource management, animal sciences, agricultural engineering, fisheries, agricultural extension, agricultural education, home science and agricultural communication. It has the mandate to co-ordinate agricultural research and development programmes and to develop linkages at national and international level with related organizations to enhance the quality of life of the farming community. ICAR has established various research institutes in order to meet the agricultural research and education needs of the country. It is actively pursuing human resource development in the field of agricultural sciences by setting up numerous agricultural universities spanning the entire country. The Technology Intervention Programmes also form an integral part of ICAR's agenda which establishes Krishi Vigyan Kendras (KVKs) responsible for training, research and demonstration of improved technologies.

As a part of its activity ICAR has taken over the CTRI from ICTC during 1965 for conducting fundamental and applied research on Tobacco for the benefit of the farming community. The institute has six Regional Stations at Guntur, Kandukur, Jeelugumilli (Andhra Pradesh, Vedasandur (Tamil Nadu), Hunsur (Karnataka) and Dinhata (West Bengal) and a Burley Tobacco Research Centre (BTRC) at Kalavacharla, Andhra Pradesh.

Improving the yield and quality of various types of tobacco viz., FCV, *Natu*, Chewing, *Lanka*, Burley, HDBRG, Hookah, Cigar wrapper, Cigar filler and Oriental is the prime mandate of this institute and its Regional Stations. The All India Coordinated Research Project (AICRP) on Tobacco was

sanctioned by the ICAR in April, 1970 with four main centers namely Rajahmundry and Pusa (CTRI), Shimoga and Anand, and five sub centers namely Guntur, Hunsur and Dinhata (CTRI), Nipani and Nandyal to intensify the research on major problems of tobacco having regional and inter-regional significance. Two new centers at Berhampur (Orissa) and Araul (Kanpur, UP) were sanctioned during VII Plan and they started functioning from 1987-88 and 1988-89, respectively. Later the AICRP on Tobacco was renamed as All India Network Research Project on Tobacco (AINRPT) and merged with CTRI in August, 1998 with Director, CTRI also as the Project Co-ordinator. AINRPT named as All India Network Project on Tobacco (AINPT) in the XII plan.

The new CTRI building complex at Rajahmundry was constructed with necessary infrastructural facilities during 1982 in the prime land of 15 acres given by the Government of A.P. The Institute Headquarters is located in the historical city of Rajahmundry (16^0 59' N, 81^0 47' E and 25 m above MSL) on the banks of the perennial river Godavari in East Godavari District of Andhra Pradesh. The Rajahmundry city is situated on Kolkata-Chennai Rail Route and National Highway No.5. The nearby Airport is located at Madhurapudi, 10 km away from Rajahmundry.

Today, the Institute is the biggest of its kind in Asia, well equipped with the most sophisticated instruments for carrying out basic and applied research, especially in the frontier areas like Biotechnology, Biochemistry and Smoke Research at Rajahmundry. It is recognised by several universities like Andhra University, Acharya N.G. Ranga Agricultural University (A.P.), Horticulture University (A.P.), Bhagalpur University (Bihar), Acharya Nagarjuna University (A.P.), Adikavi Nannaya University (A.P.) and Mahatma Phule Krishi Vidyapeeth (Maharashtra) for the award of Ph.D. degree.

At present about 267 employees including 33 Scientists, 99 technical staff and 40 administrative and 95 other skilled support staff are working in this institute. Tobacco farmers in the country are very much benefited from the results of the research done by the Institute in the past 65 years of time.

The institute has two patents to its credit viz., 1) Process for purification of Solanesol (95-%) from crude / enriched extracts of Tobacco green leaf / Tobacco cured leaf / Tobacco waste in October 2007 and 2) Invention of Palmyrah Fibre Separating Machine in January, 2009.

3.0 Management

CTRI is a constituent body of The Indian Council of Agricultural Research (ICAR), New Delhi. The Institute is headed by the Director. The following structures oversee/manage the Research programmes of the Institute

3.1 Research Advisory Committee

The Research Advisory Committee (RAC) is the apex research committee of the Institute for assessing and evaluating the research programmes.The members of the Committee are nominated by Director General (D.G.), ICAR in pursuance of Rule 71A(a) of the Rules & Bye-laws of ICAR Society for a period of three years. The committee plays catalytic role in improving the ongoing research activity of the Institute. The functions of RAC is to suggest research programmes based on national and global contest of research in the thrust areas, to review the research achievements of the Institute and to see that these are consistent with the mandate of the Institute and to perform any other function as specifically assigned by D.G., ICAR.

3.2 Institute Research Committee (IRC)

The Institute's Research Committee (IRC) meets regularly for discussion and presentation of research achievements of the projects undertaken by the Institute and also for approving new research projects.

3.3 Quinquennial Review Team (QRT)

The QRT monitors the progress of research, its relevance and excellence and provides guidelines for the ICAR for taking steps for fulfillment of the mission and achievement of the goals of the Institute. The members of the QRT are nominated by Director General (D.G.), ICAR in pursuance of the Rules & Bye-laws of ICAR for a period of five years. QRT reviews the work done by CTRIT as well as AINP on Tobacco. The review is considered as an independent external review and its membership are broad-based. The composition of QRT is restricted to 5 or 6 eminent scientists, including one management scientist/specialist and the chairman. The QRT members possess generally an expertise in the subject relevant to the programme/Institution under review with wider experience of research, education, extension, socio-economic impact analysis and management.

The purpose of the independent review is to help the Governing Body of the ICAR to assess contributions made by each one of its Institute/Unit, and to evaluate its constraints, potentials, strategies and plans in scientific research and management of the programme. The Terms of Reference to QRT are:

- Research achievements and impact
- Research relevance and budget allocation
- Relationship/Collaboration with SAUs and other stakeholders
- Linkage with clients/end-users
- Proposed changes in organization, programmes and budget constraints

3.4 Institute Management Committee (IMC)

The members of the Institute Management Committee (IMC) are nominated by Director General, ICAR in pursuance of the Rule 66(a) (6) & (7) of the Rules & Bye-laws of ICAR for a period of three years. The chairman of IMC is the Director, CTRI and the member secretary is the Senior Administrative officer, CTRI. The other members of the IMC are the representative of the State Government, Agricultural University, ICAR, Non-official persons of agricultural/rural interest, Scientists from other ICAR Institutes etc. The powers and functions of IMC are:

- Consideration of proposals for five year plan and Annual Plan.
- Periodical review of progress of development schemes.
- Consideration of proposals for the annual budget.
- Consideration of items of expenditure which are beyond the powers of Director.
- Policy issues relating to the Institute.
- Consideration of action taken on the recommendations of Institute Joint Council.
- Such powers as may be delegated by the Governing Body to enable the committee to administer the funds allocated and the programmes approved.

3.5 PME Cell

Research priority setting, monitoring and evaluation (PME) is an effective tool to assist research managers for priority focused research resource allocations, relevance, monitoring and evaluation of research projects and accountability in the system. Realizing the benefits of such a mechanism it has been decided to set up PME cells at CTRI, like any other ICAR institution, merging all present mechanism/arrangements into it.

The functions of the PME cell are:

i) To coordinate and synthesize the recommendations of QRT, RAC, IRC, Vision documents of institute and ICAR to recommend research priorities of the institution for shortlisting priority researchable problems across crop(s)/divisions/ programmes, commodity/ etc. at institution level. (Priority setting)
ii) Annual updating and presenting the report to the Director of the institution for assigning research projects.
iii) To coordinate and arrange for annual monitoring of each on-going project and evaluation of completed projects through internal and external experts.
iv) To coordinate and arrange for technology validation and/or impact assessment of successful technology claimed by scientist(s) through internal and external experts.
v) Regularly sensitizing and capacity building of research managers and scientists through training programmes.
vi) Maintaining a database on all publications, technologies developed, IPRs, consultancies, projects undertaken in the past 10 years and on-going projects.

The PME Cell deals with the day-to-day technical correspondence of the Institute, maintenance of Research Project Files (RPFs), preparation of Annual Reports, QRT Reports, Technical Reports, publication of Bulletins, Deputation of Scientists to Seminars and Symposia and Farmers Training Programmes, Arranging Radio talks, Field visits to farmers fields, Conducting Technical Programme Meetings, IRC Meetings, AINP(Tobacco), Workshops, RAC Meetings, Seminars, Training Programmes, etc at the institute. It is headed by Nodal Officer (NO).

4.0 The Research Divisions

The core research activities of the Institute are carried out under the following Divisions viz.,

- Crop Improvement
- Crop Production
- Crop Protection
- Crop Chemistry & Soil Science

4.1 Crop Improvement Division

The main objective of this Division is to evolve improved tobacco varieties with high yield potential and/or resistance to biotic/ abiotic stresses coupled with acceptable leaf quality through both conventional and biotechnological tools. The Division has so far developed 93 varieties/ hybrids, either having higher yield or resistance to biotic stresses/low level of harmful substances/ high level of flavor compounds, in various types of tobacco for cultivation throughout the country.

In view of the health problems associated with tobacco, a number of improved lines having lower levels of harmful substances (Tar and TSNA - tobacco specific nitrosamines) have been developed. Also, hybrids having high yield potential besides high leaf quality, lower levels of tar and TSNA have been developed for the benefit of the farming community. Due to the concerted efforts of the scientists, the yield potential of FCV varieties has increased from 1,500 to 3,300 kg/ha while in non-FCV varieties, the yield increased from 2,000 to 5000 kg/ha. Beside the yield, cured leaf quality was also substantially improved due to the newly released varieties. Efforts are on to breed tobacco varieties suitable for extraction of edible oil besides higher levels of phyto-chemicals viz., solanesol, nicotine, protein etc.

Tobacco germplasm management has been given top priority and at present 3,370 germplasm accessions belonging to *N. tabacum* L and *N. rustica* L besides 60 wild *Nicotiana* species, are maintained in the gene bank. Germplasm collection, maintenance, evaluation, documentation and utilization are taken up on regular basis. Germplasm accessions with desirable agronomic and quality traits, and resistance to various diseases and insect pests are identified and are used in breeding work.

The Division is equipped with all the necessary facilities for conducting plant biotechnology research. The facilities include tissue culture, transgenic screen house, growth chamber, poly houses and molecular biology lab. Various sophisticated instruments available at the Division are UV-Vis Spectrophotometer(Nanodrop), Gel Electrophoresis Units, Gel Documentation System, thermal cyclers, Real Time PCR, Analyser, Laminar Air Flow System, Microscopes, Microscopic Documentation System, High Speed Centrifuges, Vacuum Concentrator, Water Purification Unit, Ice Flaking Machine, Cell Manipulator, Micro-plate Reader, Particle Acceleration Apparatus etc.

4.2 Crop Production Division

Developing agro-ecologically sustainable, technologically feasible and economically viable production and effective transfer of technologies for economic prosperity, environmental safety and for sustainable tobacco production is the mandate of the division. Cropping systems for different agro-ecological sub-regions have been developed and recommended.

Since tobacco is a high value cash crop, a cropping systems rather than a single crop can be an alternative to tobacco. Investigations on nutrient-use-efficiency, integrated nutrient management (INM), organic farming, integrated farming systems, micro-irrigation and fertigation systems in northern light soils to minimize the labour cost and to improve water and nutrient use efficiency, integrated weed and *Orobanche* management are carried out. Research on agronomic evaluation of cultivars / germplasm for alternative uses was also conducted. The extension section of the division undertakes research in the areas of technology evaluation, impact analysis and conducts on farm trials and front line demonstrations of proven technologies from different divisions. It involves in outreach activities like Field Friends Programmes with Tobacco Board and Trade members and renders advisory services to the tobacco farmers. Need based training programmes are conducted for tobacco farmers, field staff of Tobacco Board and other stakeholders of tobacco industry in order to bridge the technology adoption gap. The division is also entrusted with Agricultural Knowledge Management Unit (AKMU) which looks after development of software for Scientific Research, Internet connectivity of the institute, maintenance, updating of data and other related activities of the institute.

4.3 Crop Protection Division

The division conducts research on the incidence and crop losses caused by insect pests and pathogens, etiology and epidemiology of diseases, bio-ecology of insect pests and developing integrated management schedules against insect pests and pathogens. The mandate of the division is to conduct basic and applied research on insect pests and disease management in tobacco and tobacco based cropping systems for development, demonstration and popularization of sustainable crop protection technologies. In order to manage the insect pest and diseases, scientists at the institute and its research station have developed several promising crop protection technologies. The work done on neem and neem based products in controlling insect pests note worthy. The entomologists have standardized mass production of bio-control agents particularly NPV. IPM modules with cultural, biological and need-based application of selective insecticides have been developed and successfully demonstrated in Farmers' fields which helped in production of pesticide residue free tobacco for export.

