# ANNEXURES

**Annexure – I**

# CERTIFICATION OF FOREST REPRODUCTIVE MATERIAL IN INDIA

(Revised Scheme, 1979)


Issued by

OFFICE OF THE COORDINATOR

INDO-DANISH PROJECT ON

SEED PROCUREMENT & TREE IMPROVEMENT

SAIFABAD, HYDERABAD-500 004

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## INTRODUCTION

Original scheme for certification of Forest Reproductive Material was presented as a paper in 1972 at Symposium on Man-made Forests organized by the Society of Indian Foresters and later on was recommended by NCA for adoption by the States. At the meeting organized by the Project on April, 19-20, 1978 at F.R.I., the working group on *Pinus roxbuurghii* recommended for revision of the scheme to make it simpler and easy to apply.

2. Accordingly a revised draft was prepared and circulated to various States, for comments. Revised draft was also discussed at the meeting of working group on ***Tectona grandis, Bombax ceiba*** **and** ***Gmelina arborea*** **held at Nagpur on October, 23-27, 1978** wherein a few minor amendments were suggested. Present version incorporates varios suggested amendments and is now being circulated to the States for adoption and implementation.

3. Following are the significant improvements/changes made in **the revised draft.**

a) It has now been **suggested that conservator of Forests, Research/Development or equivalent Authority** should be declared as Designated Authority to implement the scheme. This question was left undecided under the original scheme (see definition of the term "Designated Authority").

b) Revised scheme suggests setting up of a cell in each State under the charge of a Dy. Conservator of Forests or a Forest Geneticist to take up collection and certification of Forest Reproductive Material and to work under the directions of the Designated Authority. (Original scheme was silent on organization set up in the States) – see Rule 9.

On technical aspects following are the significant changes made in the revised draft.

c) Original scheme provided for division of country's forests into "regions of provenance", each region having sufficiently uniform ecological conditions and with distinct boundaries. **On the basis of Forest type maps available in Forest Atlas, of India, I tried to do this exercise by keeping a Forest Division as a minimum unit**. Maps showing the regions of provenance thus delimited have been sent to the States for their approval. However, it is a well known fact that ecological conditions vary

rapidly as one moves from one point to other even in the same beat or a range what to talk of uniformity in a division. To avoid this incongruity Scheme now used the term 'seed zone' instead of region of provenance', where 'seed zone' has been defined as "a geographic area delineated on State 'forest seed zone map' as approved by Conservator of Forests Research or equivalent authority". This is in tune with the approach adopted by Association of Official Seed Certifying Agencies in U.S.A.

d) Another significant change made in the revised scheme is in respect of categories of Forest Reproductive Material (R.M.) as explained in table overleaf:

CATEGORIES AS RECOGNIZED IN :-

| **Original Scheme** | **Revised Scheme** | **Remarks** |
|---|---|---|
| 1, R,M. from known administrative region | ------ | This category has now been derecognized as seed zone maps have been made. Derecognition was provided for in the original scheme also. |
| 2. R,M, from known region of Provenance. | 1. Source Identified R.M. | This is merely a change in the nomenclature. |
| 3. Selected | 2. Selected | This category of original scheme has now been aplit into two, upgrading R.M. from untested seed orchards which is presumed to be superior to R.M. from selected stands. |
| 4. Certified R.M. | 4. Tested R.M. | This is merely a change in nomenclature. Term 'Certified' was often confused with any material that is certified under the scheme irrespective or category. |

4. Still another change provided in the revised scheme is in respect of Certificates. Revised Scheme provides for use of coloured paper for certificates, colour depending upon the category in the same way as for the labels. This is mainly in attempt to make field staff, category/quality conscious.

5. I take this opportunity to acknowledge the fact that the Scheme, on the whole, is an adoption of O.E.C.D., scheme for the control of Forest Reproductive Material moving in International Trade. I am particularly grateful to Dr. H. Barner, Director, Danish/FAO Forest Tree Seed Centre, Humlebaek, Denmark, who has been my friend philosopher and guide in this work form the very beginning.

6. I am also greateful to various State Forest Departments for showing keen interest in the scheme by **sending** the comments as and when **requested**. I am particularly greateful to the members of the working group of ***Tectona grandis, Bombax ceiba*** **and** ***Gmelina arborea,*** **who met under the Chairmanship of Shri A.G. Oka, IFS., Conservator of forests, Research & Education Circle, Maharashtra, at Nagpur on October 26, 1978 to discuss the draft scheme para by para.** This discussion was most helpful and encouraging.

7. In the end I wish to convey my deep gratitude to Shri B.P. Srivastava, Inspector General of Forests and Chairman of Management Committee of our Project who has been a source of inspiration to me and who has kindly agreed to write a Foreword for this scheme.

Station: Hyderaabad, (Madan Gopal)

Dated : April 11, 1979. Coordinator,

Indo-Danish

Project on Seed

Procurement & Tree Improvement.

## Certification of Forest Reproductive Material in India

(Revised Scheme 1979)

### Object

The object of the Scheme for Forest Reproductive Material is to encourage the production and use of seeds, parts of plants and plants that have been collected, transported, processed, raised and distributed in a manner that ensures their trueness to name and quality.

Four broad categories of forest reproductive material are recognized in the scheme: (a) source identified reproductive material, which represents a minimum standard; (b) selected reproductive material; (c) reproductive material from untested seed orchards which give promise of seed of improved quality and (d) tested reproductive material which is genetically improved/superior.

### 2. Definitions

The terms used in the scheme will be interpreted as follows:

Project: means the Indo-Danish Project on Seed Procurement and Tree Improvement.

Scheme: means the scheme for certification of Forest Reproductive Material in India.

