

QUESTIONNAIRE - III

NATIONAL MEDICINAL PLANTS BOARD

QUESTIONNAIRE FOR PRIORITISING RESEARCH THEMES

Part - I : Information about respondent

1. Name : _____
2. Organisation : _____
3. Profession : _____
4. State / A.N. : _____

INSTRUCTIONS FOR FILLING PART - I

1. Write your name in Block Capital Letters.
2. Write code, choose from the following : State Forest Department/SMPB/State Mission - 1, Research Institutions - 2, NGO - 3, Medicinal Plants based industry - 4, Medicinal Plants cultivators / collectors - 5, Others -6
3. Write code, choose from the following : Scientists of ICAR, CSIR, ICFRE Research Institutes/University - 1, Field officer in State Forest Department/SMPB/State Mission (resource manager) - 2, Research manager (officer or scientist in headquarters managing research) - 3, NGO -4, medicinal plants based industry-5 Medicinal Plants cultivators / collectors - 6, Others -7
4. Code of State and Andaman Nicobar Island

Andaman & Nicobar	1	Maharashtra	17
Andhra Pradesh	2	Manipur	18
Arunachal Pradesh	3	Meghalaya	19
Assam	4	Mizoram	20
Bihar	5	Nagaland	21
Chhattisgarh	6	Orissa	22
Delhi	7	Punjab	23
Goa	8	Rajasthan	24
Gujarat	9	Sikkim	25
Haryana	10	Tamilnadu	26
Himachal Pradesh	11	Tripura	27
Jammu & Kashmir	12	Uttarakhand	28
Jharkhand	13	Uttar Pradesh	29
Karnataka	14	West Bengal	30
Kerala	15		
Madhya Pradesh	16		

Part -II Prioritising research themes

Kindly give score (0-10) to research themes according to their importance. 10 is the maximum score to be given for the most important themes. 0 score means that you do not want that any research should be carried out on the theme. Importance may be judged from the point of view of user's needs, scientific advancement, scientific leadership of India. You may add more themes.

Sl. No.	Research Themes for prioritization for medicinal plants	Score 0-10 according to importance
1.0	Bio-diversity and Taxonomy of medicinal plants	
1.1	Distribution of medicinal plants in different climatic zone of India (at state, Distt., Block & Panchayat level) using GIS tools.	
1.2	Systematic studies for documentation of medicinal plants.	
1.3	Population Status of Species of medicinal plants in natural habitat with respect to their RET status.	
1.4	Biodiversity of medicinal plants, their distribution and utilization.	
1.5	Quantitative estimation of commercially exploited medicinal plant species for trade from natural habitats for regulating are harvesting.	
1.6	Assessment of Rare, Endangered and threatened species.	
1.7	Prioritisation of RET species for conservation & cultivation using GIS databases.	
1.8	Documentation of morphological diversity in medicinal plants.	
1.9	Inventorisation & Documentation of herbaceous species of Medicinal plants of different regions.	
1.10	Survey and Inventorisation of medicinal shrubs and clinber resources of India.	
1.11	Inventorisation & Documentation of medicinal tree resources of India.	
1.12	Identification and enumeration of endemic species of medicinal plants.	
1.13	Status of medicinal plants diversity in different zones in India.	
1.14	Inventorisation & Documentation of herbaceous species of Medicinal plants of different regions.	
1.15	Survey and Inventorisation of medicinal shrubs and clinber resources of India.	
1.16	Studies in ecological diversity of medicinal plants.	
1.17	Effect of associate species on growth, development and quality of medicinal plants.	
1.18	Study on change of micro & macroflora of medicinal plants under shifting cultivation.	
1.19	Characterisation of biodiversity and conservation of genetic resources of medicinal plants.	
1.20	Study on effect of climate change on growth & population of medicinal plants.	
1.21	Phyto-sociological studies of medicinal plants.	