4.4 Crop Chemistry & Soil Science Division

The Division of Crop Chemistry and Soil Science has been entrusted with the responsibility to conduct the basic, strategic and applied research related to assessment and management of soil resource constraints for production efficiency and product quality. The priority areas of research include, soil quality management for tobacco productivity and quality, enhancing nutrient use efficiency, nutrient supplementation through organic inputs and bio-fertilizers, tobacco responses to abiotic stresses and their alleviation, development of flavour profiles and reduction of harmful substances in tobacco, and evaluation and exploitation of tobacco for alternative uses with special focus on seed oil and phyto-chemicals (solanesol, nicotine, leaf protein etc.) having potential uses in food and drug industry.

The Division is equipped with the state-of-the-art laboratory facilities to backup research activities. It houses sophisticated instruments like Total Organic Carbon (TOC) Analyzer, Auto-analyser, UV-Vis Spectrophotometer, Atomic Absorption Spectrophotometer, Photosynthetic System, Plant Canopy Analyzer, Chlorophyll Meter, Gel Documentation System, PCR Analyser, GC, GC-MS, GC-TEA, HPLC, Cigarette Smoking Machine, Laminar Air Flow System, Zeiss Microscope and other routinely used laboratory paraphernalia.

The Division has five specialized constituent units to render services relating to Soil and Water testing, Tobacco Leaf Quality Evaluation, Pesticide Residue Analysis, Cigarette Testing and Smoke Analysis, and Seed Testing. The Division is manned with scientific and technical staff having expertise and experience to provide training and consultancy in the specific areas including soil testing and water quality assessment, tobacco leaf quality evaluation, pesticide residue analysis, cigarette and smoke testing, seed testing and tobacco curing technologies.

5.0 CENTRAL LIBRARY

CTRI central library was established in 1950 to assist the researchers at the Main Institute and at its Regional Stations located at different places viz. Guntur (AP), Kandukur (AP), Jeelugumilli (AP), Vedasandur (Tamil Nadu), Hunsur (Karnataka), Dinhata (W.B.), and for Burley Tobacco Research Centre (BTRC) at Kalavacharla in carrying out the R&D in different types of tobacco.

The main functions of the library are:

- To procure published/unpublished literature on tobacco and other related subjects.
- To index and abstract the selected information available in journals.
- To prepare retrospective annotated bibliographies on different subjects.
- To provide Current Awareness Services (CAS) and Selective Dissemination of Information (SDI) services.
- To provide reference and referral services and CD ROM Databases searches.
- To provide reprographic and binding services
- To provide user training programmes to scientists and others in utilising of library resources and services.

The Library has acquired so far over 13,5oo books, more than 12000 bound volumes of journals, Annual Reports of ICAR Institutes and Universities, more than 3,000 Reports/technical bulletins, Newsletters from ICAR Institutes/Universities. Documents are categorized into different subjects.

At present, library is receiving around 70 periodicals.

Computerization of library activities and functions are completed. The following bibliographic databases are maintained.

- Back volumes of Journals available in the library.
- Articles published by CTRI and its Regional Stations and AINRP(Tobacco) centres
- Indian Tobacco Literature from 1986-2010
- CORESTA CD-ROM on tobacco is available for tobacco literature searches.

6.0 AGRICULTURL KNOWLEDGE MANAGEMENT UNIT (AKMU)

The AKMU was established in 1998 with advanced systems and peripherals. Computer systems are provided to each Scientist and each Section and LAN connectivity is provided among all the nodes. Internet connection was provided with broadband 8 MBPS line connectivity

The activities of AKMU include

- Development of software for Scientific Research
- Statistical analysis of experimental data
- Providing Internet connectivity with broadband 8MBPS line to all the systems in the main building
- Maintenance and updating of data in PERMISNET (Personnel Management Information System Network)
- Maintenance and updating of weather data in Meteorological Database Management System of Black Soil Farm, Katheru.
- Installation and Maintenance of computer systems and peripherals
- Execution and updating of Pay-roll and Co-operative society software for office automation
- Providing training to Scientific, Technical and Administrative staff in computer applications
- Maintenance of Computer systems, Server, Firewall, Plotter, Printers, Switches, Hubs and the software

7.0 MAINTENANCE & SERVICE UNIT

The Maintenance Service Unit is responsible for overall maintenance and upkeep of Institute, Scientist Home, Krishi Vihar Residential Quarters, etc.

8.0 BLACK SOIL RESEARCH FARM, KATHERU

The Farm is managed by Officer-in-charge, Black Soil Research Farm under the supervision of Head, Division of Crop Production. The Farm is used for conducting different field experiments and raising seed production plots.

9.0 SEED PRODUCTION SECTION

This section is under the supervision of Seed Production Officer (SPO). This section takes care of the seed production of released tobacco varieties for distribution to the farmers for commercial cultivation under Revolving Fund Scheme.

10.0 ADMINISTRATION & ACCOUNTS SECTION

The Administration & Accounts sections deal with Admin and accounts functions related to the Institute.

11.0 The Future

Since its establishment, the institute has made significant contributions by developing high yielding varieties/hybrids and crop production technologies. In the FCTC (Framework Convention on Tobacco Control) regime, there is a need to examine the priorities in tobacco research to comply with the government policies for ensuring remunerative prices to the farmers.

The production and market dynamics in the tobacco industry are profoundly influenced by trade requirements, consumer preferences and statutory regulations besides environmental and socio-economic considerations. The situation underscores the importance of Good Agricultural Practices (GAP) in tobacco cultivation, encompassing seed integrity; soil and water conservation; fertilizer and agro-chemical usages; crop husbandry; pre-and post-harvest operations including energy and labour saving approaches; protective equipment to farmers; farmers training and afforestation.

In this back drop, developing economically viable and eco-friendly agro-technologies for enhancing productivity and quality, reducing harmful substances, developing value-added products are the key issues, requiring innovative scientific interventions, for promoting exports, generating revenue and employment on a sustainable basis. Research on exploitation of tobacco as a source of phytochemicals has attained prominence in view of economic potential and also due to health risk associated with tobacco consumption. Also as the economic lifeline of millions of people depending on the crop stands threatened in absence of equally viable and remunerative alternatives, it has become imperative to develop the crop as a source of varied end uses like edible seed oil, high value phytochemicals, pharmaceuticals, proteins, enzymes, bio-rational pesticides, industrial chemicals, paper and board making etc. In consonance with the policy of ICAR, due emphasis will be laid on secondary agriculture to diversify the utilization of tobacco in food and pharma industries. Besides conducting research, CTRI will play the role of a catalyst in tandem with the other stakeholders for effective transfer of technology to the farming community.

1.0 SCOPE & FIELD OF APPLICATION

This Quality Manual (QM) provides a general description of the quality management process that is applied at the Institute. It also provides quality management policies and defines responsibilities for the implementation, maintenance and management of a Quality Management Systems (QMS). The Quality Manual has been formulated in line with the Quality Policy statement of the CTRI and outlines consistent and uniform procedures adopted at the organization for the fulfillment of the policy and objectives. This Manual defines how effective control is established by the use of formal written procedures.

This QM defines the CTRI's mandate, mission, vision, quality policy, quality objectives and system process requirements for basic quality related processes, such as the following:

- Resource management;
- Customer-related processes;
- Work environment;
- Customer communication;
- Product realization:
- Purchasing; and
- Measurement, analysis and improvement.

The scope of the Quality Management System covered under this manual is applicable to the following sections that directly serve, support and enhance the mission and objective of the Institute.

- Research Programmes of the Institute on Tobacco crop
- All India Network Projects(AINP) on Tobacco Crop
- User-Oriented Programmes such as Extension, Consultancy & Training
- Research Laboratories at various Divisions
- Research farm at Katheru
- Library
- Weather Station
- PME (Performance Monitoring & Evaluation)cell
- AKMU(Agriculture Knowledge Management Unit)
- ITMU (Institute Technology Management Unit),and
- Administrative & establishment sections

In the Current context the scope of the Quality Management System of the Institute shall be:

"Basic, Strategic & Applied Research on Tobacco crop"

2.0 NORMATIVE REFERENCES

At the time of publication of this Quality Manual (QM) developing the quality system the edition of this International standard (ISO 9001:2015) were valid & hence adopted.

3.0 PERMISSIBLE EXCLUSION

Permissible exclusion is none.

4.0 APPLICABLE STATUTORY /REGULATORY REQUIREMENTS

The organization complies with the following statutory/ regulatory requirements

a. Proforma and Guidelines for Research project proposal, monitoroing & evaluation, issued by Indian Council of Agricultural Research (ICAR)
b. Rules and Bye-laws of ICAR
c. ICAR audit Manual
d. Manual on Training, Consultancy, Contract Research & Contract Research
e. General Financial Rules (GFR)
f. Fundamental Rules and Supplementary Rules (FRSR)
g. Medical Attendance Rules
h. CCS (Conduct) Rules
i. Delegation of Financial power
j. Master Manual for DDO and Head of Office
k. Manual on Establishment and Administration
l. Right to Information Act,2005
m. Copy Right Act
n. Patent Act
o. FEMA guidelines
p. other guidelines & directives issued by ICAR and /or Govt &
q. Applicable rules of the local Municipal Corporation & Development authorities

5.0 OUT SOURCED PROCESSES

The outsourced processes (e.g. Security, AMC for maintenance of equipments, calibration of test and measuring equipments etc) that may affect product conformity with requirements are identified and controlled within Quality Management System. Such out sourced processes are controlled and monitored by the Institute by way of :

- Selection based on their capabilities and competences, market reputation,
- Two way communication,
- Periodic inspection,
- Detailing the technical requirements and specifications,
- Strict monitoring the performances and supply and
- Ensuring rigorous re-evaluation of the vendors/contractors etc.

4.0 CONTEXT OF THE ORGANIZATION

4.1 Understanding the organization and its context:

ICAR or in-house projects are fully supported by ICAR and are meant for building capability in identified areas of research, and to do exploratory work for concept proving at Institute scale. The expected outputs are; (1) Business development in the form of Sponsored/ Collaborative/ Grant-in-Aid/ Consultancy Projects from external/ user agencies (2) Advancement of knowledge through Publications/ Reports (3) Generation of intellectual property rights (4) Development of processes, products, & applications at Institute scale (5) Human resource development.

In addition the Mission oriented ICAR projects are meant for technology development in specific mission/ thrust areas and involve basic R&D, technology development, scaling up, demonstration, facility creation, infrastructure development, etc. These are directly approved and monitored by ICAR Headquarters.

CTIR has determined external and internal issues that are relevant to its purpose and its strategic direction and that affect its ability to achieve the intended result(s) of its Quality. Such issues include the Quality related conditions those are capable of affecting CTIR.

CTRI monitors and reviews information about these external and internal issues on yearly basis or as and when it is required.

4.2 Understanding the needs and expectations of interested parties

CTRI has determined the interested parties who are relevant to the CTRI Quality management system and the requirement of the interested parties in order to prevent the potential effect on the organization's ability to consistently provide products and services which meet the customer and applicable statutory and regulatory requirements.

Interested parties	Requirements	Monitoring & Review mechanism in CTRI
External providers	1)Specification communication 2) Payment as agreed 3) On time Supply of Input material (if any) 4) Technology support	1) Defined in Documented information of External providers control 2) Review in Management review meetings
Customer	1) Quality of product & Service 2) Delivery of product on time 3) Response to complaint 4) Proper Communication channel	1) Defined in documented information of **Organizational planning and control** 2) Review in Management review meetings
Statutory & Regulatory Body	Complying with the statutory and regulatory requirements as defined from time to time.	1) Defined in documented information of Leader ship 2) Review in Management review meetings
Bankers / Financiers	Updating of changes in the organization whenever it happened	Review in Management review meetings
Employees	Management Support, Payments on time	Accounting Control of management

4.3 Determining the scope of the Quality Management System

The Institute has prepared this comprehensive quality manual, which describes the quality management system practiced in various programmes, Divisions/cells as described in document QM 1.2. Also the Institute has prepared couple of Standard Operating Procedure (SOPs). These documents provide the overall generic guidance for quality management system in practice and establishes the procedures for management of research & development projects in the Institute.

4.4. Quality Management System and its processes

The top management of CTRI has established, documented, implemented and maintain the quality management system as per the international standard ISO 9001:2015 in the organization, with an aim to continually improve its effectiveness

In doing so, the management has -

- identified the processes as needed for the QMS and their application throughout the organization
- determined the sequence and interaction of these processes

The criteria and methods needed to ensure that both the operations and control of these process are effective are determined and indicated in the standard operating procedures

The availability of required resources and information necessary to support these processes are ensured by the CTRI management.