Seeds: Cones, fruits and seeds intended for the production of plants;

Parts of plants: Stem, leaf and root cuttings, scions and layers intended for the production of plants;

Plants: Plants raised by means of seeds or parts of plants; also includes natural regeneration.

Forest Reproductive Material:

Reproductive material of genera and species of trees used for forestry.

Basic Material:

Trees from which reproductive material is obtained.

Stands: a population of tree possessing sufficient uniformity in composition, constitution and arrangement to be distinguishable from adjacent populations.

N.B.: A stand will be identified by a forest compartment or part of compartment but never by a group of compartments.

Indigenous Stands:

A stand which has been continuously regenerated by natural regeneration, or one raised artificially from seed collected in indigenous stands of the same seed zone.

Selected Stand:

A stand of trees superior to the accepted mean for the prevailing ecological conditions when judged by the criteria set out in Appendix 1 and which may be treated for the production of seed. Where necessary, particularly to comply with the requirements of uniformity as described in paragraph 3 of Appendix I, the approval of a selected stand should be dependent on the removal of inferior trees.

Seed Orchard:

A plantation of selected clones or progenies which is isolated or managed to avoid or reduce pollination from outside source, managed to produce frequent, abundant and easily harvested crops of seed.

Progeny:

Off-spring of a particular mating or of a particular mate or a particular individual in the case of apomictic reproduction.

Clone:

A genetically uniform assemblage of individuals derived originally from a single individual by vegetative propagation, for example, by cuttings, divisions, grafts, layers or apomixis.

Cultivar:

An assemblage of cultivated individuals, which is distinguished by any characters (morphological, physiological, cytological, chemical or others) significant for the purposes of agriculture, forestry or horticulture and which, when reproduced (sexually or asexually) retains its distinguishing features.

Provenance: (Location of Seed Source):

The place in which any stand of trees is growing. The stand may be indigenous or non-indigenous.

Origin:

For an indigenous stand of trees the origin is the place in which the trees are growing; for a non-indigenous stand the origin is the place from which the seed or plants were originally introduced.

* Seed Zone:

Means a geographic area delineated on State forest tree "Seed Zone" map as approved by Conservator of Forests, Research (or equivalent authority) and to be published by the Project. Each "Seed Zone" will be identified by an approved State code letters followed by a serial number.

Seed Sub-Zone:

Each seed zone that has altitudinal variation of more that 600 metres will be further sub-divided into sub-zones based on 600m. increments as follows:

| Altitude above m.s.l. | Code |
|---|---|
| 0 to 600m. | (00-06) |
| 601 to 1201m. | (06-12) |
| 1201 to 1801m. | (12-18) |
| 1801 to 2401m. | (18-24) |
| 2401 to 3001m. | (24-30) |
| 3001 to 3600m. | (30-36) |
| Above 3600m | (36-99) |

Sub zone will be identified by above code along with code for the seed zone. Seed zone code will precede the sub-zone code.

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* Dr. Helmuth Barner comments on this as under:

"We think that it is realistic to use the concept Seed zone rather that Region of Provenance. We should never forget that the main point is to teach foresters that information on location of seed sources should be given. As a further development, sources may be improved and classified according to more to less advanced principles."

Designated Authority:

An authority designated by and responsible to Government or Chief Conservator of Forests of a State for purpose of implementing these rules and will usually be Conservator of Forests, Research/Development or equivalent officer.

**3. RULES AND DIRECTIONS OF THE SCHEME**

1. General:

The Scheme shall cover all seeds, parts of plants and plants which have been collected, transported and processed, stored, raised, sampled, labeled and sealed in accordance with the rules that follow. The said rules constitute the minimum requirements. The scheme shall be implemented in the States by Designated Authorities.

2. Categories of Reproductive Material:

The following categories shall be distinguished:

Source-Identified Reproductive Material: The two requirements of this category are (i) the seed zone where the reproductive material is collected and the origin of the basic material (which may be indigenous or non-indigenous) shall be defined and registered by a Designated Authority in the manner described in Rules 3, 4 and 5 (a); (ii) the seed shall be collected processed and stored and plants shall be raised under the control of a Designated Authority.

Selected Reproductive Material: The three requirements of this category are (i) the provenance or seed zone where the reproductive material is collected and the origin of the basic material (which may be indigenous or non-indigenous) shall be defined and registered by a Designated Authority in the manner described in Rule 3, 4 and 5(b); (ii0 the reproductive material shall be derived from basic material which conforms to the requirements given in Appendix I and has been approved and registered by a Designated Authority; (iii) the seed shall be collected processed and stored and plants shall be raised under the control of a Designated Authority.

Reproductive material form Untested Seed Orchards: The three requirements of this category are (i) the provenance or seed zone from which the components of the seed orchard came and the origin of these components (they may be indigenous or non-indigenous) or breeding records shall be defined and registered by a Designated

Authority in he manner described in Rule 3, 4 and 5 ©; (ii) the reproductive material shall be derived from the basic material which conforms to the requirements given in Appendix I B and has been approved and registered by a Designated Authority; (iii) the seed shall be collected, processed and stored and plants shall be raised under the control of a Designated Authority.

Tested Reproductive Material: The four requirements of this category are (i) the place where the reproductive material is collected and the origin of the basic material (which may be indigenous or non-indigenous) shall be defined and registered by a Designated Authority in the manner described in Rules 3, 4 and 5(d); (ii) the genetic superiority of the basic material shall be proved by test (see appendix II; (iii) the results of the tests shall be registered by a Designated Authority; (iv) the seed shall be collected, processed and stored and plants shall be raised under the control of a Designated Authority.

* 3. Delimiting Seed Zones:

Seed zones are being delimited by the Project in consultation with the Conservator of Forests Research (or equivalent Officer) by means of administrative and geographic boundaries and where applicable by altitudinal and other appropriate boundaries judged to be significant in the state.