1.22	Selection of sites for developing conservation areas for RET species of medicinal plant.	
1.23	Diversity, potential utilization and Bioprospection of Medicinal Plants of India.	
1.24	Survey documentation of ethnomedicinal plants from various tribes in India.	
1.25	Documentation of medico-ethnobotanical knowledge prevailing among rural and tribal proper in the country (Traditional Health Care).	
1.26	Documentation of Indian Phytotherapies for future validation.	
1.27	Documentation of \medicvinal Plants resources in of Sacred Groves in India.	
1.28	Biodiversity and traditional knowledge as a base for Drug discovery.	
1.29	Ethnomedicines of different tribals in India.	
1.30	Ethnomedicobotany of individual plants.	
1.31	Ethnomedicobotany of group of plants used for curing a particular disease.	
1.32	Ethnomedicobotany documentation of germplasm of Medicinal value and thin conservation Medicinal grasses.	
1.33	Documentation of Knowledge associated with medicinal plants of India.	
1.40	Ethnopharmacological study of tribal medicines.	
2	Reproduction biology and agro-technology of medicinal plants	
2.1	Studies on reproductive biology of commercially important medicinal plants.	
2.2	Studies on seed biology seed harvesting, storage treatment & testing (for viability & germination).	
2.3	Reproductive behaviour of cross polinated speceis of medicinal plants.	
2.4	Reproductive behaviour of self pollinated species of medicinal plants.	
2.5	Reproductive behaviour of a sexually propagated species of medicinal plants.	
2.6	Development of protocol for long term storage of seed /germplasm of Red Data listed medicinal plants species.	
2.7	Standardization of nursery techniques for medicinal plants through development of high tech nurseries.	
2.8	Development and refinement of agrotechniques of seasonal (harbacious) crops of medicinal plants.	
2.9	Developing protocols for propagation of shrubby and woody chimber species of medicinal plants through seeds and clonal propagules.	
2.10	Development of propagation techniques through seeds and vegetative means for medicinal trees.	
2.11	Standardization of germination parameters in seed of medicinal & aromatic plants.	
2.12	Development and refinement of agrotechniques of seasonal (harbacious) crops of medicinal plants.	
2.13	Development of agrotechniques for RET species of medicinal plants.	
2.14	Development of production technology for medicinal trees, shrubs, climbers and creepers.	

2.15	Effect of different sowing dates and application of fertilizers on growth and yield of medicinal plants.	
2.16	Commercial cultivation of RET species of medicinal plants through organic farming.	
2.17	Effect of organic manures and bio fertilizers on quality and quantity of medicinal plants.	
2.18	Captive cultivation of highly demanded species of medicinal plants using high-tech green Houses/Polyhouses.	
2.19	Effect of date of plant on the yield and disease incidence in medicinal plants	
2.20	Cultivation practices for important aromatic plants.	
2.21	Certification for organic farming in medicinal plants.	
2.22	Development of GAP & GCCP for medicinal plants for NMPB prioritized species.	
2.23	Effect of intercropping of medicinal plants with other crops : - Seasonal/annual, biennial and perennial crops.	
2.24	Cultivation of medicinal plants in agromedicinal plants/social medicinal plants systems.	
2.25	Integration of medicinal crops in orchards/ Plantationcrops.	
2.26	Effect of different edaphic factors and climatic conditions on growth and yield of medicinal plants.	
2.27	Effect of application of fertilizers and manures on the production of medicinal plants.	
2.28	Effect of irrigation and fertigation on the productivity of medicinal plants.	
2.29	Influence of different VAM fungi on root biomass yield in medicinal plants.	
2.30	Effect of integrated nutrient management on yield and quality of medicinal plants.	
2.31	Effect of organic manures and biofertilizers on growth and yield of medicinal plants.	
2.32	Management of diseases and pests of medicinal plants and their management.	
2.33	Effect of different dates of sowing and plantation on the yield and disease incidence in medicinal plants.	
3	Breeding and genetic improvement of medicinal plants	
3.1	Studies on breeding behaviour of Medicinal Plants.	
3.2	Reproductive biology of RET species of Medicinal Plants.	
3.3	Breeding of medicinal plants through hybridisation for developing high yielding varieties.	
3.4	Breeding and Genetic improvements of medicinal plants for pest and disease resistance.	
3.5	Breeding of medicinal plants for domestication in harsh climatic and edaphic conditions (stress conditions).	
3.6	Effect of growth regulators on quality and productivity of medicinal plants.	

3.7	Studies on Genetic variability through somatic variation and induced in-vitro mutagenesis for improvement of active contents in medicinal plants.	
3.8	Identification of high yielding strains in medicinal plants.	
3.9	Selection of superior genotypes in important medicinal plants for commercial cultivation.	
3.10	Genetic improvement in medicinal crops through application of tissue culture techniques.	
3.11	Selection of superior genotypes in important medicinal plants for commercial cultivation.	
3.12	Development of genebanks of superior varieties of medicinal plants.	
3.13	Production of novel variants in self pollinated crops of medicinal plants through mutation/irradiation.	
3.14	Studies on Genetic variability and molecular characterisation of medicinal plants.	
3.15	DNA finger printing and development of molecular markers in medicinal plants.	
3.16	Role of molecular markers in correct identity of controversial medicinal plant species.	
3.17	Genetic mapping of RET species of medicinal plants.	
3.18	Genetic characterisation and profiling of medicinal plant species.	
3.19	Molecular, biological and bio-technological advances in herbal medicines.	
3.20	Molecular characterisation of different species of medicinal plants.	
3.21	Clonal propagation of RET species of medicinal plants.	
3.22	Vegetative propagation of important commercial species of medicinal plants.	
3.23	Vegetative propagation of medicinal shrubs.	
3.24	Clonal propagation of important medicinal trees.	
3.25	Micro propagation of species difficult to germinate through seeds.	
4	Sustainable harvesting and post harvest management in medicinal plants	
4.1	Development of species wise scientific harvesting techniques for medicinal plants.	
4.2	Standardization of post harvesting techniques like drying, grading, winnowing, grading, packaging & storage to avoid post harvesting losses.	
4.3	Primary processing of medicinal plants for value addition at production sites & employment generation.	
4.4	Standardization and quality control for product formulation for medicinal plants like drugs, nutraceuticals, cosmeceuticals & other products.	
4.5	Standardisation of harvesting technology for medicinal plants based on official parts i.e. whole plant, roots/rhizomes/tubers, root bark, stem bark, leaves, flowers, fruits and seeds.	
4.6	Development of good harvesting and good collection practices for medicinal plants.	
4.7	Skill upgradation SHG's/ JFMC's in pre and post harvest management.	

4.8	Inventorisation of natural resources of commercial medicinal plants.	
4.9	Assessment of production estimates in commercially important medicinal plants.	
4.10	Documentation of regeneration capacity of important medicinal plants.	
4.11	Preparation of harvest inventory of important medicinal plants.	
4.12	Skill upgradation of SHG's/ JFMC's and other stake holders in pre and post harvest management by scientific harvesting techniques.	
4.13	Post harvest management technologies for important medicinal plants collected from wild sources.	
4.14	Post harvest management technologies for cultivated crops of medicinal plants.	
4.15	Post harvest management of different officinal parts (Root, Rhizome, Bulbs, Bark, Leaves, Flowers, Fruits, Whole plants)	
4.16	Drying technologies and equipments for medicinal plants based on useable parts.	
4.17	Model drying and packaging sheds.	
4.18	Storage of official parts of medicinal plants.	
4.19	Cutting into small pieces of the raw materia,l drying (shade or sun), garbling, grading, packaging and storage of medicinal plants.	
4.20	Primary Processing of medicinal plants for powders, tinctures, extracts etc. at production sites especially for low value-high volume crops.	
4.21	Primary processing technologies for high value low volume crops of medicinal plants.	
4.22	Primary Processing and value addition of commercially important medicinal crops.	
4.23	Value addition and crude processing leading to product formulation of quality raw material in medicinal plants.	
5	Biological screening of medicinal plants	
5.1	Interaction of Plant Bioactive compounds with protein kinases.	
5.2	Biochemical Pharmacology of secondary metabolites from medicinal plants.	
5.3	Natural anti-oxidants and tissue regenerations curative effects and reaction mechanisim from medicinal plants.	
5.4	Evaluation of medicinal plants for toxicity activities.	
5.5	Study of effect of Gomma irradiation on pharmacological activities of medicinal plants.	
5.6	Studies on total synthesis of biologically active natural products from medicinal plants.	
5.7	Pharmological effects of drugs obtained from spices.	
5.8	Screening for biologically active ingrediants from medicinal plants.	
5.9	Isolation and characterisation of Bioactive compounds from important medicinal plants.	
5.10	Isolation and extraction of natural flavonoids from medicinal plants.	
5.11	Isolation of active ingredients from medicinal plants having memory enhancers and memory stablizers	
5.12	Nutraceuticals from medicinal plants.	

5.13	Cosmeceuticals from medicinal and aromatic plants.	
	Bioprospecting of Medicinal plants for bioactivities like:	
5.14	Screening of medicinal plants for Anti-biotic activities.	
5.15	Screening of medicinal plants for Anti-malarial activities.	
5.16	Screening of medicinal plants for Anti-captic activities.	
5.17	Screening of medicinal plants for Anti-cancer activities.	
5.18	Screening of medicinal plants for Anti-inflammatory activities.	
5.19	Screening of medicinal plants for Anti-diabetic activities.	
5.20	Screening of medicinal plants for Anti-asthmatic activities.	
5.21	Screening of medicinal plants for Anti-microbial activities.	
5.22	Screening of medicinal plants for Hepotoprotective activities.	
5.23	Screening of potential medicinal plants for the treatment of AIDS.	
6	Phytochemical screening	
7	Quality Control and Drug Standardisation	
7.1	Importance of morphological studies on medicinal plants.	
7.2	Preparation of descriptors for commercially important species of medicinal plants.	
7.3	Identification of substitutes/ adultrants for traded medicinal plants for addition to the Ayurvedic Pharmacopoeias of AYUSH.	
7.4	Botanical identification & pharmacognostic details of the market samples of important crude drugs .	
7.5	Development of morphological markers for important species of medicinal plants.	
7.6	Importance of Pharmacognosy as an aid to drug standardization programmes.	
7.7	Pharmacognostical standardization of important medicinal plants of AYUSH.	
7.8	Studies on substitution of plant parts like roots, leaves, barks, flowers, fruits woods etc. coming from the same plant to avoid destructive harvesting as far as possible.	
7.9	Pharmacopoeial validation of medicinal plants.	
7.10	Quality certification in medicinal plants raw material & their products.	
7.11	Pharmacognostical studies on different official parts of medicinal plants.	
7.12	Quality evaluation of gums, oleoresins and tannins etc. from medicinal trees.	
7.13	Removal of controversies in use of adultants and substitutes through biochemical, morphological, cytological and chemotaxonomical studies for finding out quality raw material.	
7.14	Histochemical and pharmacognostic studies for correct identity of controversial crude drugs of AYUSH.	
7.15	Finding potent substitutes for RET listed medicinal plant & sustainable plant parts (like leaves, fruits, flowers, barks, roots, heartwood etc.).	

7.16	Comparative anatomical and histochemical studies on RET species of medicinal plants.	
8	Seed Technology and Seed Certification	
8.1	Development of morphological markers for seed identification of medicinal plants.	
8.2	Systematic studies on seed morphology of orthodox seeds of medicinal plants.	
8.3	Systematic studies on recalcitrant seeds of medicinal plants.	
8.4	Development of seed maturity standards for medicinal plants.(Maturity Indices)	
8.5	Studies on seed biology, seed collection, storage and treatment and testing of medicinal plants.	
8.6	Studies in seed germination, germination vigour and dormancy.	
8.7	Developing analytical methods to test vigour, viability and purity of seeds of medicinal plants.	
8.8	Standardization of germination parameters in medicinal & Aromatic Plants.	
8.9	Determination of seed standard and seed standardization of seed testing protocols in medicinal plants.	
8.10	Bulk production of labeled seeds quality geno types of medicinal plants.	
8.11	Production of seed and other propagated material of medicinal plants for domestication and commercialisation.	
8.12	Development of seed certification parameters and certification process for improving quality of seed of medicinal plants.	
8.13	Standardisation for moisture content in seeds of medicinal plants before storage.	
8.14	Testing of quality of seeds of medicinal plants for different pathogens before storage.	
8.15	Development of protocols for long term, medium term and short term storage of seed of medicinal plants.	
8.16	Cryopreservation of seeds for long term storage using liquid nitrogen.	
8.17	Pest & disease management in seed of medicinal plants during storage.	
9	Bio-technology of Medicinal Plants	
9.1	Biotechnology in management of natural resources of medicinal plants.	
9.2	Application of biotechnology in the development of medicinal plants sector in India.	
9.3	Mass production of quality planting material (true to type) for RET Medicinal Plants.	
9.4	Micro propagation of selected red data listed endemic medicinal plants of Himalayan regions.	
9.5	In-vitro propagation and conservation of germ plasm of Endangered species of medicinal plants.	
9.6	Standardization of protocols for propagation of exotic medicinal plants.	

9.7	Role of growth regulators and culture media in micropropagation of medicinal plants.	
9.8	Biotechnological application for enhanced production of phytopharmaceuticals.	
9.9	Regeneration protocol for RET species of medicinal plants.	
9.10	Use of molecular markers and transformation in the improvement of medicinal plants.	
9.11	DNA bar coding of medicinal plants (DNA sequence analysis of a uniform target gene to enable species identification).	
9.12	iv) High Frequency shoot regeneration from leaf, explants of medicinal plants and their Genetic stability through RAPD markers.	
9.13	Application of molecular markers and DNA fingerprinting in standardisation of herbal drugs.	
9.14	Screening of medicinal plants for production of secondary metabolites.	
9.15	Biotechnological potential of hairy root culture in medicinal plants.	
9.16	Genetic fidelity of micro-cloned progeny of medicinal plants.	
9.17	Improvement of medicinal plants through genetic engineering.	
9.18	Application of cell culture for production of secondary metabolites in medicinal plants.	
9.19	DNA fingerprinting analysis of seeds of medicinal plant using AFLP (amplified fragment length polymorphism) technology.	
9.20	Biotechnological approaches in detection, characterisation and management of diseases of medicinal plant crops.	
9.21	Genetic Finger printing analysis of micropropagated medicinal plants.	
9.22	Improvement of medicinal plants for high-biomass and active constituents through Genetic Engineering and Recombination.	
9.23	Computational Genetic Engineering approach to improve the phytochemical connection in medicinal plants.	
10	Conservation of Medicinal Plants	
10.1	Conservation of medicinal biodiversity in ecosystems, habitats and biomes.	
10.2	Establishment of tissue, embryo and somethic cell banks for RET species of medicinal plants.	
10.3	Cryopresevation of seeds and propagules of medicinal plants for long term storage.	
10.4	Establishment Biosphere- Reserves	
10.5	National Parks.	
10.6	Wild life sancturies.	
10.7	Seed production areas.	
10.8	Seed stands.	
10.9	Development of MPCA's and MPDA's for medicinal plants	
10.10	Promote conservation of species diversity in medicinal plants.	
10.11	Conservation of endemic species of medicinal plants by creating sanctuaries/biosphere reserves.	

10.12	Development of MPCA's in different climatic zones of the country with special emphasis on RET species of Medicinal Plants.	
10.13	Identification & establishment of seed production area/seed stands for medicinal plants.	
10.14	Re-introduction of RET species into their natural habitats.	
10.15	Protection & development of sacred groves with special emphasis on medicinal plants of traditional & commercial importance.	
10.16	Studies on natural regeneration of RET species of medicinal plants.	
10.17	Sustainable conservation and development strategies for RET species of medicinal plants.	
10.18	Identification of Native, Endemic and Endangered species of medicinal plants for conservation and development.	
10.19	Protection of traditional knowledge innovations and practices based on medicinal plants.	
10.20	Ensure fair and equitable sharing of benefits arising out of Genetic Resources of Medicinal Plants among the people to promote conservation.	
10.21	Addressing challenges to biodiversity of medicinal plants from climate change.	
10.22	Development of Botanical/ Herbal Gardens/Drug Farm for conservation and multiplication of medicinal plants.	
10.23	Establishment of gene banks (seed/pollens) of medicinal plants species.	
10.24	Cryopreservation & use of Biotechnology tools for multiplication & preservation of medicinal plant germ plasm.	
10.25	Afforestation and resource augmentation of Medicinal Plants for sustainable supply to AYUSH industry using waste lands, ravines, road & railway tracks etc.	
11	Intellectual Property Rights and Patent Issue	
11.1	Protecting Indias Traditional Knowledge on medicinal plants.	
11.2	Documentation of traditional knowledge, innovations and processes involved in formulation, value addition etc.	
11.3	Geographical indicators for medicinal plants indicating the source of supply and place of production of raw material.	
11.4	System of benefit sharing for the knowledge / material owned by the tribal communities.	
11.5	Patent processes and Copy Right System.	
12	Trade and Marketing	
12.1	Status of requirement for raw material by AYUSH Industries Aroma-Chemicals, Phyto-pharmaceuticals and nutraceutical industries.	
12.2	Strategies for harmonizing demand supply through preparing data base on production and consumption of Medicinal Plants.	
12.3	Marketing of Medicinal Plants- local & regional level	

12.4	Encouraging establishment of collection centres. herbal mandies at central of salient places of facilitate disposal of raw matrial produce by the producers.	
12.5	To simply rules and regulations by exempting cultivators/ collectors of medicinal plants form paying royalty and taxes for obtaining trade and transit permit which will help the stakeholders in getting proper economic return for his produce.	
12.6	To create facility for minimum support price (MSP) for growers/ collectors as a motivation to adopt the enterprise.	
12.7	Creation of facilities for storage, value addition and primary processing of medicinal plants at JFMC, SHG/VSS/FDA level.	
12.8	Contribution of medicinal plants in Trade, imbalances and Prospects.	
12.9	Medicinal Plants having commercial value and export potential.	
12.10	Export and import of Plant drugs with reference to quality control.	
12.11	Global trends in production, utilization and marketing of medicinal plants.	
13	Development of Human Resources	
13.1	Production of medicinal plants	
13.2	Post harvest techniques	
13.3	Value addition and product formulation through trainings, Orientation programmes, Exposure visits, Radio & TV Schools, Interaction workshops for stake holders, Literature, exhibitions, fairs etc.	