Monitoring, measuring (wherever possible) and analysis of these processes are through defining the Annual Action Plan ,Work Plans, outcome budget for the activities and their measurements , and

The Management ensures Implementation of these action plan in order to achieve planned results (eg. Research , Training , reports , publications etc .) and continual improvement of the processes.

5. LEADERSHIP

5.1. Leadership and commitment

5.1.1. General

The Director, CTRI, through the M.R. is committed to develop, implement and improve the quality management system to attain its maximum effectiveness through the followings;

a. Communicating to the organization and the component staff members about the importance of customer focus as well as complying statutory and regulatory requirements.
b. Establishing the quality policy.
c. Ensuring that the quality objectives are fully established.
d. Conducting management reviews and planned quality audits.
e. Ensuring the availability of adequate resources and
f. Maintaining very responsive customer communications and relations management.

5.1.2 Customer Focus:

The Director, CTRI, through the MR and other staff members ensures that the customer requirements are fully understood, identified and determined so as to enhance the effectiveness of the quality management system and to deliver quality results/products to the utmost satisfaction of the customers. Customers' opinion is honored at every step of the project implementation/ execution and their objections/complaints are immediately taken care of within the stipulated period of project implementation. Periodic reviews of projects are undertaken by internal committees as well as by the funding agencies. Efforts are made to seek and analyze customer feedback at the completion of the process (Research projects).

5.2 Quality Policy:

Quality policy of the Institute has been framed after deliberations involving the HoDs and the same has been stated under document QM 1.0 Due care are taken to display it at all pertinent places of the Institute and is being communicated to all levels internally & externally as required. As and when required, the quality policy are reviewed in the management review meeting for its continued suitability.

5.3. Organizational roles and responsibilities:

The Director, CTRI owns the overall responsibility of addressing the requirements of this quality management system and is empowered to operate/sanction/delegate within the policy guidelines of ICAR.

The Head of Divisions / Programme Leaders of CTRI are required to meet the applicable requirements of management responsibility in the respective areas under their control and authority.

The Head of Divisions / Programme Leaders are responsible for monitoring and coordinating the project activities, strictly adhering to the provisions provided in the Quality Manual.

The responsibilities and authorities of key personnel are defined as under:

Director

a. Ultimate responsibility of administration, finance and implementation of quality management system.
b. Responsible for formulating and deciding policy matters for the organization.
c. Chairman of the management review committee.
d. Overall authority for purchase.
e. Overall authority for research, business development and marketing.
f. Overall authority for arranging training in and outside the organization.
g. Management of customer relationship.

Head of the Divisions/ Programme leaders

a. Overall responsibility for administration of the Division / section
b. Implementation of ISO 9001:2015 Quality Management System
c. Development of team for project if necessary
d. Identification of training needs
e. Interface with customers & stakeholders

Administrative Section

The Administrative Section is headed by Senior Administrative Officer (SAO). The staff involved in Administrative Section performs various works relating to establishment, recruitment, procurement, stores, Bill & Cash etc. Administration also looks after Implementation of Management Information System (MIS) including Financial Management System(FMS), cashless transactions and Aadhar Enabled Biometric Attendance System (AEBAS) at CTRI. MIS FMS system includes solutions for Financial Management, Project Management, Material Management, Human Resource Management & Payroll. The SAO is supported by Assistant

Administrative Officers [AAO(E), AAO(P&S) & AAO(B&C)]. AAO(B&C) is also works as Drawing & Disbursing Officer (DDO) for the Institute. The DDO exercises the same vigilance as a person of ordinary prudence is expected to exercise in spending money. He is responsible for ensuring that rules regarding the preparation of bills are observed and that the money is required for immediate disbursement and that the expenditure is within the available appropriation. The DDO performs the following functions:

- All bills prepared and processed by the staff working under DDO in the form prescribed for the Pay, TA, Contingencies, advances etc.
- Record of contingent expenditure is kept in contingent register.
- Bills of suppliers are prepared and processed.
- Maintenance of Subsidiary Cash Book.
- Physical verification of cash on last working day of month.
- Filling of quarterly report of Income Tax.
- Deduction of Tax at source.
- Issuance of Form-16 and 16 (A).

AAO (Purchase & Stores)

The AAO (Purchase & Stores) handles the purchase related functions of the Institute, including receipt of the goods, issue of goods etc. A scientist nominated by the Competent Authority works as Store Officer and assists in performing the function like procurement of goods and services, etc.

Audit & Accounts Section:

The Audit & Accounts section is headed by Finance & Accounts Officer (F&AO). The works involved in the section are mentioned below:

- Judicious scrutiny of all sanctions copies.
- Pre-auditing of all payments with reference to proper sanction and budget provision.
- Watching adjustment/clearance of all advances & deposits through objection book.
- Auditing and making necessary check for payment of contingent bills & Establishment bills.
- Preparing Budget Estimates & Revised Estimates of the Institute.

- Preparation of Monthly Account and Annual Account i.e. Receipt & Payment A/C, Income and Expenditure A/c and Balance Sheet of the Institute.
- Watching the progress of receipts and expenditure against the sanctioned estimates.
- Furnishing the monthly/ quarterly/ half-yearly/ annual reports to ICAR, New Delhi & other Departments wherever applicable.
- Checking of comparative statements of tenders for works and supplies and of quotation for other purchases for the Institute and for different projects.
- Vetting of all purchase proposals.
- Examining the forms of contracts, invitation to tender, bids etc.
- Dealing with audit reports of the statutory auditors and making necessary effort to drop the objections raised by the Audit party.
- Auditing the Accounts of the Project funded by external agencies.
- Maintenance of all registers as required by the Audit for the Institute as well as for all other externally funded projects.
- Checking of fixation of pay before issuance of order by the administrative authorities.
- Monitoring the Bank Account of the Institute & NAIP for all the payments and withdrawals.

Apart from SAO, AAO & DDO and F&AO some Committees/Cell/Units are constituted by the Director as per the guidelines of ICAR to provide support in functioning of the Institute. Some of the important committees along with their functions are given below:

Prioritization, Monitoring and Evaluation (PME) Cell:

- To co-ordinate and synthesize the recommendation of QRT, RAC, SRC, Vision document of Institute & ICAR and to recommend research priorities of CTRI for short listing priority researchable problems across crops/divisions/programmes/commodity etc. at Institution level.
- Annual updating and presenting the report to the Director, CTRI for assigning research projects.
- To co-ordinate and arrange annual monitoring of each ongoing project and evaluation of completed project through internal and external experts.
- To co-ordinate and arrange for technology validation and impact assessment of successful technology claimed by scientists through internal and external experts.
- Regular sensitizing and capacity building of researchers and scientists through training.

- Monitoring record of all publications, technology developed, projects undertaken and projects ongoing.
- Maintain the research records, technical correspondences, technical reports and any other information sought from the Ministry/ICAR and records pertaining to external funded projects and Institutional Consultancy.
- Extends support to the Director in submission of information/report as and when required.

Project Monitoring & Evaluation Committee (PMEC):

- To oversee the overall implementation of the Project and to provide guidance to the project activities.
- To monitor the progress of the projects on regular basis and provide necessary guidance.
- To monitor the satisfaction of the beneficiaries about the work.

Institute Technology Management Unit & IPR:

- The management of Intellectual property & know-how developed in the Institute.
- The protection of intellectual property through patents, plant variety protection, trademark etc.
- Commercialization / Technology transfer through licensing agreement/MoU under public-private partnership programmes.

Official Language Implementation Committee

- The Committee will overview implementation and promotion of use of Hindi in Official work.
- The Committee will conduct activities to promote official language.

Agricultural Knowledge Management Unit (AKMU):

- For monitoring, updating and maintenance of Institute web site, internet connectivity and all mandatory regulations of its cyber security.
- Identify and develop strategies to mitigate risks to CTRI in the use of ICT.
- To monitor and review the use of information management encompassing IT, telecommunication, etc.
- To provide technical guidance during implementation of MIS FMS.

- To provide technical guidance and monitoring implementation of AEBAS at this Institute and other Research Stations, etc.

Works Committee:

- The Committee will scrutinize the proposal and offer its specific comments.
- The Committee will examine all construction, repair and maintenance works and upkeep of the Institute as well as site specific project proposal.
- Checking of detailed estimates containing the specification and quantities of various items, which have been prepared on the basis of Schedule of Rates maintained by CPWD.
- Checking the detailed Design of the proposed work.

Purchase Committee:

- The Committee will scrutinize the purchase proposals and offer its specific comments.
- The Committee will evaluate the Technical and Financial Bids and offer its specific comments.
- To recommend the most appropriate supplier or service provider based on price, quality etc.
- To ensure proportionality, transparency, fairness in the procurement process.
- To ensure all necessary procurement procedures are properly followed.
- To seek clarification from supplier/service provider wherever necessary.
- To request technical input from relevant staff as required.

Farm Advisory Committee:

- The Committee will advise on annual crop plans.
- The Committee will examine and scrutinizes proposals pertains to agricultural operations at CTRI and its Research Stations and Farm, etc.

Seed Production Advisory Committee:

- The Committee will examine, scrutinize and advise on proposals pertains to Seed Production & Processing, Seed Sales, etc under Revolving Fund Scheme.

The Organization Structure (Annex. 1) shows the relative authority and interrelationship of these personnel.

Management representative

The Director, CTRI has nominated the Management representative (MR) with proper authority and responsibilities in addition to his/her other responsibilities. The MR has the authority and responsibility for ensuring that the requirements of the ISO 9001:2015 standard are effectively met and maintained by the Institute also reports to the Director for actions he may deem necessary in carrying out his/her job. This includes the establishment, implementation and maintenance of the quality system including future revisions.

He / She is also responsible for control of all quality manuals, SOPs including amendments made from time to time. These responsibilities also include liaison with external assessment body on quality related matters, including certification audits by them.

He / she is assisted by a Principal Scientist as Co-MR.

Responsibilities & Authorities of Management Representative:

The Management Representative has the following responsibilities in order to implement the ISO 9001:2015 programme effectively.

a. To randomly inspect quality records in all Divisions/Departments/Sections of the Institute or through planned Internal Audit Programme.
b. To withhold any non-conforming product/service being supplied to the customer.
c. To coordinate with the external surveillance audit teams.

6. PLANNING

6.1. Actions to address risks and opportunities

The Director, CTRI, through the MR and staff members ensures that

a. the planning of the quality management system (QMS) is carried out at regular intervals and whenever it is felt appropriate, in order to meet the requirements, as well as the quality objectives.

b. the integrity of the QMS is maintained when the changes to the QMS are planned and implemented, and

c. project related planning are carried out whenever a new R&D project proposal is submitted.

6.2. Quality objectives and planning to achieve them

In CTRI the apex level quality objectives and annual quality improvement plans are elaborated in the form of quantifiable targets and achievements given in Outcome Budget as detailed below. It is ensured that the quality objectives are measurable and are reviewed periodically preferably every quarter.

S. No.	Output/ Deliverables against the outlay	Quantifiable deliverables / Physical Targets	
		2018-19	2019-20
1	Evaluation of Germplasm and breeding lines	120	130
2	Testing of entries in AICRP multi-locational trials	-	5
3	Identification of varieties commercial crops by AICRP varietal identification committees	1	1
4	* Production of breeder seed	5500*	7000* 10**
5	Developing and testing of new technologies	3	4
6	Conducting front line demonstrations	10	10
7	Organising farmers training programmes	11	10

* Pure seed ** breeder seed

Reference: Outcome budget of ICAR-CTRI

6.3. Planning of changes

Quality management system planning is consistent to the other requirements of the Quality Management System. A quality plan is made which covers the following issues:

- Processes required in the Quality Management System.
- Realization processes and resources needed.
- Verification, measuring and monitoring techniques of all the activities of processes
- Quality records needed

Quality Planning ensures that organizational changes are conducted in a controlled manner and that the Quality Management System is maintained during such change (s).

7. SUPPORT

7.1. Resources

7.1.1 General

The management of the Institute determines and provides the necessary resources such as adequate materials, qualified and technical manpower/human resources, infrastructure facilities and proper work environment so as to :

a. Implement and maintain the QMS and continually improve its effectiveness and
b. Continuously strive to enhance customer satisfaction by taking into account the customer requirements and expectations.

The resource requirements are analyzed and budgetary allocations are made at appropriate levels so as to ensure the availability of adequate resources for successful execution of the research project.