Maps showing the boundaries of the seed zone together with their code shall be established and published by the Project.

*4. LIST OF APPROVED BASIC MATERIAL:

In each state Designated Authority shall take action to compile and furnish the following lists in respect of reproductive material that can be collected there from and furnish to the Project which will take action to circulate the same to other States for their information and use.

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* Dr. H. Barner comments on this as under:

"Make sure that the boundaries are easy to find in the field. Very often maps are beautifully delimited zones, but not applicable to practice due to the fact that boundaries do not follow land marks."

List of seeds that are available in different seed zones (source identified material).

List of Seed Production Areas.

List of Plus trees.

List of Seed Orchards.

Test results of Progeny and Provenance trials as and when conducted and analysed.

Above information will be made available in the proformae given in Appendix VI.

5. APPROVAL OF BASIC MATERIAL:

(a) Source Identified Reproductive Material:

Reproductive material collected from any area will be labeled as Source Identified Reproductive Material only when (i) the area falls within the bounds of a seed-zone as demarcated on the seed map and approved by the Designated Authority and (ii) stand where from the material has been collected falls within the control of State Forest Department.

b) Selected Reproductive Material:

Reproductive material approved for collection or raising as Selected Reproductive Material shall be derived from selected stands and cultivars which satisfy the minimum requirements for basic material specified in Appendix I part-A.

c) Reproductive Material from untested seed orchards:

(i) Reproductive material approved for collection or raising as Untested Seed Orchard Reproductive Material, shall be derived from untested seed orchards which satisfy the minimum requirements for basic material specified in Appendix-I part B.

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* Dr. H. Barner comments on this as under: "At this stage the important step is to establish the seed zones as soon as possible. The seed demand in India is large and the main part must be collected as Source-Identified. Therefore at the initial stage all efforts should be concentrated on this, rather than on the higher categories of sources."

(ii) Reproductive material derived from single species seed orchards for conservation of gene resources or breeding by selection for the criteria set out in Appendix-I part A is included in this category. Material from such orchards that are from a single region of provenance can be included in the category selected at the discretion of the Designated Authority.

(iii) Reproductive material derived from seed orchards established to produce species hybrids or provenance hybrids can only be included in this category when early tests show that the objectives of the orchard are attained.

d) Tested Reproductive Material:

(i) Reproductive Material approved for collection or raising as tested reproductive material shall originate from seed orchards, stands or cultivars whose genetic superiority to appropriate standards, in one or two characters important to forestry, has been proved by comparative tests conducted in specified environments and approved by the Designated Authority. Detailed requirements for such comparative tests are set out in Appendix-II.

ii) Tested reproductive material can also be obtained from trees grown from a representative sample of the original seed lot which was used to establish the trials provided that the Designated Authority is satisfied that this material is similar in genotype to the original basic material.

(iii) Superiority can be certified only in terms of the environment in which the test has been carried out. Moreover, superiority revealed by a test can be certified as characteristic only upto and including the most advanced age at which it has been observed in the test.

(iv) Before approval, a check must be made to ensure that the basic material is not significantly different from that which the reproductive material included in the test was obtained, adequate measures have been taken to reduce pollination from outside sources, and its boundaries are clearly marked in the field. Seed orchards must fulfil the requirements set out in Appendix I part B.

## 6. PRODUCTION OF ALL CATEGORIES OF FOREST REPRODUCTIVE MATERIAL

(a) Minimum requirements for the Production of Forest Reproduction Material:

The minimum requirements of a comprehensive scheme for the control of forest reproductive material are:

For selected, untested seed orchard and tested reproductive material the stand or seed orchard must be inspected by a qualified person acting on behalf of the Designated Authority. At this time the boundaries of the stand or seed orchard, the quality of the stand or seed orchard, incidence of inferior trees and effectiveness of isolation must be checked as per requirements of Appendix I. After the first inspection subsequent re-inspections are made at intervals decided by the Designated Authority.

Forest reproductive material to be certified under the Scheme must be collected (including extraction, cleaning and packaging and storage) under supervision of officials duly authorized by the Designated Authority.

Sowing of seed, planting of seedlings and vegetative propagation of stem root or leaf cutting, grafts and layers must be in a nursery under direct charge of duly authorized official.

Satisfactory records must be kept of collection, processing, raising and storage of all reproductive material and these records must be available for inspection.

b) Separation of lots: All categories of forest reproductive material must, during collection, transport, processing, storage, and raising be kept in lots separated an identified according to the following criteria.

Genus and, where applicable, species, sub-species, variety or cultivar;

Provenance, seed zone or seed orchard – for reproductive material produced by sexual means;

Clone-for parts of plants and plants produced from them by vege tative means;

Indigenous, or non-indigenous;

Year and month of ripening of seed

Length of time in the nursery as seedlings, rooted cuttings, grafts or transplants.

## 7. INSPECTION, SEALING AND LABELLING AND ISSUE OF CERTIFICATES

(a) Inspection of forest repr oductive material:

(i) All categories of reproductive material shall be controlled under the responsibility of the Designated Authority, at least by random checking, during collection, processing, storage, raising, labeling and sealing, as being in accorda nce with these rules and directions. For Tested Reproductive Material the Designated Authority must be satisfied that it does not differ significantly from the material used in the relevant trials. In particular, care must be taken to ensure that the original basic material is fully represented.

(ii) Seed shall be transported in packages.

(iii) Packages shall be sealed by the supplier and a label bearing the information in Appendix IV shall be fixed by the seal. A sealing device which cannot be removed and reattached shall be used. A duplicate of the label shall also be placed inside the package.

(iv) Each consignment of plants and parts of plants shall be labeled in accordance with Rule 7 (b) in such a way as to preserve the identity of the consignment.

* (b) Labels :

(i) All lots of forest reproductive material shall be accompanied by a label or labels as indicated in Rule 7(a) (iii) and (iv).

(ii) The labels shall be issued by the Designated Authority and shall conform to specifications given in Appendix V.

(iii) A specimen of any label printed in a state should be sent to the Project for records.

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∗N.B.: Labels as well as certificates will be printed on coloured papers as under:

| | |
|---|---|
| Source Identified Reproductive Material – | Yellow |
| Selected Reproductive Material – | Green |
| Seed Orchard Material – | Pink |
| Tested Reproductive Material – | Blue |

* Dr. H. Barner comments on this as under:

The official label is to be used when the seed is dispatched to the customer. Very often there is a long way from collecting, storage in the field through processing and cleaning to the ready-made seed lot. It is essential, therefore, that each seed lot is given a code number straight from the beginning of the collection. If possible, stick to species and seed lot number, further information needed for the certificate should be available from your files and national list of approved zones or stands.

(iv) When re-labelling and resealing takes place the new labels shall reproduce all the information given on the original labels except the name of the Designated Authority in the country of origin. They shall bear also a statement of re-labelling.

(c) Certificates of provenance/clonal identity:

(i) All categories of forest reproductive material shall be accompanied by a certificate of provenance for material reproduced by sexual means or a certificate of clonal identify for material reproduced vegetatively. Specimens of certificates are presented in Appendix III.

(ii) If selected reproductive material derived from selected stands within a seed zone is mixed, the reference numbers of the selected stands used in this mixture may be recorded on the certificate of provenance. Tested Reproductive Material must not be mixed.

(iii) A specimen of each certificate printed in a state shall be sent to the Project for records.

If a lot of forest reproductive material is divided outside the state of production, new certificates will be issued by the Designated Authority in the state in which the division has taken place. These certificates will reproduce all the information given on the original certificates and also a statement that the lot has been divided.

**8. SEED TESTING:**

To the extent possible seed lots shall be got tested at a seed testing laboratory for purity, germinatin/viability and moisture content so as to give idea of its planting value. Certificate pertaining to the laboratory tests shall be obtained in the proforma given in Appendix IV.

**9. METHODS OF OPERATION OF THE SCHEME:**

(a) Designated Authorities and Seed Certification Cell:

(i) The Government or the Chief Conservator of Forests in each State will designate an authority (see definition of Designated Authority) to implement the Scheme in the State.

(ii) Further a cell will be created in the State Forest Department organization which will be responsible for collection (including extraction, transport storage and supply)

or reproductive material and its certification. The same cell will also be responsible for implementing tree improvement programmes aiming to met state's requirements of reproductive material with successively increasing quantities of higher category material. This cell will be headed by a Dy. Conservator of Forests or a Scietist (Geneticist) who will directly work under the directions of the Designated Authority.

(iii) Tree improvement programmes in respect of species, that are being raised in a state, will be chalked out by its Designated Authority jointly with Designated Authorities of other States wherein the said species occur and the Project Coordinator as per working modalities finalized for the Project at the National Level meeting held on June 2, 1978, at Dehradun (for modalities see appendix VII).

N.B.: Seed testing rules have yet to be framed for many of our species. Central Silviculturist will take necessary action in framing these rules and circulating the same to various seed testing laboratories in the country.

(b) Review and Coordination:

(i) The operation and progress of the scheme shall be reviewed as necessary at various species working group meetings to be arranged by the Project. These meetings will report on the scheme and make such proposals as are deemed necessary to State Governments through their respective Designated Authorities.

(ii) The necessary coordination of the operation of the scheme at the inter-state level shall be ensured by the Project.

(c) Responsibility:

(i) When forest reproductive material is labeled and sealed under one of the categories defined in these Rules and Directions it is understood that all controls have been made in strict accordance with the Rules and Directions.

(ii) The application of the Scheme and use of the Certificates and labels prescribed in these Rules and Directions shall not involve the Project in any liability for compensation.

## APPENDIX – I

## MINIMUM REQUIREMENTS FOR THE APPROVAL OF BASIC MATERIAL

A. SELECTED STANDS

Origin: Selected stands may consist of trees that are indigenous or non-indigenous, which have the characters listed below:

Isolation: Selected stands shall be situated at a sufficient distance from poor stands of the same species or from stands of a related species or variety which can form hybrids with the species in question. This requirement is particularly important when the stands surrounding indigenous stands are not indigenous.

Uniformity: The stands must show a normal degree of individual variation in morphological characters.

Volume production: Volume production of wood normally is an essential criterion for the acceptance of selected stands. Volume production of wood must normally be superior to the accepted mean under similar ecological conditions.

Wood quality: The quality of wood shall be taken into account and, in some cases, may become an essential criterion.

Form or Growth Habit: The trees in selected stands must show particularly good morphological features, specially straightness and circularity of stem, favourable branching habit, small size of branches and good natural pruning. In addition, the proportion of forked trees and those showing spiral grain should be low.

Health and Resistance: The trees in selected stands must in general be free from attacks by damaging organisms and show resistance to the adverse climatic and site conditions in the place where they are growing.

Effective Size of the Population: Selected stands must consist of one or more groups of trees will distributed and sufficiently numerous to make possible adequate inter-pollination. To avoid the unfavourable effects of inbreeding, selected stands shall consist of a sufficient number of individuals on a given area.

Age and Development: Selected stands shall consist of trees of such an age, height or stage of development that the criteria given above can be clearly judged.

Before a selected stand is approved for collection of reproductive material of "selected" category it shall be treated (i) to remove all unwanted inferior trees and (ii) to provide space for crown development of retained seed bearers.