7.1.2 People

The Institute ensures that qualified, trained and competent personnel are assigned the tasks of process performance for result generation and output delivery. This is achieved through continuous professional improvement, sustaining a high degree of team spirit and commitment to maintain a motivating work environment.

The Institute through the Nodal Officer, HRD and appropriate Assessments Committees regularly assesses the skills and competence of the employees and considers whether they have the skills and abilities to perform the tasks that have been assigned to them and awards promotions/career enhancements if applicable.

7.1.3 Infrastructure

The Management of the Institute regularly reviews, provides and maintains the required infrastructure in accordance with the service and product requirements and to achieve the planned results.

The infrastructure includes:

a. Buildings, workspace, well equipped laboratories for research, workshop, research farm, residential quarters and associated utilities such as water, electricity, reprographic and library facilities etc.
b. Latest equipments, gadgets, analytical instruments, computers, application software packages etc.

c. appropriate transport and communication facilities, including information system.

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b. Latest equipments, gadgets, analytical instruments, computers, application software packages etc.

c. appropriate transport and communication facilities, including information system.

Of the above equipment, gadgets, analytical instruments and computers are maintained through Annual Maintenance Contracts (AMC) with the respective companies, while other infrastructure such as buildings, Institute workspace, information systems and other utilities including transport, and telecommunications are maintained need based.

7.1.4 Environment for the operation of processes

The Institute takes care to monitor and timely improve its work environment so as to enhance the ability of employees to perform effectively in order to meet quality expectations. Elements of the Institute's work environment include the following:

a. Ability of the employees to be creative and become involved

b. Clean work stations /work space

c. Proper safety rules and equipments

d. Ergonomically appropriate work areas

e. Pollution free work areas

f. Ability to interact with others and work with a team spirit

g. Complying to applicable regulations/statutes while operating pilot projects either in-house or at customers' premises.

7.1.5 Monitoring and measuring resources

7.1.5.1 General

The processes undertaken in the Institute for fulfilling the requirements of the stake holders/customers/beneficiaries are monitored/measured from time to time for their effectiveness. This is done through evaluation of achievements against the Quality objectives defined in the Outcome Budget.

The processes, undertaken for maintenance of the quality management system get monitored and measured through mechanisms like internal audit, management review, control of corrective and preventive action and analysis of customers' feedback.
Relative importance is given to the mechanism of monitoring based upon its impact on product realization.

Reference: Output outcome framework for targets achieved during the period

For the purpose of conducting tests and analysis of samples of the research, various test and measuring equipments are used in the research labs of the Institute. As necessary, the Principal investigator (PI) and/or the Lab In charges identifies the related testing, measurements and/or monitoring equipments required for testing/analysis/monitoring in order to provide evidence of conformity of research results against the specified requirements of the research.

These Measuring and monitoring equipments are used and controlled by the Institute to ensure that the measurement and monitoring capability of the testing, measuring and/or monitoring equipment are consistent with the intended measurement and monitoring requirements of the research.

7.1.5.2 Measurement traceability

As applicable, the Principal Investigator with the support of Incharge of the respective Labs ensures that the measuring and monitoring equipments:

a. are checked, calibrated and adjusted periodically or prior to use, against reference standards, certified reference materials(CRM) etc. that are traceable to international or national standards. Where no such standards exist, the basis used for calibration are recorded,
b. are safeguarded from adjustments that would invalidate the calibration/adjustments,
c. are protected from damage and deterioration during handling, maintenance and storage,
d. have the results of their calibration/adjustments recorded
e. have the validity of previous measured results re-assessed, if they are subsequently found to be out of calibration, and corrective action taken, and
f. the Software used for measuring and monitoring of specified requirements are validated prior to use etc.

Reference: Laboratory work SOP 14

7.1.6 Organizational knowledge

The Institute is determining the knowledge necessary for the operation of its processes and to achieve conformity of products and services.

This knowledge shall be maintained and be made available to the extent necessary

When addressing changing needs and trends, the organization shall consider its current knowledge and determine how to acquire or access any necessary additional knowledge and required updates

Organizational knowledge is specific to the organization; it is generally gained by experience. It is information that is used and shared to achieve the organization's objectives.

Organizational knowledge can be based on:

a) Internal sources (e.g. intellectual property; knowledge gained from experience; lessons learned from failures and successful projects; capturing and sharing undocumented knowledge and experience; the results of improvements in processes, products and services);

b) External sources (e.g. standards; academia; conferences; gathering knowledge from customers or external providers).

7.2. Competence

The Institute ensures the followings:

a. Identifying and engaging, and if necessary, hiring of qualified personnel with appropriate education, training, work experience, professional skills and competence.

b. Definite training plans are in place (in the line with ICAR policy) for providing training where there may be gaps in needed skills and for bringing new needed skills to existing employees . Necessary trainings are provided to improve the professional skills/update technical knowledge and improve the overall competence for carrying out assigned tasks.

c. Periodic evaluation of the effectiveness of the training or other actions taken.

d. Its personnel are aware of and understand the importance of Quality Policy and the relevance of their activities as well as their contribution in achieving the quality objectives.

e. External cash flow, publications and patents are considered as the indicators of competence enhancement for the Research personnel.

f. Appropriate records of personnel education, training, skills and experience are maintained.

7.3. Awareness

The Institute has established and maintained procedures to make employees at each relevant function and level aware of (not limited to this):

- The importance of conformance with the Quality Policy, and with the requirements of the Quality Management System,
- The significant impact of their work activities on Quality, actual or potential.

- The benefits of improved personal performance.
- Their role and responsibilities in achieving conformance with the quality policy and procedures and with the requirements of Quality Management System.
- The potential consequences of departure from specified procedures.

7.4. Communication

The Director, CTRI, through the MR & the AMR issues necessary circulars and directives in printed form to the concerned R&D personnel (Scientists) and support staff periodically, whenever necessary, for the effective implementation of the QMS. For faster communication, the electronic communications systems like e-mail/ telephone are also used other than holding meetings.

All feedbacks/expectations from the customers are studied, summarized and periodically disseminated by the PME Cell to all concerned along with required measures to be undertaken. All customer complaints are handled by the PME Cell.

Reference Documents:

The Institute has a defined system for external or internal communication. Following communication channels are used:-

Entity	What	When	How	Who
External (Customer/ Supplier/ Others)	• Product/ service agreement • Quality Policy • Delivery • Improvements • Periodic Review	• Contract initiation renewal or amendment • After changes to policies or processes • As per the contract Terms and condition • As per government rules	• Letter • MoU • Internal Mail	Director/ SAO
Internal	• Quality Policy • Periodic Review Results • Office Information	• As and when required	• Circular • Office Memo • MoU • Internal Mail	All concern

7.5. Documented information

7.5.1 General

7.5.2 Creating and updating

The Institute creating and updating documented information, The Institute is ensure appropriate

a) Identification and description

b) Format (e.g. language, software version, graphics) and media (e.g. paper, electronic)

c) Review and approval for suitability and adequacy

7.5.3 Control of documented information

The following types of documents are controlled in the Institute. They are Quality Manual, SOPs, Work instructions, Specific contract, R&D related Quality plans, Design drawings/design analysis, MoU/Agreement signed with customers/contractors, manuals of important instruments, project reports, various ICAR procedures, guidelines and administrative circulars, project proposals, annual reports and final reports.

The Quality Manual is controlled by the Management Representative, who is responsible for any amendment, revision and distribution thereof. Any subsequent changes in the document are approved by original issuing authority prior to incorporation and circulation. Amended history of the document is maintained.

The SOPs are also controlled by the Management Representative. The Head of the respective Programmes initiates any amendment, revision thereto and effects such changes after discussion with the MR/AMR and Director. The SOPS are distributed and controlled by the MR as per approved list of distribution.

Obsolete documents (e.g. Controlled document made obsolete through later revisions) at user points are destroyed by the concerned Programme leaders. Existence of obsolete documents, if any, is to be probed by internal quality auditors during audit exercises to ensure effectiveness of controlled process. Important documents of external origin are maintained with the respective Heads of Division.

Records pertaining to each programmes / departments are maintained by respective Programme leaders. The various record types may be of the following categories (not an exhaustive list) and are maintained for each programmes, departments & sections.

1 Research proposals, approvals and progress reports
2. Meetings record
3. Correspondence
4. Circulars/ Guidelines on various issues/rules
6. BE/RE Budget review
7. Work records
8. Project records/files/reports
9. QMS related records including internal audits, etc.

All the research project related records are to be maintained by the PME Cell/Principal Investigators (PI). These records include evidence of project conceptualization, project proposal (a kind of project quality plan), MoU, with various agencies, including client related to specific project, correspondences with client, amendments to project concept/ proposal, corrective actions to client initiated complaints, project progress reviews (at various levels e.g. Director / IRC level /Programme Leaders etc.). The PME cell also maintains a simultaneous record of all projects mainly pertaining to approvals, statutory/laid out requirements, extensions, report submission, etc.
Concerned Programme Leaders and PIs are responsible for maintaining such records in appropriate project folders/computer files (as suitable) for specified period of storage as follows:

All records pertaining to research activities are retained as per ICAR Policy (ICAR Record retention Schedule 1989) on retention of records for the specified time from the date of completion of any project or otherwise

The QMS records are retained as per retention period specified by the MR and are documented in the master list of QMS Records.

Reference: Procedure for control of documents SOP 2
ICAR Record retention Schedule, 1989
Procedure for control of documents SOP 1

8. OPERATION

8.1. Organizational planning and control

The objective of the Institute is to undertake Research and Development (R&D) Projects to promote effective utilization of various endogenous resources that lead to economic prosperity and better quality of life for the people and provide knowledge- based services to various industries, public and private organizations, international agencies, and foreign organizations to advance their organizational objectives, keeping the overall national interest in view.

The resources required for carrying out these R&D projects are obtained from:

a. ICAR Headquarters
b. Government Divisions and Agencies
c. Public Sector Industries
d. Private Sector Industries
e. Private Organizations
f. International Agencies
g. Foreign Organizations

A brief description of various types of R&D projects is mentioned below:

In-house ICAR Projects:

The identification of these projects starts with the formulation of vision document. A number of key technology areas or major research programmes are identified in this document on which the Institute proposes to focus during the plan period. This Vision document provides the basis for the preparation of Annual Plan, which outlines the specific projects and the budgetary support sought from ICAR Headquarters for a year.

In addition, there are some centrally coordinated projects that are approved and directly monitored by ICAR headquarters and may involve multi-Institute or multi-institution participation. These are special type of projects that are approved by ICAR Headquarters under various mission programmes, viz., network projects, facility creation programmes, etc.

Externally funded Projects:

G**rant-in-Aid and Collaborative projects**: The Institute also applies to other Government Divisions, Agencies, and Public Sector Industries directly, for full or partial financial support to carry out specific projects of relevance to its research programmes.

Sponsored projects: Based on the expertise and infrastructure available at the Institute, both public and private sector industries and other organizations sponsor research and development programmes on specific problems of interest to them. The cost of such projects is fully borne by them.

Consultancy and Technical Service projects: They also seek knowledge-based services such as testing and analytical services etc. the cost of which is fully borne by them.

According to the source of funding and type of work, the projects are thus divided into six categories, viz; (1) In-house, (2) Grant-in-Aid, (3) Sponsored, (4) Collaborative, (5) Consultancy (6) Technical services and (7) ICAR coordinated Network projects.

Scope of projects:

ICAR or in-house projects are fully supported by ICAR and are meant for building capability in identified areas of research, and to do exploratory work for concept proving at Institute scale. The expected outputs are; (1) Business development in the form of Sponsored/ Collaborative/ Grant-in-Aid/ Consultancy Projects from external/ user agencies (2) Advancement of knowledge through Publications/ Reports (3) Generation of intellectual property rights (4) Development of processes, products, & applications at Institute scale (5) Human resource development.

In addition the Mission oriented ICAR projects are meant for technology development in specific mission/ thrust areas and involve basic R&D, technology development, scaling up, demonstration, facility creation, infrastructure development, etc. These are directly approved and monitored by ICAR Headquarters.

The Institute applies for Grant-in-Aid projects in R&D areas of relevance to its programmes, to various Government agencies as per their guidelines and priorities. These involve grant by way of financial inputs either in full or part, assistance in kind e.g. equipment, training etc. to supplement Institute's efforts in on-going or new R&D projects or for creating new capabilities/ facilities.