**B. SEED ORCHARDS**

The objective, design, components, isolation and location on must be approved and registered with the Designated Authority. Any subsequent significant changes must also be approved and registered with the Designated Authority.

The component clones or progenies shall be planted according to a plan which has been approved by the Designated Authority and established in such a way that each component can be identified.

Thinnings carried out in progeny seed orchards will be described together with the selection criteria used for such thinnings.

The seed orchards shall be managed and seed harvested in such a way that the objectives of the orchards are attained.

**C. CULTIVARS**

Cultivars shall be identified by distinctive characters as prescribed in the international code of nomenclature for cultivated plants.

The value of cultivates shall be established by experience or demonstrated by sufficiently prolonged experimentation.

Single trees used for production of clones shall be selected for their outstanding characters and special consideration should be given to the statements made under heads 4, 5, 6, 7, and 9 of part A.

## APPENDIX-II

## MINIMUM REQUIREMENTS FOR THE APPROVAL OF BASIC MATERIAL INTENDED FOR PRODUCTION OF TESTED REPRODUCTIVE MATERIAL

1. CHARACTERS TO BE EXAMINED

(a) Tests must be designated to assess specified characters and these must be indicated for each test.

(b) Weight is usually given to growth and resistance to pests and diseases of known economic importance. In addition, other characters, considered important in view of the economic objective sought, are considered and evaluated in relation to the ecological conditions of the region in which the test is carried out.

(c) Where the aim of the test is to assess survival under extreme ecological conditions, growth may be less important.

2. GENERAL

(a) Comparative tests set up for the approval of basic material are to be prepared, laid out, conducted and their results interpreted in such a way as to give an objective comparison, both the material under test and with reference to one or preferably several pre-chosen standards.

(b) All care is to be taken to ensure that the reproductive material under test, including the standards, is representative of the basic material being studied.

**3. SETTING UP THE TESTS**

(a) Reproductive material under study is to be both raised and planted in the tests in a replicated random layout.

(b) Each experimental unit is to contain a sufficient number of trees in order that the individual characteristics of each material under examination can be evaluated.

(c) The number of basic materials represented and the number of replicates must be sufficient to give a satisfactory degree of statistical accuracy in measurement of

differences, depending on the uniformity of the test site, differences expected and so on.

**4. MANAGEMENT OF TESTS**

(a) Reproductive materials and standards must be treated in an identical way throughout the test. This includes treatment in the nursery whether seeds, rooting, cuttings or vegetative production of root stocks, and the establishment and management of the forest test themselves.

(b) As concerns thinning, the method used should take account of the development of each should take account of the development of each reproductive material.

**5. PROCUREMENT OF REPRODUCTIVE MATERIAL FOR TESTING**

(a) The basic material for testing is to be:

i) Well defined as regards provenance, constitution composition and isolation against foreign pollen;

ii) Of such age and development that reasonable stability of the main features of the off spring can be expected.

(b) Sexual reproductive materia l for testing is to be:

i) Harvested in years of good flowering and good fruit setting unless artificial pollination is used.

ii) Harvested by methods that ensure that the samples obtained are representative.

(c) Vegetative reproductive material for testing is to originate from a single individual by vegetative means.

**6. STANDARDS**

(a) Standards should if possible have been known over a sufficiently long period in the region in which the test is to be carried out. They represent, in principle, materials that have been shown useful for forestry at the time that the test starts and in ecological conditions for which it is proposed to certify the material. They should come as far as possible from stands or belong to cultivars selected according to the

criteria in Appendix I to the Rules or from basic material officially approved for production of tested material.

(b) For testing interspecific hybrids, both parent species shall, if possible, be included among the standards.

(c) Whenever possible several standards are to be used. When necessary and justified standards may be replaced by the most suitable of the material under test or the result be presented as a comparative analysis of the relative performance of the components of the test.

(d) The same standards shall be used in all tests over as wide a range as possible.

## 7. ANALYSIS OF RESULTS AND EVALUATION

The results of the tests are to be presented in the form of numerical data. Each character is to be separately assessed.

Each reproductive material is classified for each character for each environment tested. The means and the variance of the test are to be presented.

The significance level of difference is to be shown. The difference in both absolute and relative terms is to be expressed as far as possible as genetic gain relative to the standard.

The age of reproductive material at which the character is evaluated should be indicated.

A significant superiority, both economically and statistically (95 percent level), as compared with the standards must be demonstrated for at least one important character. Where superiority is found for only one important character the values of at least two other important characters must at least achieve the average values of the standards for these two characters.

It will be clearly reported if there are any economic characters which are significantly (95 percent level) inferior to those of the standards. However, it must be stated that their effects are compensated for by favourable characters.

When the aim of the test is to certify reproductive material with reference to a character which is essential for survival under extreme ecological conditions, equality to the average value of the standards for the other characters is no longer required.

The methodology used for the test and the detailed results obtained are to be made freely available.

Records must describe the test sites, including location, climate, soil, past use, preparation, cultivations and any damage due to frost, drought, pests, diseases and so on.

A statement of the suggested region of probable adaption within the country in which the test carried out and characteristics which might limit its usefulness must also be given.

## 8. EARLY TESTS

A preliminary evaluation of young trials may be the basis for conditional approval. Claims of superiority based on early test results must be re-examined at five to ten years intervals.

Nursery, green house and laboratory tests are acceptable as valid early tests if it can be shown that there is a close correlation between the results shown in the early tests and subsequent stages of development of such material.

## APPENDIX III

Forms SC-1, SC-2, SC-3, and SC-4 will be used for Certificate of Provenance for source identified reproductive material, selected reproductive material, material from untested orchards and tested reproductive material, respectively. Further these forms will be printed on Yellow, Green, Pink or Blue paper depending upon the category of material. (Please refer to Rule 7(c)).

## APPENDIX IV

## SPECIFICATION FOR LABELS

(Vide Rule 7(b))

Shape and Size: Rectangular 12cm x 7cm with square corners.

Colour: Colour of label shall be as prescribed in N, B, under sub-rule 7(c).

Name of the Scheme: Shall be printed with black background vertically within 2cm of one end on both sides. Eyelet for binding thread will be within 2cm of other end at its mid point.

Name shall be: "Scheme for Certification of Forest Reproductive Material in India".

Prescribed information: On obverse side.

Address of Designated Authority: (to be printed)

Category: (to be printed)

Source identified/Selected/Seed Orchard/Tested

For Yellow Green Pink Blue label

Species (to be filled in):

Sub-species, variety, cultivar name

Seed zone Stand number Orchard number

(for Yellow label) (for green label) (for pink label)

Tested stand or orchard

(for blue label)

Reference number of the certificate and date:

Quantity _____Kg.

Reverse side will have space for Consignee's address.

---

N.B.: - 1. Label will bear form No. SC -6 (a) to (d)

2. Specimen labels are appended.

**Form SC-1**

## Certificate of Provenance

( Category: Source Identified Reproductive Material)

1. State : …… 2. Certificate No. …… Date ……..

3. Botanical name of produce : …….

4. Common name or trade name : ……

5. Nature of Produce (Indicate with √ ) :

   (a) Seeds ☐ (b) Parts of plants ☐ (c) Plants ☐

6. Details of source :

Division …….

Range …… Block / Compt. …….

Type of Soil ……..

7. Seed Zone (Indicate by code number as shown in Seed Zone maps)

   …….

8. Origin (Indicate with √ )

   (a) Indigenous ☐ (b) Non-indigenous ☐

   (c) Unknown ☐ (d) Introduced from ……..

9. Month and year of seed collection ……..

10. Length of time in nursery as seedlings or transplants …….

11. Package

| | |
|---|---|
| Quantity | |
| Number | |
| Nature | |

12. Remarks ……

It is certified that forest reproductive material described above has been produced in accordance with the Scheme for Certification of Forest Reproductive Material in India.

**Certifying Authority**

Name: …….. Signature ……...

Address: ……. Date …….

N.B.: - Certificate must contain all the information outlined above but the exac, arrangement of the text is at the discretion of the Designed Authority.

**Form SC-2**

Certificate of Clonal Identity (*)

Certificate of Provenance (*)

(Category: Selected Reproductive Material)

1. State:…… 2. Certificate No. …… Date …….

3. Botanical name of produce:……

4. Common name or trade name:……

5. Nature of Produce (Indicate with √ ):

(a) Seeds ☐ (b) Parts of plants ☐ (c) Plants ☐

(*) National/State Number of Seed Production Area:…….

Clone No,: ……

Details of Source:……

Division ……..

Range …….. Block / Compt. ……

Type of Soil ……

9. Seed Zone (Indicate by code number as shown in Seed Zone maps) …….

10. Origin (Indicate with √ )

(a) Indigenous ☐ (b) Non-indigenous ☐

(c) Unknown ☐ (d) Introduced from ……..

11. Month and year of seed collection ……..

12 Length of time in nursery as seedlings or transplants …….

13. Package

| | |
|---|---|
| Quantity | |
| Number | |
| Nature | |

(*) Delete what is not applicable.

12. Remarks ……

It is certified that forest reproductive material described above has been produced in accordance with the Scheme for Certification of Forest Reproductive Material in India.

**Certifying Authority**

Name : …….. Signature ……...

Address: ……. Date …….

N.B.: - Certificate must contain all the information outlined above but the exac, arrangement of the text is at the discretion of the Designed Authority.

**Form SC-3**

**CERTIFICATE OF CLONAL IDENTITY AND**

**CERTIFICATE OF PROVENANCE**

(Category: Seed Orchard Material)

1. State :_ _____ 2. Certificate No. _____ Date: _____
3. Botanical Name of Produce: _____
4. Common name of trade name: _____
5. Nature of pruduce (Indicate with _/)
   a. Seeds ☐ Parts of Plants ☐ c. Plants ☐
6. National/State Number of Seed Orchard: _____
7. Clone number(s): _____
8. Details of Source : _____
   a. Division : _____
   b. Range : _____ Block/Compt : _____
   c. Type of soil :_____
9. Seed Zone (Indicate by Code number as shown in Seed Source maps): _____

   _____

   _____

Month and year of Seed collection: _____

_____

Length of time in nursery as seedling or transplants: _____

_____

Package:

| | |
|---|---|
| Quantity | |
| Number<br>Nature | |

13, Remarks :

_____

_____

It is certified that forest reproductive material described above has been produced in accordance with ythe Scheme for Certification of Forest Reproductive Material in India,

**CERTIFYING AUTHORITY:**

Name: _____ Signature: _____

Address: _____ Date: _____

_____

_____

_____

N.B.:- Certificate must contain all the information outlined above but the exact arrangement of the text is at the discretion of the Designated Authority.

**Form SC -4**

## CERTIFICATE OF CLONAL IDENTITY AND CERTIFICATE OF PROVENANCE

1. State :_____ 2. Certificate No. _____ Date: _____
3. Botanical Name of Produce: _____
4. Common name of trade name: _____
5. Nature of pruduce (Indicate with _/)
   a. Seeds ☐ Parts of Plants ☐ c. Plants ☐
6. National/State Number of Seed Orchard: _____
7. Clone number(s): _____
8. Details of Source: _____
   a. Division: _____
   b. Range: _____ Block/Compt: _____
   c. Type of soil: _____
9. Seed Zone (Indicate by Code number as shown in Seed Source maps): _____
10. Origin (Indicate with v)
    a. Indigenous ☐ b. Non-indigenous ☐
    c. Unknown ☐ d, Introduced from _____
    _____
11, Month and year of Seed Collection: _____
12. Length of time in Nursery as seedlings or transplantation: _____
    _____
13. Package :

| | |
|---|---|
| Quantity<br>Number | |
| Nature | |

14. Remarks :

_____
_____
__

It is certified that forest reproductive material described above has been produced in accordance with the Scheme for Certification of Forest Reproductive Material in India.