Sponsored Projects are fully funded by clients having specific focused R&D objectives, well defined expected project output/ results, generally culminating in generation of intellectual property. Collaborative Projects are partially funded by the client, and/or supplemented by provision of inputs such as expert manpower, engineering, production/ fabrication of product, testing/ trials, infrastructural facilities or other inputs.

The Institute provides knowledge-based and technical services under Consultancy Projects and Extension services, which are fully funded by the clients as per the norms of ICAR.

The externally funded projects are governed by specific guidelines issued by ICAR as regards scope, implementation, costing and approving authority.

The In-house projects are formulated annually keeping the Vision document and other national priorities in mind. These are processed by the PME cell and submitted to ICAR after obtaining approval of IRC along with other projects (including projects partially/wholly funded by external agencies), for allocation of funds from ICAR. The PME cell acts as the nodal point for processing and approval of all R&D projects.

For In house projects the project proposals (RPP1) submitted by various Divisions include the following details for approval:

- Institute Project Code:
- Project Title:
- Key Words:
- (a) Name of the Lead Institute: (b) Name of Regional Centre:
- (a) Name of the Collaborating Institute(s), if any:

(b) Name of Division/ Regional Center/ Section of Collaborating Institute(s):

- Project Team (Name(s) and designation of PI, CC-PI and all project Co-PIs, with time proposed to be spent)
- Priority Area to which the project belongs:
- Project Duration:
  Date of start:
  Likely Date of Completion:
- (a) Objectives
  (b) Practical utility
- Activities and outputs

Technical Programme (brief)

(a) Material: (b) Techniques/Methodology: (c) Instrumentation: (d) Special material: (e) Analytical tools:

- Financial Implications
- Financed by the Institute
- Manpower: Scientists & Technical
- Research/ Recurring Contingency with Justification
- Non-recurring (Equipment) with Justification:
- Any Other Special Facility required (including cost)
- Financed by an organization other than the Institute (if applicable):
- Expected Output
- Expected Benefits and Economic Impact:

The PME cell allocates a unique project identification number to each of the project that is taken up by the Institute and maintains a project file on each of them which contains the approved project proposal, amendments made to the proposal from time to time, details of financial inputs, periodic progress and review reports, and documents and correspondences with external agencies which have contractual obligations for the Institute.

The Research projects have an identified leader (Principal Investigator), who is the nodal person responsible for execution of the project along with his team members. The team consists of both scientific & technical staff.

The inputs required for successful execution of the projects as well as the specifications are mentioned in the proposal. The outputs/ results are recorded in the project record book along with all the relevant operating conditions.

The projects are reviewed from time to time by the project team/Programme Head regarding its progress as provided in the project plan. The Project team/ Head of the concerned programme verify annually the conformance of the outputs obtained vis-à-vis the project requirements. The records (RPP II) of these reviews and verification are maintained in the project file. The PMEC/IRC including the client, if so desired, also periodically review the project. The Project Leader (PI) maintains all relevant documents pertaining to the projects in Project File.

For monitoring in house research projects, the following information are reviewed on RPP II

- Institute Project Code :
- Project Title :
- Reporting Period :
- Project Duration: Date of start - Likely Date of Completion-
- Project Team (Name(s) and designation of PI, CC-PI and all project Co-PIs. (with time spent for the project) if any additions/deletions)
- (a) Activity and outputs earmarked for the year (as per activities schedule given in RPP-I)
  (b) If shortfall, reasons for the same and how to catch up with the intended activities
- Annual progress Report (research result and achievements in bullets)
- Output During Period Under Report
- Special attainments/innovations
- List of Publications
  - Research papers
  - Report/Manual
  - Working and Concept Papers
  - Popular articles
  - Books/Book Chapters
  - Extension Bulletins
- Intellectual Property Generation
- Presentation in Workshop/Seminars/Symposia/Conferences (relevant to the project in which scientists have participated)
- Details of technology developed: (Crop-based, Animal-based, including vaccines, Biological – biofertilizer, biopesticide, etc. T based – database, software and any other – please specify)
- Trainings/demonstrations organized
- Training received
- Any other relevant information
- Constraints experienced, if any
- Lessons Learnt
- Evaluation

On completion of the in-house projects, the PI prepares and submits RPP III for final evaluation of the project:

- Location of the Project
- Project Title
- Priority Area
- Research Approach
- Specific Area
- Duration of Project
- Date of start: Date of Completion:
- Total cost /Expenditure Incurred
- Executive Summary:
- Key words
- Investigator s Profile
- Technical Details
- Introduction and objectives
- Project Objectives:
- Background information and importance of the projects:
- Project Technical Profile
- Technical programme
- Methodology:
- Plan of Action:
- Activities:
- Total man months involvement of component project workers
- Final Report on the Project
- Achievements in terms of targets fixed for each activity
- Questions- Answered
- Process/ Product/ Technology/ Developed
- Practical Utility
- Constraints, if any.
- Publications and Material Development
- Research papers
- Journals:
- Chapters in Book / seminar proceedings
- Reports
- Chapters in Training manuals
- Seminars, conferences and workshops participated.
- Training organized
- Recognitions
- Infrastructural facilities developed
- Comments / Suggestions of Project Leader regarding possible future line of
- Work that may be taken up arising out of this Project.

For all sponsored projects the Terms of Reference (TOR) are finalized before taking up the research project and the MOU (memorandum of understanding) is signed with the sponsoring agency

Reference : RPP I,II & III , TOR, MOU

8.2. Requirements for products and services

8.2.1 Customer communication

During the execution of the project, the Project leader/ HoD/ Nodal Officer, PME remain in touch with the customer for necessary interaction, review and validation as provided in the approved research project proposal or MOU (in case of sponsored projects)

After the research is completed, the beneficiaries/sponsoring agency(customer) are requested to send its feedback on the research project for further improvement and corrective action, in an appropriate format to the PME cell of the Institute.

The Institute, through its AKMU cell and website makes continuous efforts to provide information to its clientele. The website is constantly monitored and regularly updated. The computer cell (AKMU) is responsible to update the website with latest contents on achievements and future strategy.

All complaints received from the customers (stake holders, funding agencies, beneficiaries etc) are received and handled by the Grievances cell headed by the Asst. Administrative officer (AAO)

RTI related queries are handled as per the provisions of the RTI Act by the Public Information officer of the Institute

8.2.2 Determining the requirements for products and services

Before initiation of a project the scientists study the state of the art, interact with interested users/ beneficiaries and peer groups to determine the need, suitability and economic viability of the project. Then a proposal is submitted and reviewed internally before transmission to the client for funding.

Based on the feedback received from the IRC/RAC (In case of Institute research programmes) or the funding agency (In case of funded projects) and subsequent follow-up the proposal is revised, if necessary. Once the approval of the competent authority /sponsoring agency is received on the original or revised proposal, the project is planned for implementation and the details are put down in a specific format for approval of the competent authority.

In case of Institute initiated projects RPP I or in case of sponsored projects an agreement, sanction letter, work order, ToR or MoU with the sponsoring agency is prepared to support the proposal. Such documents specify the requirements of reference of research in clear terms.

While undertaking research the Project Team tries to visualize all necessary performance and statutory requirements for the successful achievement of project objectives before undertaking the research project. These along with the minimum acceptability criteria for the deliverables (where applicable) are mentioned in the research project plan/ToR.

The Institute remains open for post delivery activities in accordance with project agreements.

8.2.3 Review of the requirements for products and services:

Both in case of institute initiated research projects and sponsored projects, before any project proposal is submitted to the competent authority / sponsoring agency or taken up for implementation by the Institute or an agreement /MOU is executed with the sponsoring agency the same is reviewed and approved by the competent authority. The following aspects are examined during the review process:

- The objectives and the specified deliverables of the research projects
- Availability of resources to meet the objectives in the specified time-frame at the specified cost
- Relevance & justification for taking up the research project
- Expected benefits to the customer, beneficiaries and the interested parties
- Constraints/ risks involved in taking up the research project etc.

8.2.4 Changes to requirements for products and services:

The institute ensure that relevant documented information is amended, and that relevant persons are made aware of the changed requirements, when the requirements for products and services are changed.

8.3 Design and development:

8.3.1 General

Most of the research projects undertaken by the Institute involve process or product design and development. In order that these projects are successfully implemented, the following processes are followed.

8.3.2 Design and development planning

The methodology and work plan of the research project, the assignment of responsibilities to team members as well as the time plan of execution are defined in the project proposal. In addition the proposal mentions the monitoring checkpoints/milestones for review of the project and reassessment of the adopted methodology keeping the overall timeframe and cost in mind. This is done periodically by the Project team/ HOD/IRC. If it requires any changes in the requirements laid down by the customer, the same is intimated to the customers for their approval. The project team headed by the Principal Investigator (PI) is primarily responsible for the successful implementation of the research. For all interfaces with the project team, the Head of the Programmes / Principal Investigator (PI) act as the nodal point.

The planning involves assessment of constraints, risks and critical infrastructural requirements for the successful implementation of the research project. The team also decides the monitoring checkpoints for review and assessment of outputs realized and future course of action.

8.3.3 Design and development inputs

The objectives and the minimum acceptance criteria of the deliverables of the research projects are clearly defined by the project team before embarking on the research project and as the research project work progresses the same are continuously assessed. These requirements include functional and performance specifications of the process/ product/ any other outcome of the research projects, any applicable statutory and regulatory requirements, and other environmental and operating requirements essential for successful realization of the objectives the research project.

Some of them are (as applicable):

a. Product/ Process specifications including minimum acceptance criteria
b. Material specifications
c. Testing specifications
d. Operation, Installation, Application requirements
e. Storage, Handling and Delivery specifications
f. Maintenance
g. Physical parameters and environmental requirements
h. Reliability and availability
i. Safety considerations
j. Price and life-cycle costs

k. Liability and environmental costs
l. Waste disposal
m. Statutory/ regulatory requirements
n. Benchmarking of these against competing products/ processes etc.

8.3.4 Design and development controls

The project execution and results are reviewed periodically (at least annually) or as scheduled in the project plan first by the project team, then by Head of the Division / programme, the Director and finally by the IRC & RAC. In case of sponsored research projects the same is additional reviewed by the Sponsoring agency. The research team takes care to fulfill the planned objectives and milestones for the successful implementation of the project. The IRC also reviews the progress of projects annually (or at specified interval in case of sponsored projects) on the basis of data submitted in RPP II.

The P.I. in association with his team members do verification of satisfactory achievement of objectives laid down in the research proposal (as modified from time to time), and explicitly records observations, data, including shortfalls, if any, for appropriate action and analysis . The Head of the Division/Programme (s) review and certify this wherever required. In case of institute project the out-put document is presented in RPP III to the IRC and in case of Sponsored project the Final report , for final review

Most of the time it is not possible to verify the outputs of the research projects in the laboratories of Institute. In such cases the research team defines the methods under which the scaling has to be done and techniques to be followed to validate that the outputs (product/process/technology etc.) of the research project meet the research objectives. Where possible the research findings are validated under field conditions. It is after extensive validation of the product, process, technology etc are released for use by the beneficiary and research reports are published. The records of such validation are maintained in the project file.

8.3.5 Design and development outputs

The expected outcome of the research /deliverables of the project are clearly defined in the research proposal (RPP I)/ MoU/ToR . The outputs are recorded in the project record and verified by the Project Team/Head of Division/IRC/PMEC from time to time in order to ensure that they are authentic, reliable and meet the acceptance criteria. The information is preserved in accordance with the policy of the Institute mentioned elsewhere.

8.3.6 Design and development changes

In course of research, at times modifications/changes are to be made (as required) based on the review of the progress / verification of the research project. All such changes, modifications to the research method, samples, collection of data and analysis etc from the originally envisaged research plan are reviewed, verified and validated by the same team which did the research job in the first place or in their absence by a competent team designated by the Head of the Division/ Director/ Sponsoring agency/IRC. Relevant records in this respect are generated and maintained in the relevant project files.

Reference: Procedure for Conducting Research projects – SOP 8

8.4. Control of externally provided processes, products and services

8.4.1 General

Provision of adequate and timely supply of material to scientists is of prime importance for carrying out meaningful scientific research as well as for meeting the targets set for completion of various in-house & sponsored projects. On the other hand, any public procurement will not only have to be made in fair and transparent manner but will also have to fall in line with the canons of financial propriety. The purchase procedure strives to achieve both these ends.

The Institute takes care of the following issues (as applicable) while purchasing a product or service:

a. Timely, effective and accurate identification of needs of purchased product/ service specifications
b. Evaluation of the product taking into account performance, cost, delivery, post delivery service and warranty
c. Procedure for verification of purchased products
d. Training & Documentation
e. Logistic and infrastructural requirement including personnel
f. Statutory Requirements
g. Safety Requirements

In addition the following issues related to suppliers/vendors are taken care of during the tender evaluation process:

a. Evaluation of previous experience with the supplier with regard to product quality, price, delivery, post-delivery service, response to problems, etc.

b. Checking of supplier's reference and available data on his track record

c. Supplier's infrastructural, financial, and logistic and service facilities and history of performance

8.4.2 Type and extent of control

The purchasing process of material, etc., in the Institute can be divided into the following distinct stages:

a. Consulting the budget.

b. Prioritization of purchase of equipment, machinery etc. for the financial year based on ICAR budget considering the Project needs & priorities of externally funded Projects.

c. Placing the indent by the scientist and other officers concerned, after verifying the non-availability in stock.

d. Calling for tender/quotations and processing of tenders by the Purchase Section.

e. Evaluation of the tenders/ quotations by the Purchase Committee.

f. Submission of the Tender documents, etc to the Competent Authority for approval.

g. Placement of orders.

h. On receipt of equipment, inspection, installation and commissioning.

i. Issue, stock entry, and payment as per terms & conditions of order.

E-Procurement

As per the directives of Ministry of Finance, Government of India and ICAR, all procurements with an estimated amount of Rs.2.00 lakh and above are procuring through E-Procurement on Central Public Procurement Portal (CPPP) with effect from 01.11.2016. For this purpose, a Nodal Officer (e-procurement), two number bid openers & bid evaluators have been nominated by the Competent Authority. Under the guidance of Nodal Officer, the entrusted responsibilities of e-Procurement have been carried out by the Bid Opener and Bid Evaluators under the overall supervision of Senior Administrative Officer of the Institute.

The detailed process is described in the ICAR - Manual on Purchase Procedure and General Financial Rules (GFR-2017) and its subsequent amendments issued by Government of India/ICAR, from time to time.

Reference: ICAR Manual on Purchase Procedure; General Financial Rules (GFR-2017) Delegation of Powers (DOP); E-Procurement implementation orders issued vide this office letter No. 13(E-PROC)/ 2016-17/ADM.III(P&S) dated 30.11.2016.

As a practice, the indentor inspects the materials as soon as it arrives and shall normally adhere to the schedule given by him at the time of placing the indent. Normally the concerned indenting division should ensure completion of inspection within fifteen days of receipt of advice from the stores. For imported equipments the packing are opened in the presence of the Indian Agent to avoid short/ damaged supply due to improper packing/handling. The inspection is to be completed within the validity period of the Insurance Policy so that the claims for shortage/ damage if any can be lodged with the insurance company. Failure to inspect the material within the time schedule makes the Indentor and the concerned Project leader responsible for the loss.

Once the inspection is complete and the indentor certifies the Inspection Report, Stores dept. ensures that the bill containing the stock entry reference and copy of the inspection report is sent to Purchase dept within three working days after the inspection is over. The Purchase wing sends the same directly to accounts within four working days for payment and then the accounts dept must arrange payment to the vendor within agreed time from the date of receipt of bill. If for any reason, the payment is held up beyond the period stipulated, the matter is brought to the notice of the Director for his decision.

8.4.3 Information for external providers

For items to be procured out of ICAR funds, the Director appoints a committee at the beginning of every financial year to correctly assess the requirement of equipment, machinery, plant etc. for various projects including infrastructure requirement. A scientist of sufficient seniority chairs this committee. The committee goes through the requirement submitted by various Heads of Division for the year and prioritizes the list of purchases to be made in that year. The committee checks the availability of such equipment in the lab, its performance and the rationale for procurement of another piece of equipment. All purchases that are made during the year from ICAR funds are done in accordance prioritization list. The priority list for sponsored projects are finalized either through a committee or by Heads of Divisions/ PIs and approved by the Director. However, in order to meet emergency requirements, about 10-15% of the budget allocated for this purpose is kept as reserve and all emergency purchases may be made from this reserve.

Whenever an indent is placed by the Scientist/ other concerned official, they ensure that the following details shall accompany it:

a. A detailed description of the equipment including summary of its function and detailed specifications including whether the requirement is fresh or additional or replacement.
b. The details, such as, the useful life of equipment, availability of spares, arrangement for maintenance etc.
c. The estimated cost of equipment and that of spares, last purchase price if any, (to be given separately).
d. The list of available vendors, their addresses, past experiences, if any, and their website, wherever available shall be submitted along with Indent.
e. A certificate to the effect that the item is of proprietary nature, if it has to be bought from a known, single source. (This certificate shall be given by the indentor, which shall be concurred by the Finance & Accounts Officer and after its concurrence the same should by approved by the Director).

a. A description of space requirement for the equipment, the installation area and other infrastructural requirements such as, power, civil works etc. wherever applicable.
b. The approximate period required for the equipment to be delivered at Institute.
c. Tentative inspection schedule and time to become operational of equipment from the date of its receipt.
d. Approval for Emergency purchase, in case of purchase is to be made on emergent basis.
e. Budget provision certificate duly linking with the Project/scheme.

(Note: The indentor submits his indent type written. No hand written indent are accepted. No addition/alteration is generally made in the indent. In case, this becomes necessary on rare occasions, the indentor affixes his/her initials on the corrections/additions made. Electronic submission of indents can be accepted with built in safety mechanism).
The Indentors are thoroughly checked and ensure that the Indents are strictly raised as per the purchase procedure. The Purchase & Stores Officer (AAO) does not normally accept indents, which are faulty or incomplete and return such indents to the indentor within two working days. Minor deficiencies in the indents, however, are set right by discussions with the indentors. The Purchase Officer checks that items sought to be imported do not fall within the restrictive list contained in the Foreign Trade policy of the Government.

The Purchase Officer satisfies himself if necessary by verifying from F&AO/PME/PI that funds are available commensurate with the delivery schedule.

The Indentor/PI/HOD ensures that the specifications suggested by the indentor confirm to the latest BIS specifications wherever applicable.

Since time is of the essence, the Purchase Officer while vetting the indents play a facilitating role. This role is to guide the indentor in order that the right item is bought at the right price. If necessary, Purchase Officer helps the indentor to raise the indent in the correct manner by giving relevant inputs.

Control and monitoring of the external providers performance will be carried out on case to case basis.

8.5. Production and service provision

The execution of project and follow-up actions necessary after the project outputs are delivered to the customer covered under this.

8.5.1 Control of production and service provision

While conducting research/ executing projects or deliver other services, the Institute follows good practices/ guidelines in the public domain to control their processes. Some of the issues that are addressed by the Project Leaders (PI) , HoD, and Section in charges are :

a. Proper planning

b. Use of Competent human resources

c. Use of information, SOP

d. Adequacy of infrastructural support like information, supply of stores and equipment, services and utilities, tools, process equipment , test, measuring and monitoring equipment

e. Availability of Implementation of Monitoring, review and verification arrangements of the outputs

f. Implementation of release, delivery, and post delivery activities, if any.

The processes of delivery of services by the different processes are well established in CTRI and re guided by the parent organization ICAR . Hence no separate validation of the processes are required

Reference : SOP manual & ICAR guidelines

8.5.2 Identification and Traceability:

A project number uniquely identifies each research project. The corresponding project files of the research project are maintained by the Principal investigator (PI) and the PME Cell separately.

8.5.3 Property belonging to customers or external providers:

The Institute/ project team exercise care with customer property (e.g. seed /soil samples/ farm land offered by the targeted beneficiaries for conducting trails/testing etc) while they are under its control or being used by the Institute for the purpose of research , testing and /or trials .

Customer property for CTRI also includes intellectual property or information/data provided by the customers / beneficiaries which are treated in confidence.

The use & access to customer's property are in accordance with the mutually agreed principles and (or) following Institute's /ICAR policies regarding control of records. Damage, loss or unsuitability if any are recorded and reported to the customer/stakeholder.

8.5.4 Preservation:

The Institute/project team maintains conformity of the products (e.g. samples, research data, test results etc) as per its due requirements (e.g. identification, handling, storage and protection etc.) during internal processing and final release.

All the respective heads of research units educates the project staff to be judicious while using chemicals in research experiments and follows safety norms specified by the manufacturer, checking for the expiry date of the chemicals, disposal of toxic wastes, etc. are few such instances.

8.5.5 Post-delivery activities

The Institute meets requirements for post-delivery activities associated with the products and services

The Institute consider in determining the extent of post-delivery activities that are required,

a) Statutory and regulatory requirements
b) Potential undesired consequences associated with its products and services
c) Nature, use and intended lifetime of its products and services
d) Customer requirements
e) Customer feedback

8.5.6 Control of changes

The Institute reviews and controls changes when it is necessary to ensure the continuing conformity to the requirements.

The changes are initiated at three levels:

1) Changes in the customer requirements
2) Changes in the statutory and regulatory requirements
3) Change in the product

Documented information describing the result of review of changes, the person authorizing the changes and necessary action arising from the review are retained.

8.6. Release of products and services

The products of the Institute are in the form of technical research reports, testing activities, training imparted, consultancy services provided etc.

Monitoring and measure of research projects of the Institute are done in the following manner:

- Research projects – Annual review by IRC on the RPP II submitted by the PI and on completion on the basis of Project Completion report prepared by PI on RPP III
- Training Programmes- Feedback from the participants
- Extension & Consultancy services- Feedback from the recipient (beneficiaries) of the services

For such research projects, reviews are done by the Quinquennial Review Team (QRT) & by Institute Research committee (IRC) to ensure that the objective(s) of the Research have been met.

Monitoring and measure of externally funded/ sponsored research projects of the Institute are done as per ToR/MoU with the sponsoring agency.

The Director, with the approval of IRC/ acceptance by sponsoring agency releases the report after reviewing the executive summary, which outlines to what extent project objectives are fulfilled.

The Principal investigators and the PME cell keep the records of such review.

Reference: RPP II & RPP III, findings of the QRT & IRC etc
Customer Feedback

8.7. Control of nonconforming outputs:

The nonconforming products of the Institute can be the inadequacies in Research reports, test results, analysis of samples, consultancy services and customer complaint, indicated by the internal/external customers, which may come up after the submission of the final report for a research project, or submission of test result or on the consultancy service provided.

The customer complaints are examined by the respective nodal officer (PIO) and resolved.

In case of non conforming test results or improper analysis, the test /experiment is not released and is repeated to rectify the deficiency.

In Research projects, if it is observed that the research trial is not carried out as per research plan the same is also treated as non conformity and the research data not released till necessary measures (e.g. repeat the experiment/ trial, discard the results , as the case may be) are initiated

The reconfirmed /revised outputs are measured against the requirement and only if found acceptable are released

Records of control (identification, quarantine, rectification & release) of the non conforming products/services for all the instances are maintained.

Reference: Procedure for Control of Non conforming Products: SOP 4

9. PERFORMANCE EVALUATION

9.1. Monitoring, measurement, analysis and evaluation

9.1.1. General

The Institute has planned and implemented the following monitoring, measurement, analysis and improvement processes to demonstrate conformity to product requirement, to ensure conformity of the quality management system and to continually improve the effectiveness of the quality management system of the Institute.

9.1.2 Customer Satisfaction:

a. All the In-house and externally funded research projects are periodically reviewed and assessed by the project team, once in a year, separately for effective need addressal of the funding agency /stakeholder

b. At the end of the project, a detailed project report is sent to the customer/stakeholder. In some cases the draft project report is first sent and subsequently the final report is sent to the party after incorporating necessary inputs, if any, from the customer/stakeholder

c. Wherever possible, structured feedbacks are obtained and evaluated by the research team from the beneficiaries of the research findings, sponsoring agencies to measure the benefits

d. In case of trainings organized for the farmers etc. structured feedbacks from the trainees are also obtained at the end of the training programmes to evaluate the success of the programme

The feedbacks received are appropriately evaluated for further improvement in QMS of the Institute and shared in the Management review meetings.

9.1.3. Analysis and evaluation

The Institute determines, collects and analyzes appropriate data to demonstrate the suitability and effectiveness of the quality management system and to evaluate where continual improvement of the effectiveness of the QMS can be made.

This includes data generated as a result of monitoring and measurement of various processes as described earlier and also such data from other external/relevant sources. The data analysis techniques are applied in different Divisions depending upon the relevance in individual project situation.

Data on the following aspects are analyzed.

(a) Customer satisfaction; (b) R&D output; (c) Vendor evaluation etc

The Stores and purchase in charge deals with analysis relating to the suppliers' performance. The suppliers are evaluated based on their performance in meeting product quality, timeliness of supply etc. Based on such evaluations, sub-standard supplies are weeded out.

9.2. Internal audit

a. in order to measure if the quality management system , implemented in the Institute are maintained as per planned arrangement and continues to be suitable , the Management representative plans, co-ordinates and executes the Internal Audit (IA) at defined intervals through the team of trained internal auditors on the Institute ,

b. Internal Auditors are selected by the MR in consultation with the Director on the basis of their Qualification, experience, familiarization with ICAR processes, training on internal auditing attended etc.

c. Minimum two scheduled Internal audits are performed in a year at proper intervals. Unscheduled audits may also be performed as and when the system demands.

d. Planning for individual rounds of audit are done by the MR describing area to be audited, auditee, auditors, scheduled date of audit and are approved by the Director.

e. This is communicated as audit plan to the Divisions/sections

f. In panning internal audit it is ensured that the auditor do not audit their own work in order to maintain impartiality

g. Internal Audit, in general, is conducted by a team of one /two auditors.

h Before conducting audit, the designated Auditors seek clarifications if any, from the MR and confirm the date and timing with the Auditee. The auditors also go through the procedure/ process to be audited and prepare checklist. During audit, the Auditors note down

their observations and raise non conformity reports once they find there are process deviation/non compliances / failure to comply statutory /regulatory requirements etc

i. The Internal Auditors furnishes audit report (Including the non conformity reports if any) within 2/3 days of conducting the audit in a standard form with one copy each to auditee and the MR.

k Non conformities identified in Audit. if any, are required to mentioned in the report, attributing clause of the ISO 9001:2015 standard / SOP No. / Guidelines etc against which it is raised.

l. The auditee dept initiates the necessary corrections/corrective or preventive measures against the non conformities identified during the audit , after ascertaining the root cause

k. Follow up audit, wherever needed, is planned by the MR and is conducted to verify and record the implementation and effectiveness of corrective action taken.

l. The audit finding and implementation status of corrective action is discussed in management review meeting held by the MR All results are communicated to/ discussed with Director, for guidance and instructions, if any.

m. The MR maintains all records of audit and their subsequent actions

Reference: Procedure for Internal Audit :SOP 3

9.3. Management review

9.3.1 The top Management of the Institute ensures that proper review of the effective implementation of the Institute's QMS is done at planned and regular intervals.

While doing so the major thrusts are given on the continuing suitability, adequacy and effectiveness of the QMS. Such reviews include assessing opportunities for improvement and need for amendments to the QMS, including the quality policy and quality objectives.

The management review exercise is conducted at different levels to monitor the overall performance of the QMS. e.g.

f. The Research Advisory Committee (RAC) being the apex research committee of the Institute assesses and evaluates the research programmes at least once in a year.

g. The Institute's Research Council (IRC) meets at least once in a year for review, discussion and presentation of research achievements of the projects undertaken by the Institute and also for approving the conduct of new research projects.

h. The Quinquennial Review Team (QRT), once in five years, monitors the progress of research, its relevance and excellence and provides guidelines for the ICAR for taking steps for fulfillment of the mission and achievement of the goals of the Institute

i. General Management and Administrative functions of the Institute are reviewed by the Institute Management Committee (IMC) at least twice in a year.

j. The Quality Management process of internal audit, customer feedback, achievement of quality objectives, quality policy of the Institute, customer complaints etc. are reviewed by the Management Review committee (MRC)

Records of all such management reviews are meticulously maintained by respective conveners of the meetings.

9.3.2 Management Review input

The inputs for the management reviews, includes the following information:

a) The status of actions from previous management reviews

b) Changes in external and internal issues that are relevant to the quality management system;

c) Information on the performance and effectiveness of the quality management system, including trends in:

1) customer satisfaction and feedback from relevant interested parties;
2) the extent to which quality objectives have been met;
3) process performance and conformity of products and services;
4) nonconformities and corrective actions;
5) monitoring and measurement results;
6) audit results;
7) the performance of external providers

d) The adequacy of resources;

e) The effectiveness of actions taken to address risks and opportunities

f) Opportunities for improvement

9.3.3 Management Review output

The output from the management review are in the form of Minutes and includes all decisions and actions related to:

a. Improvement of the effectiveness of the QMS and its processes.
b. Improvement of products with respect to customer's requirement and satisfaction.
c. Requirement of resources.

The respective conveyors maintains the record of the Management review meetings

Reference: Procedure for Management Review of the QMS- SOP 7

10. IMPROVEMENT

10.1. General

The institute determines and selects opportunities for improvement and implements any necessary actions to meet customer requirements and enhance customer satisfaction.
These include:

- improving products to meet requirements, as well as to address future needs and expectations;
- correcting, preventing, or reducing undesired effects;
- Improving the performance and effectiveness of the Quality Management System.

10.2. Nonconformity and corrective action

Corrective action planned against external complaints from customer/external agencies, or conforming products/services and the non conformity situations identified through internal quality audits are logged. The concerned project leaders / HOD, after due analysis of the root causes take necessary corrective measures and also intimate MR of the actions taken.

The results of corrective actions taken and effectiveness of such steps are reviewed and discussed in Management Review Meeting. Records of corrective actions and the review decisions (along with compliance of recommended follow up actions are maintained by concerned project leader /MR for review.

Reference: Procedure for Corrective Actions - SOP 8

10.3. Continual improvement

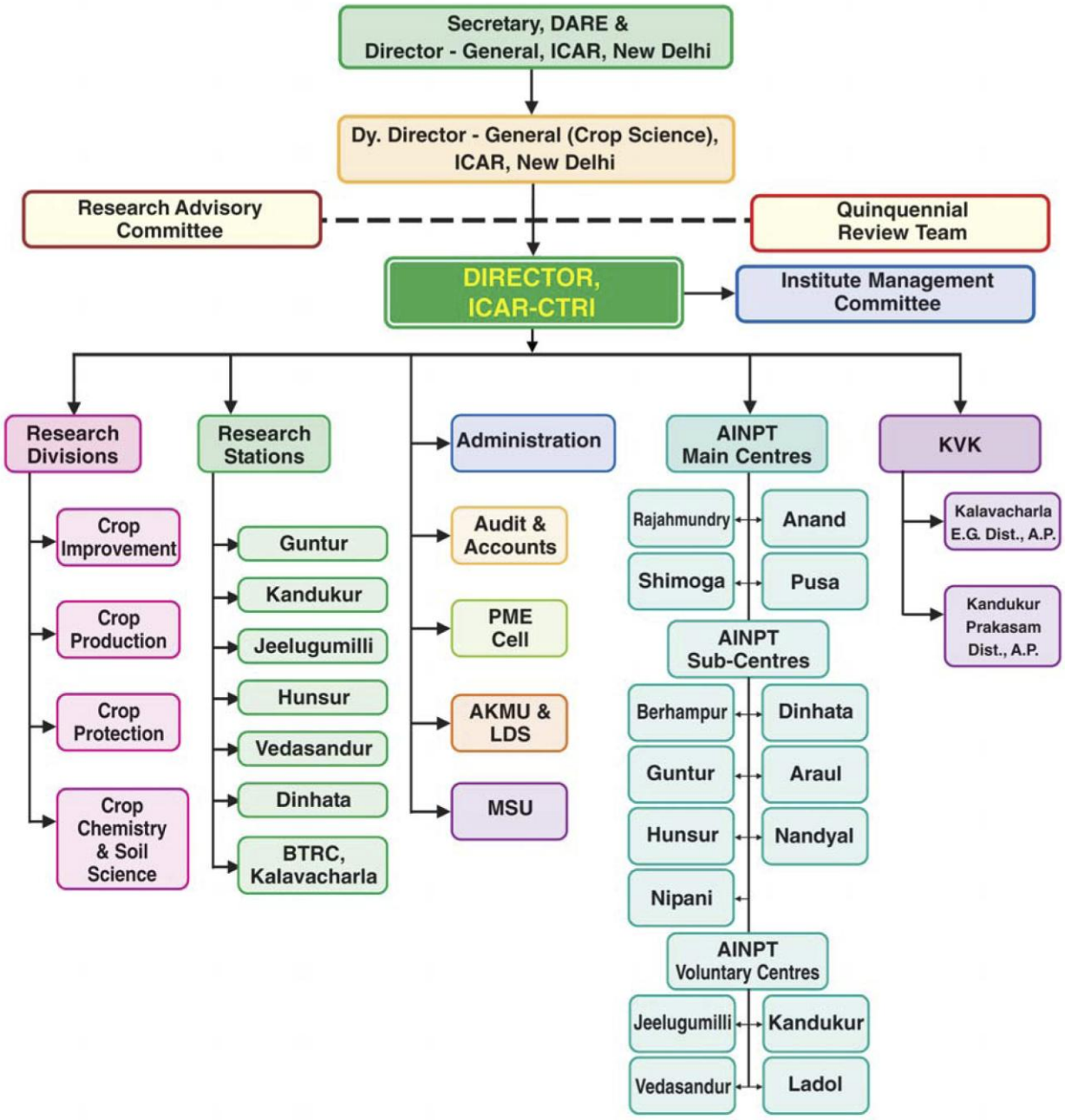
The Institute continually improves the effectiveness of the quality management system through the use of the quality policy, quality objectives, audit results, analysis of data, corrective and preventive actions and management reviews.

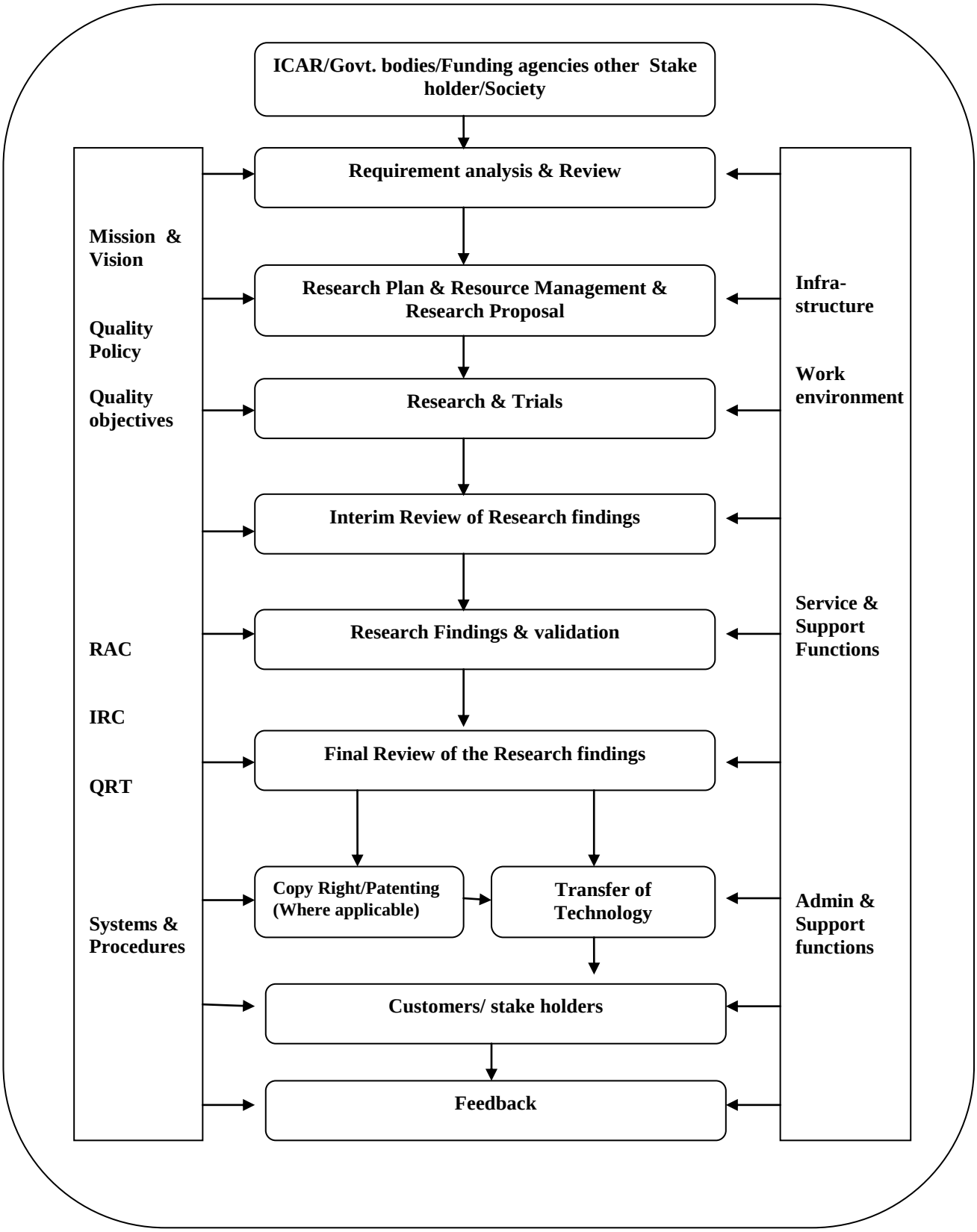
Internal audit reports and customers complaints are generally the inputs for initiating corrective and preventive actions. Action taken to eliminate quality problems/potential quality problems shall be appropriate to the magnitude and the risk involved. Continual improvement planning is managed as below:
Responsibility for continual improvement process

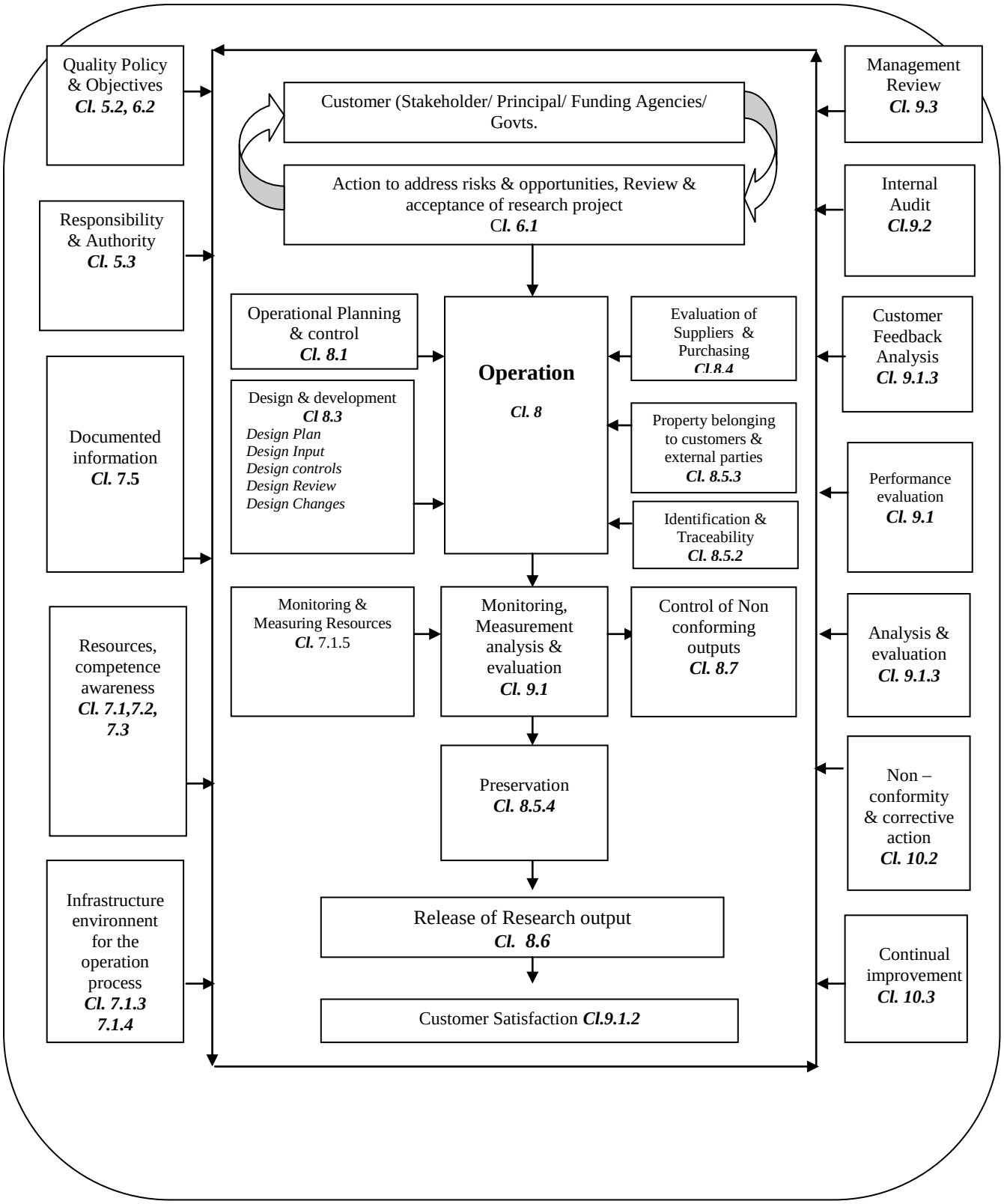
a. Programme head for Product realization (Research projects, Training, Extension, Consultancy etc)
b. Principal Investigator for Customer related process
c. The Division/Sections Head/In- charges for respective services provided by the Division/Sections.

MR for QMS implementation

ORGANOGRAM


Secretary, DARE & Director - General, ICAR, New Delhi
Dy. Director - General (Crop Science), ICAR, New Delhi
Research Advisory Committee
Quinquennial Review Team
DIRECTOR, ICAR-CTRI
Institute Management Committee
Research Divisions
Crop Improvement
Crop Production
Crop Protection
Crop Chemistry & Soil Science
Research Stations
Guntur
Kandukur
Jeelugumilli
Hunsur
Vedasandur
Dinhata
BTRC, Kalavacharla
Administration
Audit & Accounts
PME Cell
AKMU & LDS
MSU
AINPT Main Centres
Rajahmundry
Anand
Shimoga
Pusa
AINPT Sub-Centres
Berhampur
Dinhata
Guntur
Araul
Hunsur
Nandyal
Nipani
AINPT Voluntary Centres
Jeelugumilli
Kandukur
Vedasandur
Ladol
KVK
Kalavacharla E.G. Dist., A.P.
Kandukur Prakasam Dist., A.P.


ICAR/Govt. bodies/Funding agencies other Stake holder/Society
Requirement analysis & Review
Research Plan & Resource Management & Research Proposal
Research & Trials
Interim Review of Research findings
Research Findings & validation
Final Review of the Research findings
Copy Right/Patenting (Where applicable)
Transfer of Technology
Customers/ stake holders
Feedback
Mission & Vision
Quality Policy
Quality objectives
RAC
IRC
QRT
Systems & Procedures
Infra-structure
Work environment
Service & Support Functions
Admin & Support functions


Quality Policy & Objectives Cl. 5.2, 6.2
Responsibility & Authority Cl. 5.3
Documented information Cl. 7.5
Resources, competence awareness Cl. 7.1,7.2, 7.3
Infrastructure environnent for the operation process Cl. 7.1.3 7.1.4
Customer (Stakeholder/ Principal/ Funding Agencies/ Govts.
Action to address risks & opportunities, Review & acceptance of research project Cl. 6.1
Operational Planning & control Cl. 8.1
Design & development Cl 8.3
Design Plan
Design Input
Design controls
Design Review
Design Changes
Operation Cl. 8
Evaluation of Suppliers & Purchasing Cl.8.4
Property belonging to customers & external parties Cl. 8.5.3
Identification & Traceability Cl. 8.5.2
Monitoring & Measuring Resources Cl. 7.1.5
Monitoring, Measurement analysis & evaluation Cl. 9.1
Control of Non conforming outputs Cl. 8.7
Preservation Cl. 8.5.4
Release of Research output Cl. 8.6
Customer Satisfaction Cl.9.1.2
Management Review Cl. 9.3
Internal Audit Cl.9.2
Customer Feedback Analysis Cl. 9.1.3
Performance evaluation Cl. 9.1
Analysis & evaluation Cl. 9.1.3
Non – conformity & corrective action Cl. 10.2
Continual improvement Cl. 10.3

SOP 1	Procedure for Control of QMS documents
SOP 2	Procedure for Control of QMS records
SOP 3	Procedure for Internal Audit of the QMS
SOP 4	Procedure for control of Non conforming products and services
SOP 5	Procedure for Corrective actions
SOP 6	Procedure for Preventive actions
SOP 7	Procedure for management review of the QMS
SOP 8	Procedure for design and development of Research projects
SOP 9	Procedure for conducting training programmes
SOP 10	Procedure for management of CTRI website
SOP 11	Procedure for updating data & information in PERMISNET
SOP 12	Procedure for updating data in PIMS-ICAR
SOP 13	Procedure for updating data in HYPM
SOP 14	Laboratory Workflow
SOP 15	10 golden rules for the laboratory
SOP 16	10 Do nots in the Laboratory
SOP 17	Library management
SOP 18	Management of AINP projects
SOP 19	Skill development of the Scientists
SOP 20	Participation in Ministry/Govt. interface meetings related to AINP projects
SOP 21	Participation in Regional coordination meetings of ICAR Line dept & SAUs related to AINP projects
SOP 22	Handling Parliament Questions
SOP 23	Handling QRT queries
SOP 24	Preparation of budget. release & monitoring of funds related to AINP projects
SOP 25	On Farm technology dissemination programme- demonstration of Technology, Plant Varieties
SOP 26	On Farm technology dissemination programme- documentation of Technology, Plant Varieties
SOP 27	Library Rules
SOP 28	Guidelines for the Researchers for Field Visits
SOP 29	Patenting of Product/Technology/Process
SOP 30	Breakdown management of equipments
SOP 31	Purchase of Books & Journal
SOP 32	Publishing publications
SOP 33	Purchase process
SOP 34	Civil Works
SOP 35	FMS/MIS
SOP 36	AEBAS Attendance system

TERMS AND DEFINITIONS

- **AEBAS :** Aadhar Enabled Biometric Attendance System
- **Auditee:** Organization being audited
- **Audit**: systematic, independent, and documented process for obtaining evidence and evaluating objectively to determine the extent to which the criteria are fulfilled.
- **Auditee:** Organization being audited
- **Auditor** Person with the competence to conduct an audit
- **Audit conclusion :** Outcome of an audit , provided by the audit team after consideration of the audit objectives and all audits
- **Audit criteria :** set of policies, procedures or requirements
- **Audit evidence: r**ecords, statements of fact or other information, which are relevant to the **audit criteria** and verifiable (note audit evidence may be qualitative or quantitative.)
- **Audit findings: r**esults of the evaluation of the collected audit evidence against audit criteria **(**Note audit findings can indicate either conformity or nonconformity with audit criteria or opportunities for improvement.)
- Client/Customer/Stakeholder: Person or entity receiving a product from the organization.
- **Conformity**: fulfillment of a requirement
- **Continual improvement**: recurring activities to increase the ability of the organization to fulfill requirements.
- **Corrective action**: action to eliminate the cause of detected nonconformity or other undesirable situation
- **CTRI** : Central Tobacco Research Institute
- **Divisions/sections**: The technical and administrative sections/divisions within the Institute
- **MIS FMS:** Management Information System includes Financial Management System
- **Management system**: system to establish policy and objectives & to achieve those objectives.
- **Management**: The highest level of management within an organization (top management)
- **Network:** The Institutes' intranet system
- **Non conformity:** non : fulfillment of a requirement
- **Non conformity:** non : fulfillment of a requirement
- **Objective evidence**: data supporting the existence or verity of something
- **Objective evidence**: data supporting the existence or verity of something
- **Organization**: group of people and facilities with an arrangement of responsibilities , authorities and relationship
- **Outsourced Process**: Process needed for the organization's QMS but chosen to be performed by a party external to the organization
- **Preventive action**: action to eliminate the cause of a potential nonconformity
- **Procedure**: specified ways to carry out an activity or a process

- **Process:** set of interrelated/ interacting activities which transforms inputs to outputs
- **Product Realization**: The sequence of processes required to achieve the product
- **Product**: results of a process /result of a set of interrelated/interacting activities which transforms inputs to outputs (products includes services)
- **Quality assurance**: part of quality management focussed on fulfilling quality requirement
- **Quality management system**: a management system to direct & control an organization related to quality as formally expressed by top management
- **Quality manual**: document specifying the quality management system of an organization.
- **Quality objective**: something sought, aimed for or related to quality
- **Quality plan**: document specifying which procedures and associated resources shall be applied by whom and when to a specified project, product, process or contract.
- **Quality policy**: overall intentions and direction of an organization related to quality as formally expressed by top management.
- **Quality**: degree to which a set of inherent characteristics fulfills requirements
- **Record:** document setting the results achieved or provide evidence of activities performed.
- **Supplier**: Person or entity providing a product/service to the organization
- **Top management**: person or group of people who directs and controls an organization at the highest level.
- **Validation**: Confirmation through the provision of objective evidence that the requirements for a specific intended use or application have been fulfilled
- **Verification**: Confirmation through the provision of objective evidence that specified requirements have been fulfilled

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