**CERTIFYING AUTHORITY:**

Name: _____ Signature:_____

Address: _____ Date: _____

_____

_____

_____

N.B.:- Certificate must contain all the information outlined above but the exact arrangement of the text is at the discretion of the Designated Authority.

**Form SC –6**

## APPENDIX V

## SPECIFICATION FOR LABELS

(Vide Rule 7(b))

Shape and Size: Rectangular 12cm x 7cm with square corners.

Colour: Colour of label shall be as prescribed in N, B, under sub-rule 7(c).

Name of the Scheme: Shall be printed with black background vertically within 2cm of one end on both sides. Eyelet for binding thread will be within 2cm of other end at its mid point.

Name shall be: "Scheme for Certification of Forest Reproductive Material in India".

Prescribed information: On obverse side.

Address of Designated Authority: (to be printed)

Category: (to be printed)

Source identified/Selected/Seed Orchard/Tested

For Yellow Green Pink Blue label

Species (to be filled in):

Sub-species, variety, cultivar name

Seed zone Stand number Orchard number

(for Yellow label) (for green label) (for pink label)

Tested stand or orchard

Reference number of the certificate and date:

Quantity _____Kg.

Reverse side will have space for Consignee's address.

N.B.: - 1. Label will bear form No. SC -6 (a) to (d)

2. Specimen labels are appended.

**Form SC –6(a)**

1) **Address of Designated Authority :**
2) **Category :** **Source identified**
3) **Species :**
4) **Sub-Species Variety, Cultivar Name :**
5) **Seed Zone :**
6) **Reference Number of the Certificate and Date :**
7) **Quantity :** **_____KGs.**

Scheme for Certification of Forest Reproductive Material In India

**Form SC –6(b)**

1) **Address of Designated Authority :**
2) **Category : Selected**
3) **Species :**
4) **Sub-Species Variety, Cultivar Name :**
5) **Stand number :**
6) **Reference Number of the Certificate and Date :**
7) **Quantity : _____KGs.**

Scheme for Certification of Forest Reproductive Material In India

Green

**Form SC –6(c)**

1. **Address of Designated Authority :**
2. **Category : Seed Orchard**
3. **Species :**
4. **Sub-Species Variety, Cultivar Name :**
5. **Orchard Name:**
6. **Reference Number of the Certificate and Date :**
7. **Quantity : _____KGs.**

Scheme for Certification of Forest Reproductive Material In India

Pink

**Form SC –6(d)**

1. **Address of Designate d Authority :**
2. **Category : Tested**
3. **Species :**
4. **Sub-Species Variety, Cultivar Name :**
5. **Tested Stand or Orchard :**
6. **Reference Number of the Certificate and Date :**
7. **Quantity : _____KGs.**

Scheme for Certification of Forest Reproductive Material In India

Blue Label

Back page of all the forms 6a, 6b, 6c, and 6d

| | |
|---|---|
| Scheme for Certification of Forest Reproductive Material In India | **To,**<br><br>……..<br>……..<br>……..<br>…….. |

## APPENDIX – VI

## PERFORMANCE FOR COMPILATION AND CIRCULATION OF INFORMATION ON APPROVED BASIC MATERIAL

(Vide Rule 4)

Proformae given at the end of this appendix will be used for compilation and circulation of the information on the basic material in the manner stated below:

A. SOURCE IDENTIFIED MATERIAL:

Seed Zone maps and statement showing availability of various species in various seed zones have been finalized for some of the States. These will be circulated shortly by the Project.

N.B.: - Form SC-7 gives the format used for this compilation.

B. SELECTED REPRODUCTIVE MATERIAL:

(i) Information about approved selected stands (Seed Production Areas) will be compiled in form SC-8 and communicated to the Project for circulation to other States.

(ii) Detailed information will also be compiled in respect of each of the Seed Production Areas in form SC-9 by the state Designated Authority and communicated to the Project. This information will be kept in the offices of Designated Authority and Geneticist of the State concerned and also in the officers of the Project Coordinator and the Team Leader concerned and shall become readily available for reference even though not circulated.

C. SEED ORCHARD MATERIAL

(i) Plus Trees: (a) Information about plus trees selected in each state will be compiled in Form SC-10 and communicated to the Project for circulation to other States.

(b) Detailed information about each of the plus trees will be compiled by the State Designated Authority in form SC-11 and will be made available to the Project. This information shall be kept in offices of the Designated Authority or Geneticist of the

State concerned and also in the offices of the Project Coordinator and the Team leader concerned and shall be readily available for reference.

(ii) Seed Orchard/Germ Plasm Banks: (a) Information about the seed orchards and Germ Plasm Banks will be compiled in Form SC-12 and communicated to the Project for circulation to the States.

(b) Detailed information about each of the Seed Orchard or Germ Plasm Banks will be compiled in Form SC-13 by the authority incharge and will be made available to the Project. This information will be kept in the offices of the Designated Authority and/or Geneticist concerned and also in the offices of the Project Coordinator and the Team leader concerned and shall be readily available for reference.

## D. TESTED REPRODUCTIVE MATERIAL

No forms are being prescribed for the time being to deal with this category. Forms will be designed as soon as necessity arises.

N.B.: Samples of Form SC-9, SC-11 and SC-13, which have specially been designed for SYSCON visualizor, are appended.

**Form No. SC-7**

**Seed Zone wise Distribution of Species**

State : ……

| Seed Zone No. | Forest Division | Forest Types (Division wise) | Altitudinal Limits* | Species Availability | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Botanical name of species | | | | | | |
| | | | | | | | | | | |
| 1 | 2 | 3 | 4 | (i) | (ii) | (iii) | (iv) | (v) | (vi) | (vii) |
| | | | | | | | | | | |

REFERENCES:

Altitudinal Limits: Please give here minimum and maximum altitude of the forest areas in the division concerned to help in subdividing seed zones into sub-zones on the basis of altitude.

It is hoped that sub-division of the seed zone into sub-zones on the basis of altitude will render each sub-zone into more homogeneous ecological unit.

Sub-Zones based on 600m, interval i.e., altitude between 0-600m, 601-1200m, 1201-1800m, etc, will each form separate sub-zone for purposes of seed certification.

Species Availability: Indicate the availability of species division wise with following symbols.

P = Predominant, R = Rare, F = Frequent, A = Absent, O = Occasional, PL = Planted.

Form SC-8

**Forest For Seed Production Area Register**

Species : …….  State ……

| Sl. No. | Seed Zone | Division | Range | Block & compartment. | Year of Selection/formation | Estimated age at time of formation | Site Qty. | Area in hect. | Average or range of annual seed/fruit/cone prod (kg.) | No. of seed bearers | Treated/un-treated | Stand Regn. No. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | |

**Form SC-9**

**Format for Plus/ Tree Register**

Species : …….  State ……

| Sl. No. | Seed Zone | Division | Range | Block & compt. | Date of final selection | Height in Mts. | Girth at b.h. | Clear bole ht. | Crown diameter | Purpose of selection | Regn. No. | Progency test done/not done |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | |

INDO-DANISH PROJECT ON SEED PROCUREMENT AND TREE IMPOROVEMENT, HYDERABAD

**Sheet No. 1** | **SEED PRODUCTION AREA RECORD FORM** | **FORM No. SC.9**

STATE : SPECIES

YRS OF EXPLOITATION AS PER W.P.

FOREST TYPE:

ORIGIN: INDIGENOUS*/INTRODUED*

GENERATION:VIRGIN*/NAT. REGENERATION*/PLANTED* DELETE WHAT IS NOT APPLICABLE

STAND DESCRIPTION & SELECTION CRITERIA

ISOLATION :

LOCATION MAP

| SEED ZONE | DIVISION & RANGE | BLOCK & COMPT | YEAR OF SELECTION / FORMATION | EST. AGE AT TIME OF FORMATION | SITE QLT. | AREA IN HCT. | AV. OR RANGE OF ANNUAL SEED / FRUIT/CONE PROD (KG.) | No. of SEED BEARERS | TREATED / UNTREATED | STAND REGN No. |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | |
| | | | | | | | | | | |
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| SEED PRODUCTION AREA RECORD FORM | |
|---|---|
| **SOIL :** | |
| **TOPOGRAPHY :** | |

| | JAN. | FEB. | MAR. | APR. | MAY. | JUNE | JULY | AUG. | SEPT. | OCT. | NOV. | DEC. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **MONTHLY REAINFALL IN MM.** | | | | | | | | | | | | |
| **MAX. TEMPERATURE IN $^{O}$C :** | | | | | | | | | | | | |
| **MIN. TEMPERATURE IN $^{O}$C :** | | | | | | | | | | | | |
| **MAX HUMIDITY IN %** | | | | | | | | | | | | |
| **MIN HUMIDITY IN %** | | | | | | | | | | | | |

| | |
|---|---|
| | |
| **DATE OF SELECTION :** | |
| **SELECTED BY :** | |
| **APPROVED BY:** | |
| **DATE OF APPROVAL :** | |
| **OPERATION CARRIED OUT AT FIRST FORMATION :** | |
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| INDO-DANISH PROJECT ON SEED PROCUREMENT AND TREE IMPOROVEMENT, HYDERABAD | **Sheet No. 2** | **SEED PRODUCTION AREA RECORD FORM** | **FORM No. SC.9** |
|---|---|---|---|
| | STAND TREATMENT RECORD | | STAND REGISTERATION NO. |
| | OPERATION DATE : | 20……. 20……. 20……. 20……. 20……. 20……. 20……. 20……. 20……. 20……. 20……. 20……. | |
| | AREA : | | |
| | AGE : | | |
| | NO. OF TREES RETAINED : | | |
| | CROP HEIGHT IN METERS : | | |
| | FERTILIZER APPLICATION : | | |
| | (*) | KG./TREE | |
| | (*) | KG./TREE | |
| | (*) | KG./TREE | |
| | (*) | KG./TREE | |
| | FLOWER RATING : | | |
| | CROP RATING (SEED ETC) | | |
| | OTHER OPERATIONS | | |

## SEED PRODUCTION AREA RECORD FORM

**SEED COLLECTION :**

| AREA OF COLLECTION | NO. OF MOTHER TREES | MONTH /YEAR | QTY. IN KG. | SEED LOT No. | QTY/HECT | VIABILITY | GERMINATION % | DELIVERED TO | REMARKS |
|---|---|---|---|---|---|---|---|---|---|
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REF. TO TESTS /EXPTS

**Form SC-12**

## Format For Seed Orchard Register

Species : …….  State ……

| Sl. No. | Seed Zone | Division | Range | Block & compt. | Year of planting | Area planted in hect. | Spacing in mtrs. | No. of rametes | No. of clones | Seed orchard Regn. No. | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | |