



**ROYAL GOVERNMENT
OF BHUTAN**

"Walking the Extra Mile"



SEED RULES AND REGULATIONS OF BHUTAN, 2006

**MINISTRY OF AGRICULTURE
THIMPHU BHUTAN**

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PREAMBLE

Whereas, the Seeds Act of Bhutan, 2000 under Section 21.2 empowers the Ministry of Agriculture to adopt Seed Rules and Regulations to administer the Act and implement the provisions contained therein;

Recognizing that within the purview of the Act, Ministry of Agriculture shall facilitate timely availability and ensure high quality seeds and planting materials of superior varieties of crops with a view to increasing the production of crops, farmers' productivity, per capita farm incomes and export earnings;

The Ministry of Agriculture hereby adopts this Seed Rules and Regulations.

1 TITLE, EXTENT, AND COMMENCEMENT

- i) This Rules and Regulations shall be called the Seed Rules and Regulations of Bhutan, 2006.
- ii) It shall extend to the whole of the Kingdom of Bhutan.
- iii) It shall come into force from the date specified in the notification of enforcement issued by the Minister for Agriculture.

2 DEFINITION OF TERMS

For the purpose of this rules and regulations, the following terms shall have the meanings ascribed to them in this section, unless the context clearly requires otherwise:

- i) "*Business*" means business pertaining to seed of notified kind or variety and shall include carrying on the business of selling, keeping for sale, offering to sell, bartering or otherwise supplying seeds of any notified kind or variety
- ii) "*Certified Seed*" includes all seeds as shall have been inspected during their period of growth and preparation for market by BAFRA, and found to conform to the requirements of the laws and regulations governing seed certification in the Kingdom and therefore certified; or such seeds as shall have been certified by a recognized foreign seed certification agency subject to the requirements of the laws and regulations governing seed certification in the kingdom.

- iii) “*Foreign Seed Certification Agency*” means any seed certification agency of a foreign country recognized in accordance with Section 6 (VII) of the Rules and Regulation.
- iv) “*Genetically Modified Organism*” include seeds genetically engineered/modified or produced from transgenic plants.
- v) “*Kind*” means one or more related species or subspecies which singly or collectively is known by one common name, for example, corn, wheat, oats, alfalfa, and paddy.
- vi) “*Labeling*” includes all labels, and other written, printed or graphic representations, in any form whatsoever, accompanying and pertaining to any seed whether in bulk or in containers, and representations on invoices.
- vii) “*Mixture*” or “*Mixed*” Seeds means those consisting of more than one kind or variety when each is present in excess of the levels prescribed in Minimum Standards for Seed and Planting Material Certification guidelines.
- viii) “*Minimum Standards on Purity and Germination of Seed*” means the minimum standards of germination and purity specified in pursuance of Section 5 of the Rules and Regulations.
- ix) “*Notified Kind or Variety*” means any kind or variety notified under Section 3 (IX) of The Seed Rules and Regulations.
- x) “*Seed Certification Agency*” means the seed certification agency established under Section 6 of the Rules and Regulations.
- xi) “*Seeds*” means any planting materials used for sowing or planting, and includes seeds of food, feed, oilseed, forages, vegetable crops, tubers, bulbs, rhizomes, roots, cuttings, all type of grafts and other vegetatively propagated material of food and fiber.
- xii) “*Sample*” means randomly selected representative samples of the total seeds of the specific kinds / varieties.

xiii) “*Treated.*” means the seed has received an application of a substance, or that the seed has been subjected to a process, for which a claim is made.

xiv) “*Variety*” means subdivision of a kind characterized by growth, yield, plant, fruit, seed, or other characteristics, by which it can be differentiated from other plants of the same kind. Variety should be distinct, uniform and stable.

3 MANAGEMENT

I) National Seed Board (NSB)

As provisioned in The Seeds Act of Bhutan 2000, Chapter II, Section 3, the Ministry of Agriculture has established a National Seed Board (NSB) to advise on matters arising out of the administration of the Act and to carry out the functions assigned to it.

II) Members

The NSB is constituted with the following membership:

a) Members

- I. Hon’ble Minister, MoA, Chairman
- II. Hon’ble Secretary, MoA
- III. Director General, DoF
- IV. Director, DoA
- V. Director, DoL
- VI. Director, CoRRB
- VII. Executive Director, BAFRA
- VIII. Managing Director, DSC
- IX. Chief Research Officer, CoRRB (Member Secretary)
- X. Two representatives of progressive farmers/seed growers/farmers’ organizations
- XI. Three subject matter specialists: Plant breeder, plant pathologist, agronomist, etc.

III) Functions of NSB

- a) Advise the Ministry of Agriculture regarding notification of such kinds/varieties for which it thinks it has become necessary or expedient to regulate the quality of seeds
- b) Recommend procedures and standards for certification, tests and analysis of seeds
- c) Advise the MoA on the minimum standards of germination and purity of seeds for those kinds/varieties brought under the purview of the Seeds Act
- d) Recommend to the MoA the suitability of any Seed Certification Agency established in any foreign country for the purpose of the Seeds Act
- e) Approve the rate of fee to be charged for analysis of samples by the Central Seed Testing Laboratory and for certification by the Seed Certification Agency
- f) Advise the MoA regarding the suitability of seed testing laboratories
- g) Ensure that proper records of all released, registered, and notified varieties/kinds of seeds are maintained
- h) Ensure that all private seed companies interested in seed enterprise and variety development are registered
- i) Carry out such other pertinent functions that are supplemental, or consequential to any of the functions conferred by the Seeds Act of Bhutan, 2000
- j) NSB may constitute committees to fulfill its functions

IV) NSB Rules of Procedures

- a) NSB shall convene a meeting only if a minimum of two-third members are present.
- b) The NSB shall make bylaws, rules of procedures; fix the quorum and conduct of all businesses that it transacts.
- c) NSB shall convene the meeting annually.
- d) In circumstances, when members are not able to attend, suitable candidate can be nominated by the concerned members and get approved from the Chairman prior to meeting.

V) Variety Release Committee (VRC)

As provisioned in the Seeds Act of Bhutan, 2000, Chapter II, Section 3.4, the NSB shall constitute a Variety Release Committee (VRC) for the purpose of assessing new varieties for release, and recommending notification of varieties.

VI. Functions of VRC

The specific functions of VRC are to:

- a) Establish and adopt standard procedures for release of a variety
- b) The VRC will scrutinize variety release proposals and formally accept for release or reject proposals
- c) The Member-Secretary may invite proposals within a time frame for release as per prescribed Performa in Annexure I.
- d) Propose all the released varieties for notification to the National Seed Board in the prescribed format
- e) Facilitate Bhutan Agriculture Food Regulatory Authority (BAFRA) to enlist and update as and when necessary a comprehensive list/records of released and notified varieties in the country
- f) Propose for de-notification of obsolete varieties from national list so that their maintenance and seed multiplication is no longer required, but ensure that the germplasm is maintained in the national genebank of National Biodiversity Center (NBC).
- g) Establish guidelines for considering varieties introduced from public and private programmes, and determine whether to release them as per existing variety release guidelines.
- h) VRC Meeting will be convened annually.

VII) VRC Membership

The VRC is constituted with the following members:

I.	Director, CoRRB	Chairperson
II.	CRO/Joint Director, CoRRB	Member secretary
III.	CRCO/Joint Director, CoRRB	Member
IV.	Joint Director, DoA	Member
V.	Joint Director, DoL	Member
VI.	Joint Director, DoF	Member
VII.	Program Director, RC Bajo	Member

VIII.	Program Director, RC Yusipang	Member
IX.	Program Director, RC Jakar	Member
X.	Program Director, RC Wengkhar	Member
XI.	Program Director, NPPC	Member
XII.	Program Director, NSSC	Member
XIII.	Program Director, NBC	Member
XIV.	Program Director, NFFDP	Member
XV.	Technical Specialists (need based)	Member

Observers:

- A. Representative from BAFRA
- B. Representative from DSC

VIII) Procedure for release of varieties

- a) The proposals for release of variety shall be forwarded to the member secretary in the prescribed format as in Annex I, who will convene a meeting of VRC members with the approval of the Chairperson.
- b) The proposed variety should be distinct, uniform and stable as specified in The Biodiversity Act of Bhutan, 2003, Chapter 3, Part I, Section 13 and 14.
- c) Any new variety for which plant variety protection is granted under Chapter 3 (*Sui Generis System*) of the Biodiversity Act, 2003, should be submitted for release and notification.
- d) The proposed variety should be superior over the existing varieties in respect of yield or resistance to pests/diseases or quality characteristics or its suitability for a specific cropping system or growing environment
- e) VRC shall regularize all released varieties including the existing and new as notified kinds or varieties
- f) VRC shall formally accept/reject for seeds for release

IX) Notification of varieties

- a) Notification shall apply to the following two categories of varieties:
 - i) Any kind of variety, either introduced or traditional, which is grown on a commercial scale,

and if VRC is of the opinion that it is necessary or expedient to regulate the quality of seed in public interest.

ii) All crop varieties released by VRC are also considered notified

b) The Minister of Agriculture, in exercise of the power vested under Chapter II, Section 4 of The Seeds Act of Bhutan, 2000, shall notify kinds or varieties of seeds in the kingdom on the recommendation of the NSB

X) Procedure for notification of varieties

- a) VRC shall submit varieties to the NSB for approval for the purpose of notification. The NSB after considering all facts may or may not recommend the notification of such varieties wholly or partially.
- b) VRC shall formally accept/reject seeds for notification

XI) Registration of varieties/seeds and seedlings

- a) Bhutan Agriculture Food Regulatory Authority (BAFRA) shall be responsible for opening & maintaining central registry of all the seed growers in the country. The registration procedure should be followed as per Annexure IV.
- b) BAFRA shall be responsible for opening and maintaining a central registry of all varieties, seeds and seedlings, which have been released/notified/de-notified.
- c) The Member Secretary of VRC, whenever a variety or kinds are released/notified/ de-notified upon approval by NSB, will submit a list of varieties to BAFRA as per Section 3 (XII) c below.

XII) National Lists of notified kinds or varieties of seeds

- a) The member secretary of VRC, will update, as and when necessary, a national list of all notified kinds or varieties of seeds, in the kingdom as provided in Annex II.

- b) The names of breeding line / common names / local names should be used to identify notified kinds or varieties of seeds in the national list
- c) The updated list shall be provided to BAFRA

4 REGULATION OF SEED SALE

I) Domestic

Notwithstanding the possession of trade license to carry on seed business, any person either by himself or by any other person on his behalf shall not carry on the business pertaining to seed of notified kind or variety except under the circumstances mentioned below;

- a) The seed is identifiable to its kind or variety
- b) The seed conforms to the seed standards including the minimum limits of germination and purity as prescribed in the Minimum Standards for Seed and Planting Materials guidelines.
- c) The label on the container of such seed shall bear in writing;
 - i) The kind or variety to which the seed belongs
 - ii) Purity percentage,
 - iii) Germination percentage
 - iv) Viability Period of seed
 - v) Date of packaging
 - vi) Seed treatment, if any
- d) The seed for commercial purpose should be registered with BAFRA
- e) Seeds of identified varieties which are applied for variety protection shall follow the provisions of Chapter III (*Sui Generis System*) of The Biodiversity Act of Bhutan, 2003.
- f) This regulation shall not apply to farmers engaged in small-scale exchange and local sale of their traditional varieties, unless notification is applied as per Section 3, (ix), a
- f) Other requirements as may be prescribed by NSB from time to time.

II) Import of Seed

In accordance with the power vested upon Ministry of Agriculture by Seed Act of Bhutan 2000, Chapter 3, Section 21.1, the following rules and regulations has been established to regulate import of seeds.

- a) Subject to the provisions specified in sub-section b, c, d, e & f below, import of seed shall be allowed for;
 - i) Commercial purpose,
 - ii) Private Growers,
 - iii) Research Purpose,
 - iv) For multiplication and re-export,

Provided, it meets the requirements of Plant Quarantine Act of Bhutan, 1993, Plant Quarantine Rules and Regulation, 2003, The Biodiversity Act of Bhutan 2003 and other applicable laws.

- b) Import of seeds will require a permit granted by BAFRA.
- c) Import of genetically modified seeds has to comply with the National Regulatory Framework on Biosafety.
- d) No limitation will be imposed on the quantity of seeds that is imported into the country provided the consignment complies with the following:
 - i) Name and main characteristics of the kind or species/varieties.
 - ii) Name and address of exporter with country/place of origin, and agency responsible for its certification.
 - iii) The name and address of importer.
 - iv) Intended purpose of the imported seeds meet all the requirements referred in Plant Quarantine Act 1993 and Plant Quarantine Rules and Regulations of Bhutan 2003.
 - v) Except for research purposes, import of seeds of non-notified kinds or varieties shall be prohibited.
 - vi) Seeds of non-notified variety imported for multiplication and re-export will require approval from VRC prior to importation of such seeds
 - vii) Seeds imported and multiplied for re-export cannot be sold locally.
 - viii) Seeds of notified kind or variety, if imported for direct sale into the country should meet the Minimum Standards for Seed and Planting Materials for certification

- e) Import of seeds/planting materials of forestry tree and ornamental plant species listed in Annexure VI and VII, respectively, shall be allowed provided it meets all the requirements specified in II (a, b, c, d) above.
- f) Import of forestry tree and ornamental species not listed in Annexure VI and VII shall be considered case by case.

III) Export of Seed

- a) After the arrival of consignments at the approved point of entry, samples will be subjected to quarantine inspection as per the Plant Quarantine Act 1993 and Plant Quarantine Rules and Regulations.
- b) All varieties shall be allowed to be exported provided it meets the minimum seed standards of the importing country subject to Sub-sections c, d, e, f & g below.
- c) Export of seeds will require a phytosanitary certificates granted by BAFRA.
- d) All varieties / kinds for export have to undergo testing and certification procedures.
- e) Export of local, indigenous genetic resources will be governed by the Biodiversity Act of Bhutan 2003.
- f) Export of seed for which plant variety protection is granted under Chapter 3 (*Sui Generis System*) of the Biodiversity Act, 2003, shall be subjected to the rights conferred to the breeder under Section 16 and 17 of the Biodiversity Act, 2003.
- g) No seed shall be imported to or exported from Bhutan, except through the official points of entry designated under Plant Quarantine Rules and Regulations, 2003.

IV) Implementation

Regulation and inspection of seed of notified kind or variety shall be conducted by BAFRA as per the guidelines prescribed in the Minimum Standards for Seed and Planting materials Standards

5 SEED STANDARDS

- i) As provisioned in The Seeds Act of Bhutan, 2000, Chapter II, Section 5, the VRC shall fix and revise the minimum standards for seeds with respect to seed of any notified kind or variety.
- ii) BAFRA shall ensure sale of such seeds be properly packaged, marked and labeled in conformity to minimum seed standards.
- iii) Member Secretary shall through VRC revise the existing minimum standards for seeds as deemed necessary.

6 SEED CERTIFICATION

I) Seed Certification Agency

The Bhutan Agricultural and Food Regulatory Authority (BAFRA) shall be the Seed Certification Agency established by the MoA in pursuance of Section 7 of the Seeds Act of Bhutan 2000.

II) Procedure for Seed Certification

- a) The applicant shall submit an application for certification to BAFRA in the format provided in Annexure V
- b) BAFRA shall conduct field visits to ensure and verify that the prescribed seed standards are met.
- c) BAFRA shall conduct sample testing to examine if the seed standard requirements including the minimum limits of germination and purity are met.
- d) BAFRA shall monitor and evaluate the quality of certified seeds

III) Grant of Seed Certification

- a) In the event, the seed standard requirements including the minimum limits of germination and purity are fulfilled, BAFRA shall grant a certificate.
- b) The certificate shall, among other things, provide the duration for which the certificate shall be valid.

IV) Fixation of Certification Fee

- a) National Seed Board (NSB) shall fix the certification fee.
- b) Considerations including the market value of the seed need for promotion of seed industry and recovery of the service costs shall determine the amount of certification fee
- c) Certification fees fixed by NSB shall form an integral part of the Rules and Regulations of this Act.
- e) BAFRA may with the approval of the NSB change the amount of the certification fee periodically.
- f) The Seed Inspectors shall be responsible to ensure and report that any business pertaining to seed of notified kind or variety that is certified are in compliance with the certification procedures.
- g) Along with the application the applicant shall pay a certification fee of Nu. 10.

V) Revocation of Certificate

Where it is found that;

- a) The applicant, without reasonable cause, has contravened the conditions subject to which the certificate was granted or,
- b) The certificate is obtained by misrepresentation of an essential fact either in the application or by other means inconsistent with the Seeds Act of Bhutan 2000, and Rules and Regulations or,
- c) The applicant has contravened any of the provisions of the Act or the Rules and Regulations,

BAFRA shall after giving an opportunity of showing cause, revoke the certificate.

VI) Appeal

- a) The National Seed Board shall be the appellate authority for the purpose of grant of certificate under Section 6(III) and revocation of certificate under Section 6(V).

- b) Any aggrieved person may appeal against the decision of BAFRA.
- c) The appellant shall, within 30 days from the date on which the decision is communicated to him by BAFRA, prefer an appeal to the National Seed Board
- d) If the National Seed Board is satisfied that the appellant is prevented by sufficient cause from filing the appeal in time, the National Seed Board may entertain the appeal even after the expiry of thirty days
- e) In the exercise of appellate authority the National Seed Board shall give adequate opportunity to the appellant of being heard. The appellate authority shall dispose the appeal as expeditiously as possible.
- f) The decision of the appellate authority shall be final and binding.

VII) Recognition of Foreign Seed Certification Agency

- a) BAFRA shall allow import of seed certified by recognized foreign seed certification agency provided such seeds are of notified kinds and meets requirements of Plant Quarantine Rules and Regulations, 2003 and other applicable laws.
- b) BAFRA shall be the responsible agency to maintain the list of recognized foreign seed certification agencies.

7 SEED INSPECTION

I) Seed Inspectors:

- a) Seed Inspector shall be a public official for the purpose of implementing Seed Rules and Regulations, and shall be officially subordinate to BAFRA
- b) BAFRA shall subject to approval of the Ministry of Agriculture/RCSC, appoint the Seed Inspectors
- c) A person should have a minimum qualification of Diploma in Seed Science or equivalent to be a seed inspector
- d) The Seed Inspectors shall exercise such powers conferred by the Rules and Regulations.
- e) A quarantine inspector of BAFRA may also have a dual responsibility as a seed inspector under the same organization

- f) A Seed Inspector shall while on duty carry an official identification tag/card, which should be produced during inspection.

II) Powers of Seed Inspectors

In accordance with Section 15.2 of the Seed Act 2000, the Seed Inspector may;

- a) Take sample of any seed of notified kind or variety from;
 - i) Any person selling such seed; or
 - ii) Any person who is in the course of conveying, delivering or preparing to deliver such seed to a purchaser or a consignee; or
 - iii) A purchaser or a consignee after delivery of such seed to him.
- b) Enter and search at all reasonable times, any building premises or structure in which he believes that the evidence of commission of an offence under the Seed Act 2000 is likely to be found, after obtaining a search warrant from the nearest court of law.
- c) Order in writing the person in possession of any seed in respect of which the offence has been, or is being committed, not to dispose of any stock of such seed for a specific period not exceeding thirty days or, unless the alleged offence is such that the defect may be removed by the possessor of the seed, or seize the stock by giving receipt
- d) Examine any record, register, document or any other material object found in any place mentioned in Sub-Section 7(II)b above and seize the same, if he has reason to believe that it may be helpful in establishing the commission of an offence punishable under the Seed Act 2000. The Seed Inspector shall inform BAFRA of such a seizure
- e) Break-open any container in which any seed of any notified kind or variety may be contained or the door of any premises, where any such seed may be kept for sale, provided that the power to break-open the door shall be exercised only after the owner or any other person in occupation of the premises, refuses to open the door on being called upon to do so.

- f) Execute such other powers as may be necessary for carrying out the functions assigned under the Seeds Act of Bhutan, 2000.

III) Procedure of Seed Inspection by sample testing

In accordance with Section 16 of the Seed Act 2000, when a Seed Inspector intends to take a sample of any seed of any notified kind or variety for analysis under the circumstances mentioned in Section 7(II), he shall;

- a) Give a notice in writing of such intention to the person from whom he intends to take the sample.
- b) Take three representative samples of reasonable quantity of the consignment *not exceeding* 10% of the total amount of the seed stock.
- c) Seal and mark each of the samples and package them using appropriate material. The particulars such as the type of seed sample, the variety, the date when sample is taken, the Dzongkhag, gewog, chiwog from where the sample is taken including the purpose for what intention the sample is being taken should be included.
- d) All three samples shall bear the seal and signature of both the seed inspector and the vendor/person from whom the seed sample is taken in a manner that can be detected if the seal is broken or tampered.
- e) Out of three samples taken under Section 7(III)b, the Seed Inspector shall;
 - i) Deliver one sample to the person from whom it has been taken
 - ii) Send in the prescribed manner one sample for analysis to the Central Seed Testing Laboratory for analysis; and
 - iii) Retain the third sample in the prescribed manner for production in case any legal proceedings are initiated.

IV) Central and Referee Seed Testing Laboratory

- a) The Minister of Agriculture under the powers conferred by Section 12 of Seed Act of Bhutan, 2000 hereby declare

BAFRA's Seed-Testing Laboratory at Yusipang as the Central Seed Testing Laboratory. The Minister shall as per Section 13 of the Seed Act 2000 declare a Referee Seed Testing Laboratory on the recommendation of the NSB.

- b) The Central Seed Testing laboratory will charge a recommended seed testing fee of Nu. 100 per sample if the test is conducted for the seed company/agencies for any purposes other than the samples submitted by the certification agency (Seed Inspector, BAFRA) for purposes of seed quality regulation.
- c) NSB shall identify any of the Seed Testing Laboratory in the neighboring country, which is accredited to ISTA as a referee Laboratory.
- d) The Referee Seed Testing laboratory shall charge seed testing fee from the appellant.
- e) The fees will be subject to revision with the approval of National Seed Board from time to time.
- f) Central Seed Testing Laboratory of BAFRA shall do analysis of seeds in a standard procedure for the purpose of certification to ensure that the prescribed minimum seed standards are met.
- g) The procedures of testing seed should comply with the standards recommended by ISTA (International Seed Testing Association).
- h) The results of seed sample analysis or tests conducted by central seed testing laboratory shall be communicated as under section 17 of Seed Act of Bhutan, 2000 with a copy each of the analysis report sent to Seed Inspector and the person from whom the sample has been taken. By arrangement, in urgent situations, results can be conveyed to the inspector by phone or fax.

V) Report of the Seed Testing Laboratory

- a) If the report of the Central Seed Testing Laboratory reveals that the seed sample does not conform to the prescribed minimum seed standards, the vendor may be penalized depending on the nature of the offences prescribed in Section 8 of the Rules and Regulations.
- b) On request and upon payment of the prescribed fee by the accused, the third sample can be sent to referee laboratory for analysis by the court, provided it is satisfied that the sample is intact and is not

tampered with. Such sample shall be dispatched under the seal of the Court.

VI) Procedure for Dispute Management

- a) On disagreement of the laboratory analysis, the accused can express his concern to court in writing.
- b) If there is a written request along with payment of prescribed fee from the accused to send sample mentioned under Section 7(V) b to Referee Laboratory for re-examination of the sample, court may dispatch such sample under seal of court provided it is satisfied that sample is not tampered with and is intact.
- c) Referee Laboratory shall conduct analysis of seed samples in a standard procedure based on the instruction of the court under its seal.
- d) The appellant shall deposit Nu. 1000/- as an advance to the court being the cost of sample analysis. The court shall remit the amount to the designated Referee Laboratory. Any additional cost for the analysis of the samples levied by the Referee Laboratory should also be borne by the appellant.
- e) If the findings of the Referee Laboratory reconfirm the findings of central seed testing laboratory, the appellant shall be punishable for violation of petty misdemeanor as provided in the Bhutan Penal Code, 2004.
- f) If the findings of Referee and Central Seed testing Laboratory are in disagreement, findings of the Referee laboratory shall prevail.
- g) No suit, prosecution or legal proceeding shall lie against Central Seed Testing Laboratory in respect of anything done or intended to be done in good faith in pursuance of the Act and the Rules and Regulations.

VII) Return of Seized Stock

Whenever a Seed Inspector takes any action under Section 7(VI), he/she shall;

- a) If the sample tested is in compliance with provisions of the Seed Act 2000 and the corresponding Rules, he/she shall

revoke any order passed and take such action as may be necessary for the return of the seized stock.

- b) Without prejudice to the institution of any prosecution and on being satisfied that the possessor of the seed has rectified the defect, if the alleged offence is such that the defect may be rectified by the possessor, revoke the order forthwith passed under the Seeds Act, 2000.

8 OFFENCES AND PENALTY

In pursuance of Section 21.2 of the Seed Act of Bhutan, the Ministry of Agriculture shall provide for offences and penalties.

I) Offenses and Penalties under Section 4: Regulation of Seed Sale, Sub- section I: Domestic Sale

i. Offenses

- a. Selling seeds of notified kinds or varieties that are not in conformity with the minimum seed standards
- b. Selling seeds of notified kinds or varieties without proper labeling as prescribed in Section 4, (i) c
- c. Sale of non-notified seeds on commercial scale

ii. Penalties

- a. In the event of non-compliance for the first time to any of the circumstances referred above, BAFRA shall stop the sale of such seed, and impose a fine equivalent to prevalent market value of the seed involved
- b. In the event of non-compliance for the second time, BAFRA shall confiscate seed stock and impose a fine twice the value of the seed involved.
- c. Non-compliance for three or more times, the person shall be prosecuted in the court of law. Upon conviction he shall be punishable with the offence of petty misdemeanor as per Bhutan Penal Code, 2004.

II) Offenses and Penalties under Section 4: Regulation of Seed Sale, Sub-section II: Import of Seed

i. Offenses

- a. Engaging in a seed trade without a valid permit from BAFRA
- b. Import of seed of non-notified variety or kinds for domestic sale
- c. Domestic sale of seeds that are imported for the purpose of multiplying and re-export
- d. Import of seeds without proper labeling as prescribed in Section 4 (II) c.
- e. The seed imported for direct sale in the country is not in compliance with the minimum seed standard requirements

ii. Penalties

- a. Individual/group/organizations that imports seed without a valid import permit shall be guilty of an offence, and shall be liable to a fine ranging from Nu. 500/- to Nu. 2000/- along with the confiscation of the seed.
- b. If seed of non-notified varieties are imported from outside Bhutan, the offender shall be liable to a fine ranging from Nu. 500/- to Nu. 5000/- depending on the volume of seed being imported. The seed shall be confiscated, denatured, and disposed off by BAFRA.
- c. If the offences (a & b) is committed for more than two times, the individuals/group/organizations shall be prosecuted in the court of law with the offence of petty misdemeanor as per Bhutan Penal Code, 2004
- d. BAFRA shall forfeit the seed if the consignment imported is not properly labeled as specified in Section 4, (ii), d of Seed Rules and Regulations
- e. If the seed imported for direct sale in the country is not in compliance with the minimum seed standards requirements, the seed shall be confiscated by BAFRA.

III) Offenses and Penalties under Section 4: Regulation of Seed Sale, Sub-Section III: Export of Seed

i. Offenses

- a. Export of seed without certification by BAFRA

- b. Import or export of seed from Bhutan through entry points other than that designated in Plant Quarantine Rules and Regulations, 2003.

ii. Penalties

- a. Export of seed without certification by BAFRA shall be liable to a fine of Nu. 1000/-.
- b. Import to or export of seed from Bhutan through entry points other than that designated in Plant Quarantine Rules and Regulations, 2003 shall be liable with a fine of Nu. 1000/-, and forfeiture of seed by BAFRA
- c. Commission of offenses a and/or b for more than two times shall be prosecuted in the court of law with an offence of petty misdemeanor as per Bhutan Penal Code, 2004.

IV) Offenses and Penalties under Section 6: Seed Certification

i. Offenses

- a. Engaging in seed trade without valid certificate issued by BAFRA
- b. Seed transaction beyond the validity of the certificate

ii. Penalties

- a. Fine of Nu. 1000/- will be imposed upon failing produce valid certificate issued by BAFRA
- b. If seeds are found to be traded beyond the validity of the certificate, such seed shall be confiscated and fine with an amount equivalent to the value of seed involved.

V) Offences and Penalties under Section 7: Seed Inspection

i. Offenses

- a. Whoever prevents the seed inspector from exercising the power or functions conferred under the Act or the Rules and Regulations, herein, shall be guilty of obstruction of lawful Authority

ii. Penalties

- a. For obstructing or resisting search, inspection or seizure by seed inspectors, fine ranging from Nu. 1000/- to 5000/-

shall be imposed depending on the degree of offense

VI) General Violation of Rules or Act

In addition to the offenses described above, any person guilty of an offense under the Seed Act and Seed Rules and Regulations where no specific penalty for such offense is stated in the Act or the Rules shall be subject to a fine of Nu. 1000/- and can extend up to Nu. 20,000/- depending on the gravity of offenses.

9 LIABILITY OF THE SEED INSPECTOR

A seed inspector, who wrongfully and without reasonable cause seizes seed, records or any other material, or for any act beyond the purview of this Rules and Regulations, shall be punishable in accordance with the Royal Civil Service Rules. This shall not preclude his liability as a public official under the Bhutan Penal Code, 2004.

10 PROTECTION OF ACTION TAKEN IN GOOD FAITH

A seed inspector shall not be liable for anything done by him in good faith for the purposes of enforcing this act or otherwise acting in the course of duty unless his manner of exercising his powers is violative and unreasonable of the basic civil rights of individuals.

11 AMMENDMENT

The minister of Agriculture may amend the Seed Rules and Regulations of Bhutan 2006 as and when deemed necessary.

A. Performa for Submission of Field Crop Variety Release Proposal

1. Name of the crop and species:
 - a) Name of the variety tested:
 - b) Proposed name of the variety:
2. Institution or agency developing the variety:
3. Person(s) involved in variety development:
4. Person(s) involved in in-country variety testing:
5. Variety Improvement
 - a). Parents/pedigree:
 - b). Source of materials in case of introduction:
 - c). Breeding methods:
 - d). Breeding objectives:
6. Justification for release
 - a). Specific areas of adaptation:
 - b). Are farmers already growing it, if so what is the area and number of farmers?
 - c) Recommended ecology/agro-ecological zones
7. Yield/performance data
 - a) Yield data in regional/inter-regional/district trials year-wise (level of fertiliser application, density of plant population and superiority over local controls/standard variety to be indicated):
 - b) Yield data from large-scale demonstrations from farmers' fields:

- c) Average yield under normal conditions (kg/ha):
- d) Agency responsible for maintaining breeders seeds:
- e) Quantity of breeders seed in stock:

8. Description of parents (if hybrid)

- a). Plant height: Female: Male:
- b). Distinguishing morphological traits
- c). Days to 50% flowering:
- d). Maturity (range in number of days - seed to seed)
- e). Is there any problem of synchronization? If yes, mention method(s) to overcome it.
- f). Reaction to major disease (under field conditions)
- g). Reaction to major insect pests (under field and controlled conditions including stored pests)
- h) Reaction to stresses

9. Description of variety

- a) Plant height
- b) Distinguishing morphological characteristics
 - Leaf width
 - Blade pubescence
 - Blade colour
 - Base leaf sheath colour
 - Leaf angle
 - Flag leaf angle
 - Culm angle
 - Culm strength
 - Panicle length
 - Panicle type

Panicle exertion
Shattering
Panicle threshability
Awning
Grain length
Grain width
Grain shape
1000-grain weight
Days to 50% flowering

- c) Maturity range in number of days – seed to seed
 - d) Maturity group (early, medium, late etc.)
 - e) Reaction to major diseases under field and controlled conditions
 - f) Reaction to major pests under field and controlled conditions
 - g) Agronomic features (e.g. resistant to lodging and shattering; fertilizer responsiveness; suitability for early or late sown conditions; seed rate etc.)
 - h) Quality of produce of grain, forage/fibre including nutritive value
 - i) Reaction to stresses
10. Information on the acceptability of the variety by farmers, consumers, industry etc.
11. Specific recommendations if any for seed production
12. Any other pertinent information

Signature of the Head of the Institution

B. Performa for Release of Horticulture Crop Varieties

1. Name of crop and species

2.
 - a) Name of the variety under which tested
 - b) Proposed name of the variety

3.
 - a) Institute or agency responsible for supplying variety (address)
 - b) Name of persons who helped in the development of the variety

4.
 - a) Source of material in case of introduction

5.
 - a) Justifications for the release of proposed variety

 - b) Specific areas of its adaptation

 - d) Are farmers already growing it? If so what is the area and number of farmers?

6. Recommended ecology/ agro-ecological zones

7. Description of variety
 - a) Plant height

 - b) Distinguishing morphological characteristics

eg:

Cultivar	Tree/Vine appearance	Bloom time	Self-compatibility	Harvest time	Productivity

- c) Days to maturity
 - d) Reaction to major diseases
 - e) Reaction to major pests
8. a). Agronomic features, quality, reaction to stresses

eg. Fruits characteristics

Cultivars	Shape	Large (mm)	Long (mm)	TSS (%)	Taste

- b) Yield data
9. a) Agency responsible for maintaining breeder seed
- b) Quantity of breeder seed in stock (kg)

10. Information on the acceptability of the variety by farmers/consumers/industry

12. Any other pertinent information

Signature of the Head of the Institution

ANNEXURE II

NATIONAL LIST OF NOTIFIED KINDS OR VARIETIES

I. Field Crops

Variety	Variety/breeding name/original line	Year release	Releasing Agency
RICE			
IR 64	IR 64	1988	RC- Bajo
Milyang 54	Milyang 54	1989	RC -Bajo
IR 20913	IR 20913-B-26-1-2-2-3	1989	RC -Bajo
No 11	No 11	1989	RC -Bajo
			RC -Bajo
BR 153	BR 153-2B-10-1-3	1989	RC -Bajo
BW 293	BG293-2	1990	RC -Bajo
Barket	K-78-13	1992	RC -Bajo
Khangma Maap	Chummro	1999	RC-Wengkhar
Bajo Maap 1	CARD21-10-1-1-3-2-1	1999	RC-Bajo
Bajo Maap 2	CARD21-14-1-1-3-2-1B	1999	RC-Bajo
Bajo Kaap 1	IR61331-2-148-B	1999	RC-Bajo
Bajo Kaap 2	IR61328-1-136-2-1-2-3	1999	RC-Bajo
PP4-8-1-1 (red)	Yusi Ray Maap	2002	RC-Yusipang
PP3-31-2-1 (white)	Yusi Ray Kaap	2002	RC-Yusipang
Khumal-2	Khangma Kaap	2002	RC-Wengkhar
MAIZE			
Yangtsipa	Suwon 1	1992	RC-Wengkhar
Khangma Asom 1	Palmirah8529	1999	RC-Wengkhar
Khangma Asom 2	Suwon8528	1999	RC-Wengkhar
WHEAT			
Sonalika	Sonalika	1988	RC-Bajo
Bajoka 1	HD 2380	1991	RC-Bajo
Bajoka 2	BL1093	1994	RC-Bajo
MINOR CEREALS			
Finger Millet			
3459	Limithang Kongpu-1	2002	RC-Wengkhar
5459	Limithang Kongpu-2	2002	RC-Wengkhar

OILSEEDS			
<i>Mustard</i>			
Type-9	Type-9	1989	RC Bajo
M-27	M-27	1989	RC Bajo
Bajo Peka 1	BSA	1994	RC Bajo
Bajo Peka 2	PT 30	1994	RC Bajo
Mustard green	Khangma Petche-1	2004	RC-Wengkhar
Mustard Green	Khangma Petche-2	2004	RC-Wengkhar
<i>Soybean</i>			
One Daughter	One Daughter	1994	DSC
GC 86018-427-3	Khangma Libi-2	2002	RC-Wengkhar
AGS 258	Khangma Libi-1	1999	RC-Wengkhar

II. Horticultural Crops

Variety/breeding line name/original	Variety	Year release	Releasing Agency
Vegetable			
<i>Potato</i>			
720088	Yusikap	1988	RC-Yusipang
800258	Kufri Jyoti	1989	RC-Yusipang
800048	Desiree	1989	RC-Yusipang
CIP 378015.13	Khangma Kaap	2002	RC-Wengkhar
<i>Beans</i>			
Borloto	Borloto	1990	RC-Bajo
Pusa Parvati	Pusa Parvati	1990	RC-Bajo
Kentucky Wonder	Kentucky Wonder	1990	RC-Bajo
Brothbone	Brothbone	1990	RC-Bajo
Top Crop	Top Crop	1990	RC-Bajo
Rasma	Rasma	1994	
Long John	Long John	1994	
KPS 2	Lingmethang Mung 1	2002	RC-Wengkhar
Barimung	Lingmethang Mung 2	2002	RC-Wengkhar
<i>Cabbage</i>			
Copenhagen Market	Copenhagen Market	1990	RC-Bajo
Golden Acre	Golden Acre	1990	RC-Bajo
Baldura	Baldura	1994	RC-Bajo
Pride of India	Pride of India	1994	RC-Bajo
<i>Cauliflower</i>			
White Top	White Top	1990	RC-Bajo
White Summer	White Summer	1990	RC-Bajo
Progress	Progress	1990	RC-Bajo
Snow Ball-16	Snow Ball-16	1994	RC-Bajo
<i>Chilli</i>			
Sha Ema	Sha Ema	1990	DSC
Hot wax	Hot wax	1990	RC-Bajo
<i>Capsicum</i>			
California Wonder	California Wonder	1990	RC-Bajo
<i>Carrot</i>			
Early Nantes	Early Nantes	1990	RC-Bajo
Chantaney Improved	Chantaney Improved	1990	RC-Bajo
<i>Radish</i>			
Spring Toknashi	Spring Toknashi	1990	RC-Bajo
Minowase	Minowase	1990	NASEPP

Milaysige	Milaysige	1990	NASEPP
Shogoem Shon	Shogoem Shon	1990	NASEPP
Hongkong White	Bajo Laphu 1	2002	RC-Bajo
Tomato			
Roma	Roma	1990	RC-Bajo
Helfruch	Helfruch	1990	RC-Bajo
Nozomi	Nozomi	1990	RC-Bajo
Fusi'3	Fusi'3	1990	NASEPP
Rattan	Bajo Lambenda 1	2002	RC-Bajo
Turnip			
PTWG	PTWG	1990	NASEPP
Local Purple	Local Purple	1990	NASEPP
Greens(Saag)			
Him Beauty	Him Beauty	1990	RC-Bajo
Takama	Takama	1990	NASEPP
Neguna	Neguna	1990	NASEPP
Taisai	Taisai	1990	NASEPP
Bulb Onion			
Senshu Yellow	Senshu Yellow	1990	NASEPP
Nasik Red	Nasik Red	1990	NASEPP
Senshu Red	Senshu Red	1994	NASEPP
Red Creole	Bajogop 1	2002	RC-Bajo
Cardamom			
Bharlangey	Bharlangey	2002	RC-Jakar
Golsey	Golsey	2002	RC-Jakar
Bombay Red	Bombay Red	1999	DSC?
Welsh Onion			
Kujo	Kujo	1990	NASEPP
Ladies Finger/Okra			
Kranti	Ktanti	2004	DSC?
Lettuce			
Great Lake	Great Lake	1990	NASEPP
Sunny	Sunny	1994	NASEPP
Cucumber			
Shabigenchu	Shabigenchu	1990	NASEPP
Santon No. 1	Santon No. 1	1990	NASEPP
Spinach			
All Green	All Green	1990	RC-Bajo
Chinese Cabbage			
Kyoto 1	Kyoto 1	1990	RC-Bajo
Pumpkin			

Ramthang Brumsha	Ramthang Brumsha	1990	NASEPP
Tetsu Kabuta	Tetsu Kabuta	1990	NASEPP
Utsuki Red	Utsuki Red	1990	NASEPP
Brinjal			
Paro Local	Paro Local	1990	NASEPP
Big Round	Big Round	1990	NASEPP
Pusa Purple Long	Pusa Purple Long	1990	RC-Bajo
Pea			
JI 1050	JI 1050	1994	RC-Bajo
Snow pea	Snow pea	1990	RC-Bajo
Garlic			
Local Selection	Local Selection	1990	NASEPP
Celery			
Sort Lake	Sort Lake	1990	NASEPP
Parsley			
Paramount	Paramount	1990	NASEPP
Okra			
Blue Bell	Blue Bell	1994	NASEPP
Pusa Sawani	Pusa Sawani	1994	RC-Bajo
Broccoli			
Desico	Desico/Deccicco	1994	RC-Bajo
Summer Squash			
Zucchini (green)	Zucchini (green)	1994	NASEPP
Fruits and Nuts			
Melon			
Honey Dew	Honey Dew	1990	RC-Bajo
Almonds			
Texas		2004	RC-Bajo
Drake		2004	RC-Bajo
Dhebhar Badhan		2004	RC-Bajo
Kagzi		2004	RC-Bajo
Walnut			
KantheI	KantheI	2004	RC-Yusipang
Yusipang 2	Yusipang-2	2004	RC-Yusipang
Water Melon			
Asahi Yamato	Asahi Yamato	1990	
Grapes			
Muscate of Alexandria		2004	RC-Bajo
Perlette		2004	RC-Bajo
Lime			
Bearrs		2004	RC-Bajo
Rangpur lime (as rootstock)		2004	RC-Bajo
Peach			
Flordasun	Bajokham 1	2002	RC-Bajo
July Elberta	Bajo Kham 2	2004	RC-Bajo
Pear			

Flemish Beauty	Bajo Lea 1	2004	RC-Bajo
<i>Apricot</i>			
New Castle	Bajo Khamchung 1		RC-Bajo
<i>Apple (Scion)</i>			
Red Delicious	Red Delicious	1994	RC-Yusipang
Royal Delicious	Royal Delicious	1994	RC-Yusipang
Golden Delicious	Golden Delicious	1994	RC-Yusipang
Jonathan	Jonathan	1994	RC-Yusipang
Rich Red	Rich Red	1994	RC-Jakar
Lobo	Lobo	2002	RC-Yusipang
Red chief	Red Chief	2004	RC-Yusipang
Red Free	Red Free	2004	RC-Yusipang
Bajo Apple	Anna	2004	RC-Bajo
<i>Root Stock</i>			
MM-106	MM - 106	1994	RC-Yusipang

III. Fodder Crops

Variety	Variety/breeding line name/original	Year release	Releasing Agency
Paspalum Atratum	Paspalum atratum	2002	RC-Jakar
Palisade Grass	Bracharia brizantha	2002	RC-Jakar
Lucerne	Medicago sativa	2002	RC-Jakar
Swede	Brassica napus	2001	RC-Jakar
Oat	FOB	2001	Rc-Jakar
	Naked	2004	RC-Jakar
	Stampede	2004	RC-Jakar
Fodder Beet	Alba	2004	RC-Jakar
Grass	Gautemala	2004	RC-Jakar
White Clover	Trifolium repens	2001	RC-Jakar
Italian Rye grass	Lolium multiflorum	2001	RC-Jakar
Cocks foot	Dactylus glomerata	2001	RC-Jakar
Tall Fescue	Festuca arunidinaceae	2001	RC-Jakar
Willow	Salixbabylonica	2001	RC-Jakar
Molasses grass	Melinis minutiflora	2001	RC-Jakar
Ruzi	Brachiaria ruziensis	2002	Rc-Jakar
Sugarcane	Saccharum officinalis	2002	RC-Jakar
Ficus	Ficus auriculata	2001	RC-Jakar
Fodder peanut	Arachis pintoi	2001	RC-Jakar
Stylo	Stylosanthes guianensis	2001	RC-Jakar
Kikiyu grass	Pennisetum clandestinum	2001	RC-Jakar
Napier	Pennisetum purpureum	2001	RC-Jakar
Greenleaf desomodium	Desmodium intortum	2001	RC-Jakar

List of seed and seedling packaging materials

1. Polythene bags
2. Aluminum foils
3. Cellophane
4. Paper bags
5. Gunny bags
6. Shredded paper (fruit seedlings)
7. Wood shavings (fruit seedlings)

**Registration Procedure of both private and public seed growers /
companies in the country**

- a. An application should be submitted in writing to BAFRA for registration along with an attached copy of their trade license
- b. On acceptance of the application, BAFRA provides a registration number to the proprietor of the nursery/company
- c. The grower / company then provide information on the following for:
 - i. Location
 - ii. Area
 - iii. Type of plants available (names with varieties)
 - iv. Cropping calendar every season to facilitate seed inspectors to carry out their inspection based on phenological stages of plant
 - v. Changes in any of the above-mentioned information
- d. If the nursery growers/company fail to provide above information, the registration will be considered cancelled.

Application Form for Seed Certification

To

I/we, the seed producers, herewith submit an application for issuance of seed certification for the following seed/planting materials as per prescribed standards:

Name and address of applicant

.....
.....
.....

Details of seed/planting materials

Sl. No.	Crop (seed/seedlings)	Variety	Quantity (kg/no.)	Purpose (internal/external supply)
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Duration/validity of the certificate:

.....

Fee for certification:

.....

Signature of applicant

Annexure VI

List of Forestry Tree Species Available in Bhutan

SI No	NAME OF THE SPECIES		SI No	NAME OF THE SPECIES	
1	<i>Abies</i>	<i>densa</i>	35	<i>Albizia</i>	<i>lucidior</i>
2	<i>Acacia</i>	<i>sp.</i>	36	<i>Albizia</i>	<i>gamblei</i>
3	<i>Acacia</i>	<i>auriculiformis</i>	37	<i>Albizia</i>	<i>sherriffii</i>
4	<i>Acacia</i>	<i>catechu</i>	38	<i>Alcimandra</i>	<i>cathcartii</i>
5	<i>Acacia</i>	<i>lenticularis</i>	39	<i>Alnus</i>	<i>nepalensis</i>
6	<i>Acacia</i>	<i>mearnsii</i>	40	<i>Alseodaphne</i>	<i>owdenii</i>
7	<i>Acacia</i>	<i>decurrens</i>	41	<i>Alstonia</i>	<i>scholaris</i>
8	<i>Acacia</i>	<i>farnesiana</i>	42	<i>Alstonia</i>	<i>scholaris</i>
9	<i>Acacia</i>	<i>catechu</i>	43	<i>Altingia</i>	<i>excelsa</i>
10	<i>Acer</i>	<i>sp.</i>	44	<i>Amoora</i>	<i>sp.</i>
11	<i>Acer</i>	<i>campbellii</i>	45	<i>Amoora</i>	<i>rohitooca</i>
12	<i>Acer</i>	<i>laevigatum</i>	46	<i>Amoora</i>	<i>wallichii</i>
13	<i>Acrocarpus</i>	<i>fraxinifolius</i>	47	<i>Annona</i>	<i>reticulata</i>
14	<i>Actinidiaceae</i>	<i>callosa</i>	48	<i>Anogeissus</i>	<i>latifolius</i>
15	<i>Actinidiaceae</i>	<i>strigosa</i>	49	<i>Anthocephalus</i>	<i>cadamba</i>
16	<i>Actinodaphne</i>	<i>obovata</i>	50	<i>Aphanomixis</i>	<i>polystachya</i>
17	<i>Actinodaphne</i>	<i>sikkimensis</i>	51	<i>Aporosa</i>	<i>octandra</i>
18	<i>Adenantha</i>	<i>pavonina</i>	52	<i>Aquilaria</i>	<i>malaccensis</i>
19	<i>Adina</i>	<i>cordifolia</i>	53	<i>Archidendron</i>	<i>monadelpham</i>
20	<i>Aesandra</i>	<i>butyracea</i>	54	<i>Artocarpus</i>	<i>sp.</i>
21	<i>Aesculus</i>	<i>assamica</i>	55	<i>Artocarpus</i>	<i>chama</i>
22	<i>Ailanthus</i>	<i>sp.</i>	56	<i>Artocarpus</i>	<i>heterophyllus</i>
23	<i>Ailanthus</i>	<i>excelsa</i>	57	<i>Artocarpus</i>	<i>hirsuta</i>
24	<i>Ailanthus</i>	<i>grandis</i>	58	<i>Artocarpus</i>	<i>lacucha</i>
25	<i>Ailanthus</i>	<i>integrifolia</i>	59	<i>Azadirachta</i>	<i>indica</i>
26	<i>Alangium</i>	<i>sp.</i>	60	<i>Baccaurea</i>	<i>ramiflora</i>
27	<i>Alangium</i>	<i>alpinum</i>	61	<i>Bambusa</i>	<i>balcooa</i>
28	<i>Alangium</i>	<i>chinense</i>	62	<i>Bauhinia</i>	<i>sp.</i>
29	<i>Albizia</i>	<i>sp.</i>	63	<i>Bauhinia</i>	<i>purpurea</i>
30	<i>Albizia</i>	<i>lebbeck</i>	64	<i>Bauhinia</i>	<i>variegata</i>
31	<i>Albizia</i>	<i>falcataria</i>	65	<i>Bauhinia</i>	<i>malabarica</i>
32	<i>Albizia</i>	<i>julibrissin</i>	66	<i>Beilschmiedia</i>	<i>sp.</i>
33	<i>Albizia</i>	<i>odoratissima</i>	67	<i>Beilschmiedia</i>	<i>dalzellii</i>
34	<i>Albizia</i>	<i>procera</i>	68	<i>Beilschmiedia</i>	<i>gammieana</i>

SI No	NAME OF THE SPECIES		SI No	NAME OF THE SPECIES	
69	<i>Beilschmiedia</i>	<i>roxburghiana</i>	107	<i>Castanopsis</i>	<i>lanceifolia</i>
70	<i>Benthamidia</i>	<i>capitata</i>	108	<i>Castanopsis</i>	<i>tribuloides</i>
71	<i>Betula</i>	<i>sp.</i>	109	<i>Catunaregam</i>	<i>logispina</i>
72	<i>Betula</i>	<i>alnoides</i>	110	<i>Cedrela</i>	<i>sp.</i>
73	<i>Betula</i>	<i>utilis</i>	111	<i>Cedrela</i>	<i>toona</i>
74	<i>Bischofia</i>	<i>javanica</i>	112	<i>Celtis</i>	<i>australis</i>
75	<i>Boehmeria</i>	<i>rugulosa</i>	113	<i>Cephalostachyum</i>	<i>sp.</i>
76	<i>Bombax</i>	<i>ceiba</i>	114	<i>Cephalostachyum</i>	<i>fuchsianum</i>
77	<i>Brassaiopsis</i>	<i>sp.</i>	115	<i>Chimonobambusa</i>	<i>callosa</i>
78	<i>Brassaiopsis</i>	<i>hainla</i>	116	<i>Choerospondias</i>	<i>axillaris</i>
79	<i>Brassaiopsis</i>	<i>hispida</i>	117	<i>Chukrasia</i>	<i>tabularis</i>
80	<i>Brassaiopsis</i>	<i>mitis</i>	118	<i>Cinnadenia</i>	<i>paniculata</i>
81	<i>Bridelia</i>	<i>sp.</i>	119	<i>Cinnamomum</i>	<i>sp.</i>
82	<i>Bridelia</i>	<i>retusa</i>	120	<i>Cinnamomum</i>	<i>bejolghota</i>
83	<i>Bridelia</i>	<i>tomentosa</i>	121	<i>Cinnamomum</i>	<i>glaucescens</i>
84	<i>Bridelia</i>	<i>pubescens</i>	122	<i>Cinnamomum</i>	<i>impressinervium</i>
85	<i>Calamus</i>	<i>sp.</i>	123	<i>Cinnamomum</i>	<i>jaylanicum</i>
86	<i>Calamus</i>	<i>acanthospathus</i>	124	<i>Cinnamomum</i>	<i>tamala</i>
87	<i>Calamus</i>	<i>erectus</i>	125	<i>Cladrastis</i>	<i>sinensis</i>
88	<i>Calamus</i>	<i>tenuis</i>	126	<i>Clerodendium</i>	<i>colebrookeanum</i>
89	<i>Callicarpa</i>	<i>vestita</i>	127	<i>Clerodendium</i>	<i>serratum</i>
90	<i>Callicarpa</i>	<i>macrophylla</i>	128	<i>Cocculus</i>	<i>laurifolius</i>
91	<i>Callicarpa</i>	<i>longiflora</i>	129	<i>Cordia</i>	<i>sp.</i>
92	<i>Callicarpa</i>	<i>arborea</i>	130	<i>Cordia</i>	<i>grandis</i>
93	<i>Callicarpa</i>	<i>sp.</i>	131	<i>Cordia</i>	<i>obliqua</i>
94	<i>Calophyllum</i>	<i>polyanthum</i>	132	<i>Coriaria</i>	<i>napalensis</i>
95	<i>Camellia</i>	<i>kissii</i>	133	<i>Corylopsis</i>	<i>himalayana</i>
96	<i>Camellia</i>	<i>sinensis</i>	134	<i>Corylus</i>	<i>ferox</i>
97	<i>Canarium</i>	<i>sikkimense</i>	135	<i>Crateva</i>	<i>religiosa</i>
98	<i>Carpinus</i>	<i>viminea</i>	136	<i>Croton</i>	<i>himalaicus</i>
99	<i>Carpinus</i>	<i>faginea</i>	137	<i>Croton</i>	<i>tigilium</i>
100	<i>Caryota</i>	<i>urens</i>	138	<i>Croton</i>	<i>roxburghii</i>
101	<i>Cassia</i>	<i>sp.</i>	139	<i>Croton</i>	<i>joufra</i>
102	<i>Cassia</i>	<i>fistula</i>	140	<i>Croton</i>	<i>caudatus</i>
103	<i>Cassia</i>	<i>siamea</i>	141	<i>Cryptomeria</i>	<i>japonica</i>
104	<i>Castanopsis</i>	<i>sp.</i>	142	<i>Cupressus</i>	<i>sp.</i>
105	<i>Castanopsis</i>	<i>hystrix</i>	143	<i>Cupressus</i>	<i>corneyana</i>
106	<i>Castanopsis</i>	<i>indica</i>	144	<i>Cupressus</i>	<i>cashmeriana</i>

SI No	NAME OF THE SPECIES		SI No	NAME OF THE SPECIES	
145	<i>Cyathea</i>	<i>spinulosa</i>	183	<i>Elaeocarpus</i>	<i>varuna</i>
146	<i>Dalbergia</i>	<i>sp.</i>	184	<i>Engelhardtia</i>	<i>spicata</i>
147	<i>Dalbergia</i>	<i>sericea</i>	185	<i>Enkianthus</i>	<i>deflexus</i>
148	<i>Dalbergia</i>	<i>sissoo</i>	186	<i>Eriobotrya</i>	<i>petiolata</i>
149	<i>Dalbergia</i>	<i>latifolia</i>	187	<i>Eriobotrya</i>	<i>bengalensis</i>
150	<i>Dalbergia</i>	<i>rimosa</i>	188	<i>Erycibe</i>	<i>laurifolia</i>
151	<i>Daphniphyllum</i>	<i>sp.</i>	189	<i>Erythrina</i>	<i>sp.</i>
152	<i>Daphniphyllum</i>	<i>chartaceum</i>	190	<i>Erythrina</i>	<i>arborescens</i>
153	<i>Daphniphyllum</i>	<i>himalense</i>	191	<i>Erythrina</i>	<i>stricta</i>
154	<i>Delonix</i>	<i>regia</i>	192	<i>Erythrina</i>	<i>suberosa</i>
155	<i>Dendrocalamus</i>	<i>sp.</i>	193	<i>Eucalyptus</i>	<i>sp.</i>
156	<i>Dendrocalamus</i>	<i>hamiltonii</i>	194	<i>Eucalyptus</i>	<i>camaldulensis</i>
157	<i>Dendrocalamus</i>	<i>nutans</i>	195	<i>Eucalyptus</i>	<i>globulus</i>
158	<i>Dendrocalamus</i>	<i>strictus</i>	196	<i>Euonymus</i>	<i>sp.</i>
159	<i>Dendrocide</i>	<i>sinuata</i>	197	<i>Euptelea</i>	<i>pleiosperma</i>
160	<i>Derbregeasia</i>	<i>wallichiana</i>	198	<i>Eurya</i>	<i>cavinervis</i>
161	<i>Desmodium</i>	<i>oojeinense</i>	199	<i>Eurya</i>	<i>acuminata</i>
162	<i>Dillenia</i>	<i>sp.</i>	200	<i>Eurya</i>	<i>cerasifolia</i>
163	<i>Dillenia</i>	<i>indica</i>	201	<i>Evodia</i>	<i>fraxinifolius</i>
164	<i>Dillenia</i>	<i>pentagyna</i>	202	<i>Exbucklandia</i>	<i>populnea</i>
165	<i>Diospyros</i>	<i>lanceifolia</i>	203	<i>Fagraea</i>	<i>obovata</i>
166	<i>Diploknema</i>	<i>butyracea</i>	204	<i>Fargesia</i>	<i>sp.</i>
167	<i>Dipterocarpus</i>	<i>macrocarpus</i>	205	<i>Fargesia</i>	<i>bhutanensis</i>
168	<i>Dodecadenia</i>	<i>grandiflora</i>	206	<i>Ficus</i>	<i>sp.</i>
169	<i>Drepanostachyum</i>	<i>sp.</i>	207	<i>Ficus</i>	<i>auriculata</i>
170	<i>Drepanostachyum</i>	<i>intermedium</i>	208	<i>Ficus</i>	<i>glaberrima</i>
171	<i>Drimycarpus</i>	<i>racemosus</i>	209	<i>Ficus</i>	<i>semicordata</i>
172	<i>Drypetes</i>	<i>indica</i>	210	<i>Ficus</i>	<i>hispida</i>
173	<i>Drypetes</i>	<i>assamica</i>	211	<i>Ficus</i>	<i>lacor</i>
174	<i>Duabanga</i>	<i>grandiflora</i>	212	<i>Ficus</i>	<i>neriifolia</i>
175	<i>Echinocarpus</i>	<i>decicarpus</i>	213	<i>Ficus</i>	<i>subincisa</i>
176	<i>Ehretia</i>	<i>laevis</i>	214	<i>Ficus</i>	<i>conglobata</i>
177	<i>Ehretia</i>	<i>wallichiana</i>	215	<i>Ficus</i>	<i>cyrtophylla</i>
178	<i>Ehretia</i>	<i>wallichiana</i>	216	<i>Ficus</i>	<i>oligodon</i>
179	<i>Ehretia</i>	<i>macrophylla</i>	217	<i>Ficus</i>	<i>rumphii</i>
180	<i>Elaeocarpus</i>	<i>sp.</i>	218	<i>Ficus</i>	<i>religiosa</i>
181	<i>Elaeocarpus</i>	<i>sikkimensis</i>	219	<i>Ficus</i>	<i>elastica</i>
182	<i>Elaeocarpus</i>	<i>sphaericus</i>	220	<i>Ficus</i>	<i>concinna</i>

SI No	NAME OF THE SPECIES		SI No	NAME OF THE SPECIES	
231	<i>Fraxinus</i>	<i>paxiana</i>	266	<i>Jambosa</i>	<i>formosa</i>
232	<i>Gamblea</i>	<i>ciliata</i>	267	<i>Juglans</i>	<i>regia</i>
233	<i>Garcinia</i>	<i>stipulata</i>	268	<i>Juniperus</i>	<i>sp.</i>
234	<i>Garcinia</i>	<i>sopsopia</i>	269	<i>Juniperus</i>	<i>pseudosabina</i>
235	<i>Garcinia</i>	<i>xanthochymus</i>	270	<i>Juniperus</i>	<i>recurva</i>
236	<i>Garuga</i>	<i>pinnata</i>	271	<i>Juniperus</i>	<i>squamata</i>
237	<i>Gironniera</i>	<i>cuspidata</i>	272	<i>Kydia</i>	<i>calycina</i>
238	<i>Gliricidia</i>	<i>sepium</i>	273	<i>Lagerstroemia</i>	<i>sp.</i>
239	<i>Glochidion</i>	<i>sp.</i>	274	<i>Lagerstroemia</i>	<i>hirsuta</i>
240	<i>Glochidion</i>	<i>assamicum</i>	275	<i>Lagerstroemia</i>	<i>parviflora</i>
241	<i>Glochidion</i>	<i>bhutanicum</i>	276	<i>Larix</i>	<i>griffithiana</i>
242	<i>Glochidion</i>	<i>thomsonii</i>	277	<i>Leucaena</i>	<i>leucocephala</i>
243	<i>Glochidion</i>	<i>oblatum</i>	278	<i>Leucosceptum</i>	<i>canum</i>
244	<i>Glochidion</i>	<i>velutinum</i>	279	<i>Ligustrum</i>	<i>confusum</i>
245	<i>Glochidion</i>	<i>nubigenum</i>	280	<i>Ligustrum</i>	<i>compactum</i>
246	<i>Glochidion</i>	<i>acuminatum</i>	281	<i>Lindera</i>	<i>sp.</i>
247	<i>Glochidion</i>	<i>sphaerogynum</i>	282	<i>Lindera</i>	<i>pulcherrima</i>
248	<i>Gmelina</i>	<i>arborea</i>	283	<i>Lindera</i>	<i>heterophylla</i>
249	<i>Gmelina</i>	<i>arborea</i>	284	<i>Lindera</i>	<i>neesiana</i>
250	<i>Grevillea</i>	<i>robusta</i>	285	<i>Lindera</i>	<i>bootanica</i>
251	<i>Grewia</i>	<i>asiatica</i>	286	<i>Lindera</i>	<i>assamica</i>
252	<i>Gynocardia</i>	<i>odorata</i>	287	<i>Lithocarpus</i>	<i>sp.</i>
253	<i>Helicia</i>	<i>nilagirica</i>	288	<i>Lithocarpus</i>	<i>dealbatus</i>
254	<i>Heliciopsis</i>	<i>terminalis</i>	289	<i>Lithocarpus</i>	<i>elegans</i>
255	<i>Heteropanax</i>	<i>fragrans</i>	290	<i>Lithocarpus</i>	<i>fenestratus</i>
256	<i>Holarrhena</i>	<i>pubescens</i>	291	<i>Lithocarpus</i>	<i>pachyphyllus</i>
257	<i>Holoptelia</i>	<i>integrifolia</i>	292	<i>Lithocarpus</i>	<i>listeri</i>
258	<i>Homonoia</i>	<i>riparia</i>	293	<i>Litsea</i>	<i>sp.</i>
259	<i>Hovenia</i>	<i>acerba</i>	294	<i>Litsea</i>	<i>hookeri</i>
260	<i>Hovenia</i>	<i>dulcis</i>	295	<i>Litsea</i>	<i>monopetala</i>
261	<i>Hymenodictyon</i>	<i>excelsum</i>	296	<i>Litsea</i>	<i>sericea</i>
262	<i>Hyptianthera</i>	<i>stricta</i>	297	<i>Litsea</i>	<i>cubeba</i>
263	<i>Illicium</i>	<i>griffithii</i>	298	<i>Litsea</i>	<i>laeta</i>
264	<i>Itea</i>	<i>microphylla</i>	299	<i>Litsea</i>	<i>elongata</i>
265	<i>Jacaranda</i>	<i>mimosifolia</i>	300	<i>Litsea</i>	<i>glutinosa</i>

SI No	NAME OF THE SPECIES		SI No	NAME OF THE SPECIES	
301	<i>Litsea</i>	<i>panamanja</i>	340	<i>Neomicrocalamus</i>	<i>ringshu</i>
302	<i>Lyonia</i>	<i>sp.</i>	341	<i>Neonauclea</i>	<i>griffithii</i>
303	<i>Lyonia</i>	<i>ovalifolia</i>	342	<i>Nyctanthes</i>	<i>arbor-Tristis</i>
304	<i>Lyonia</i>	<i>villosa</i>	343	<i>Nyssa</i>	<i>javanica</i>
305	<i>Macaranga</i>	<i>sp.</i>	344	<i>Oroxylum</i>	<i>indicum</i>
306	<i>Macaranga</i>	<i>denticulata</i>	345	<i>Osmanthus</i>	<i>fragrans</i>
307	<i>Macaranga</i>	<i>pustulata</i>	346	<i>Osmanthus</i>	<i>suavis</i>
308	<i>Macropanax</i>	<i>undulatus</i>	347	<i>Ostodes</i>	<i>paniculata</i>
309	<i>Macropanax</i>	<i>sp.</i>	348	<i>Pandanus</i>	<i>sp.</i>
310	<i>Magnolia</i>	<i>sp.</i>	349	<i>Pandanus</i>	<i>nepalensis</i>
311	<i>Magnolia</i>	<i>campbellii</i>	350	<i>Pandanus</i>	<i>sikkimensis</i>
312	<i>Magnolia</i>	<i>globosa</i>	351	<i>Parasassafras</i>	<i>confertiflora</i>
313	<i>Mallotus</i>	<i>sp.</i>	352	<i>Peltophorum</i>	<i>pterocarpum</i>
314	<i>Mallotus</i>	<i>philippinensis</i>	353	<i>Pentapanax</i>	<i>racemosus</i>
315	<i>Mallotus</i>	<i>tetracoccus</i>	354	<i>Persea</i>	<i>sp.</i>
316	<i>Mallotus</i>	<i>nepalensis</i>	355	<i>Persea</i>	<i>Clarkeana</i>
317	<i>Malus</i>	<i>baccata</i>	356	<i>Persea</i>	<i>fructifera</i>
318	<i>Mangifera</i>	<i>sp.</i>	357	<i>Persea</i>	<i>odoratissima</i>
319	<i>Mangifera</i>	<i>indica</i>	358	<i>Persea</i>	<i>bootanica</i>
320	<i>Mangifera</i>	<i>sylvatica</i>	359	<i>Persea</i>	<i>duthiei</i>
321	<i>Melia</i>	<i>azadarach</i>	360	<i>Persea</i>	<i>glaucescens</i>
322	<i>Meliosma</i>	<i>sp.</i>	361	<i>Phoebe</i>	<i>sp.</i>
323	<i>Mesua</i>	<i>ferrea</i>	362	<i>Phoebe</i>	<i>attenuata</i>
324	<i>Meyna</i>	<i>spinosa</i>	363	<i>Phoebe</i>	<i>hainesiana</i>
325	<i>Michelia</i>	<i>sp.</i>	364	<i>Phoebe</i>	<i>lanceolata</i>
326	<i>Michelia</i>	<i>cathcartii</i>	365	<i>Phoebe</i>	<i>goalparensis</i>
327	<i>Michelia</i>	<i>champaca</i>	366	<i>Phoenix</i>	<i>rupicola</i>
328	<i>Michelia</i>	<i>doltsopa</i>	367	<i>Phyllanthus</i>	<i>emblica</i>
329	<i>Michelia</i>	<i>kisopa</i>	368	<i>Picea</i>	<i>sp.</i>
330	<i>Michelia</i>	<i>velutina</i>	369	<i>Picea</i>	<i>brachytyla</i>
331	<i>Mimusops</i>	<i>elengi</i>	370	<i>Picea</i>	<i>spinulosa</i>
332	<i>Mitrephora</i>	<i>harai</i>	371	<i>Pieris</i>	<i>formosa</i>
333	<i>Morinda</i>	<i>angustifolia</i>	372	<i>Pinus</i>	<i>sp.</i>
334	<i>Morus</i>	<i>macroura</i>	373	<i>Pinus</i>	<i>bhutanica</i>
335	<i>Morus</i>	<i>australis</i>	374	<i>Pinus</i>	<i>roxburghii</i>
336	<i>Myrica</i>	<i>esculenta</i>	375	<i>Pinus</i>	<i>wallichiana</i>
337	<i>Neolamarckia</i>	<i>cadamba</i>	376	<i>Pithecellobium</i>	<i>dulce</i>
338	<i>Neolitsea</i>	<i>foliosa</i>	377	<i>Plectocomia</i>	<i>himalayana</i>
339	<i>Neolitsea</i>	<i>cuipala</i>	378	<i>Plumeria</i>	<i>rubra</i>

SI No	NAME OF THE SPECIES		SI No	NAME OF THE SPECIES	
379	<i>Polyalthia</i>	<i>simiarum</i>	418	<i>Salix</i>	<i>salwinensis</i>
380	<i>Populus</i>	<i>sp.</i>	419	<i>Salix</i>	<i>myrtillacea</i>
381	<i>Populus</i>	<i>ciliata</i>	420	<i>Salix</i>	<i>obscura</i>
382	<i>Populus</i>	<i>rotundifolia</i>	421	<i>Salix</i>	<i>wallichiana</i>
383	<i>Populus</i>	<i>nigra</i>	422	<i>Salix</i>	<i>stomatophora</i>
384	<i>Premna</i>	<i>bracteata</i>	423	<i>Salix</i>	<i>excelsa</i>
385	<i>Premna</i>	<i>bengalensis</i>	424	<i>Salix</i>	<i>daltoniana</i>
386	<i>Prunus</i>	<i>sp.</i>	425	<i>Salix</i>	<i>longiflora</i>
387	<i>Prunus</i>	<i>carmesina</i>	426	<i>Salix</i>	<i>oxycarpa</i>
388	<i>Prunus</i>	<i>cerasoides</i>	427	<i>Samanea</i>	<i>saman</i>
389	<i>Prunus</i>	<i>napaulensis</i>	428	<i>Sapindus</i>	<i>rarak</i>
390	<i>Pseudostachyum</i>	<i>polymorphum</i>	429	<i>Sapium</i>	<i>sp.</i>
391	<i>Pterospermum</i>	<i>acerifolium</i>	430	<i>Sapium</i>	<i>baccatum</i>
392	<i>Pterygota</i>	<i>alata</i>	431	<i>Sapium</i>	<i>eugeniifolium</i>
393	<i>Pyrularia</i>	<i>edulis</i>	432	<i>Sapium</i>	<i>insigne</i>
394	<i>Pyrus</i>	<i>pashia</i>	433	<i>Sapium</i>	<i>sebiferum</i>
395	<i>Quercus</i>	<i>sp.</i>	434	<i>Saprosma</i>	<i>ternatum</i>
396	<i>Quercus</i>	<i>glauca</i>	435	<i>Sarcosperma</i>	<i>arboreum</i>
397	<i>Quercus</i>	<i>lamellosa</i>	436	<i>Saurauja</i>	<i>napaulensis</i>
398	<i>Quercus</i>	<i>lanata</i>	437	<i>Saurauja</i>	<i>armata</i>
399	<i>Quercus</i>	<i>griffithii</i>	438	<i>Saurauja</i>	<i>griffithii</i>
400	<i>Quercus</i>	<i>semecarpifolia</i>	439	<i>Saurauja</i>	<i>fasciculata</i>
401	<i>Quercus</i>	<i>thomsoniana</i>	440	<i>Saurauja</i>	<i>punduana</i>
402	<i>Quercus</i>	<i>oxyodon</i>	441	<i>Saurauja</i>	<i>roxburghii</i>
403	<i>Quercus</i>	<i>semiserrata</i>	442	<i>Schima</i>	<i>wallichii</i>
404	<i>Quercus</i>	<i>acutissima</i>	443	<i>Schima</i>	<i>khasiana</i>
405	<i>Quercus</i>	<i>senescens</i>	444	<i>Schoepfia</i>	<i>griffithii</i>
406	<i>Quercus</i>	<i>rubescens</i>	445	<i>Schoepfia</i>	<i>fragrans</i>
407	<i>Racemobambos</i>	<i>sp.</i>	446	<i>Shorea</i>	<i>robusta</i>
408	<i>Rhododendron</i>	<i>sp.</i>	447	<i>Sloanea</i>	<i>sp.</i>
409	<i>Rhododendron</i>	<i>arboreum</i>	448	<i>Sloanea</i>	<i>decicarpus</i>
410	<i>Rhus</i>	<i>sp.</i>	449	<i>Sloanea</i>	<i>sterculiacea</i>
411	<i>Rhus</i>	<i>chinensis</i>	450	<i>Sophora</i>	<i>wightii</i>
412	<i>Rhus</i>	<i>hookeri</i>	451	<i>Sorbus</i>	<i>sp.</i>
413	<i>Rhus</i>	<i>paniculata</i>	452	<i>Sorbus</i>	<i>griffithii</i>
414	<i>Rhus</i>	<i>succedanea</i>	453	<i>Sorbus</i>	<i>microphylla</i>
415	<i>Robinia</i>	<i>pseudoacacia</i>	454	<i>Spondias</i>	<i>mangifera</i>
416	<i>Salix</i>	<i>sp.</i>	455	<i>Spondias</i>	<i>pinnata</i>
417	<i>Salix</i>	<i>babylonica</i>	456	<i>Sterculia</i>	<i>sp.</i>

SI No	NAME OF THE SPECIES		SI No	NAME OF THE SPECIES	
457	<i>Sterculia</i>	<i>alata</i>	496	<i>Tetradium</i>	<i>fraxinifolius</i>
458	<i>Sterculia</i>	<i>villosa</i>	497	<i>Tetrameles</i>	<i>nudiflora</i>
459	<i>Stereospermum</i>	<i>sp.</i>	498	<i>Thamnocalamus</i>	<i>sp.</i>
460	<i>Stereospermum</i>	<i>personatum</i>	499	<i>Thamnocalamus</i>	<i>aristatus</i>
461	<i>Streblus</i>	<i>asper</i>	500	<i>Thevetia</i>	<i>peruviana</i>
462	<i>Styrax</i>	<i>serrulatus</i>	501	<i>Thuja</i>	<i>orientalis</i>
463	<i>Styrax</i>	<i>grandiflora</i>	502	<i>Toona</i>	<i>sp.</i>
464	<i>Symplocos</i>	<i>sp.</i>	503	<i>Toona</i>	<i>ciliata</i>
465	<i>Symplocos</i>	<i>glomerata</i>	504	<i>Toona</i>	<i>sureni</i>
466	<i>Symplocos</i>	<i>lucida</i>	505	<i>Trema</i>	<i>politoria</i>
467	<i>Symplocos</i>	<i>paniculata</i>	506	<i>Trema</i>	<i>tomentosa</i>
468	<i>Symplocos</i>	<i>spicata</i>	507	<i>Trewia</i>	<i>nudiflora</i>
469	<i>Symplocos</i>	<i>lucida</i>	508	<i>Tsuga</i>	<i>dumosa</i>
470	<i>Symplocos</i>	<i>cochinchinensis</i>	509	<i>Turpinia</i>	<i>pomifera</i>
471	<i>Symplocos</i>	<i>ramosissima</i>	510	<i>Ulmus</i>	<i>lanceifolia</i>
472	<i>Symplocos</i>	<i>dryophila</i>	511	<i>unspecified</i>	<i>bamboo</i>
473	<i>Symplocos</i>	<i>sumuntia</i>	512	<i>unspecified</i>	<i>broadleaf</i>
474	<i>Symplocos</i>	<i>pyrifolia</i>	513	<i>unspecified</i>	<i>chikpala</i>
475	<i>Syzygium</i>	<i>formosum</i>	514	<i>unspecified</i>	<i>cane</i>
476	<i>Syzygium</i>	<i>sp.</i>	515	<i>unspecified</i>	<i>conifer</i>
477	<i>Syzygium</i>	<i>claviflorum</i>	516	<i>unspecified</i>	<i>tree fern</i>
478	<i>Syzygium</i>	<i>cumini</i>	517	<i>unspecified</i>	<i>erect palm</i>
479	<i>Tabernaemontana</i>	<i>divaricata</i>	518	<i>unspecified</i>	<i>rattan, cane</i>
480	<i>Talauma</i>	<i>hodgsonii</i>	519	<i>Viburnum</i>	<i>sp.</i>
481	<i>Tamarindus</i>	<i>indica</i>	520	<i>Vitex</i>	<i>heterophylla</i>
482	<i>Tarennoidea</i>	<i>wallichii</i>	521	<i>Vitex</i>	<i>negundo</i>
483	<i>Taxus</i>	<i>baccata</i>	522	<i>Vitex</i>	<i>quintata</i>
484	<i>Tectona</i>	<i>grandis</i>	523	<i>Vitex</i>	<i>burmensis</i>
485	<i>Terminalia</i>	<i>sp.</i>	524	<i>Wallichia</i>	<i>densiflora</i>
486	<i>Terminalia</i>	<i>belerica</i>	525	<i>Walsura</i>	<i>tubulata</i>
487	<i>Terminalia</i>	<i>catappa</i>	526	<i>Wendlandia</i>	<i>puberula</i>
488	<i>Terminalia</i>	<i>chebula</i>	527	<i>Wendlandia</i>	<i>speciosa</i>
489	<i>Terminalia</i>	<i>bialato</i>	528	<i>Wendlandia</i>	<i>grandis</i>
490	<i>Terminalia</i>	<i>alata</i>	529	<i>Wrightia</i>	<i>coccinea</i>
491	<i>Terminalia</i>	<i>myriocarpa</i>	530	<i>Wrightia</i>	<i>arborea</i>
492	<i>Terminalia</i>	<i>procera</i>	531	<i>Xantolis</i>	<i>hookeri</i>
493	<i>Terminalia</i>	<i>arjuna</i>	532	<i>Yushania</i>	<i>sp.</i>
494	<i>Terminalia</i>	<i>tomentosa</i>	533	<i>Yushania</i>	<i>maling</i>
495	<i>Tetracentron</i>	<i>sinense</i>	534	<i>Yushania</i>	<i>hirsuta</i>

SI No	NAME OF THE SPECIES	
535	<i>Yushania</i>	<i>microphylla</i>
536	<i>Zanthoxylum</i>	<i>sp.</i>
537	<i>Zanthoxylum</i>	<i>armatum</i>
538	<i>Zanthoxylum</i>	<i>budrunga</i>
539	<i>Zanthoxylum</i>	<i>rhetsa</i>

List of Ornamental Plants Available in Bhutan

SL NO	NAME OF SPECIES	SL NO	NAME OF SPECIES
1	Acacia Mangieum	30	Camellia Sp
2	Acer Sp (Sugar Maple)	31	Canterbury flower
3	Achemia	32	Catlegh (Hybrid)
4	African Daisy	33	Ceranthus albiforus
5	Agapanthus Sp	34	Chameodora cataractorum
6	Agrostis Spp (Creeping Bentgrass)	35	Chamaedor microspadix
7	Amyralis Sp	36	Cherry (Prunus sp)
8	Anthoenum andrenium	37	Chrysantemum
9	Anthurium Scherezianum	38	Clarkia elegans
10	Areca palm	39	Clerodendron Sp
11	Arkrya Sp	40	Cornflower
12	Ascocetum	41	Croton Sp
13	Aspaid	42	Cryptomeria japonica (Dhupi)
14	Aster Sp	43	Cupressus calimiana
15	Ashoka (Polyalthae spp)	44	Cupressus orientalis
16	Aurocarair tree	45	Cupressus sempervies
17	Azaelea Sp	46	Cupressus funebaries
18	B. tistoir	47	Cyclamen Sp
19	Bamboo (Bambusa Sp)	48	Cycas Sp
20	Begonia Sp	49	Deodar/ Rain tree
21	Benziaurn Sp	50	Dalbergia sisoo
22	Bleeding Heart	51	Dahlia Sp
23	Bougainvillea Sp	52	Everlasting flower
24	C dioan (Palm)	53	Fatsia
25	Calathea Sp	54	Friencisis (Shrub flower)
26	Calendula	55	Fuchsia
27	California poppy	56	Fox glove
28	Calla lilies (Lilium sp)	57	Gaillordia
29	Callistemon	58	Gamari

SL NO	NAME OF SPECIES	SL NO	NAME OF SPECIES
59	Gardenia grandiflora	92	Phaleonopsis
60	Geranium Sp	93	Catlega
61	Gerbera	94	Oniedium
62	Gladiolus	95	Leptorchirs
63	Golden duranta	96	Ascolcelum
64	Gypsopila elegans	97	Jewel orchids
65	Gulmohur	98	Ornamental bamboo
66	Hemarcallis Sp	99	Ornamental juniprus
67	Holly hock	100	Oxalis
68	Hydrangea Sp	101	Pansy (Vivola Spp
69	Impatiens Sp	102	Petunia Sp
70	Ivy (Hedora Sp)	103	Peony
71	Jewel orchids	104	Phaloepnopsis (Hybrid)
72	Justacia Sp	105	Philadelpus
73	Juniperus Sp	106	Philodendron Sp
74	Poa Pratensis	107	Phlox paniculata
75	Larkspur	108	Phonix rubilina
76	Legostromeaia Sp	109	Pittosporum
77	Leptorchis (Hybrid)	110	Primula Sp
78	Lilies	111	Raflex palm
79	Lupinus polyphylus	112	Zephranthus Sp (Rain lily)
80	Manihot esculenta	113	Eananculus Sp
81	Magnolia Sp	114	Rosaceae Sp (rose)
82	Maple tree	115	Ficus elastica (rubber plant)
83	Epipremium pinnatum (Money plant)	116	Schefflera Sp
84	Myrtus	117	Siloricia adresium
85	Nandina	118	Silver oak (Quercus Sp)
86	Neanthebella	119	Snapdragon
87	Neougella	120	Spathephyllum
88	Oneidium (Hybrid)	121	Spider flower
89	Ophiopogon	122	Spirae Sp
90	Vanda Miss Joaquim (hybrid)	123	Star lily (Achimensis)
91	Cymbidium	124	Straw flower (Helichrysum)

SL NO	NAME OF SPECIES	SL NO	NAME OF SPECIES
125	Swami plants (Ficus benjaminae)	131	Thuja compacta
126	Sweet William	132	Topianthus calatheae
127	Tamarix	133	Tupidence Sp
128	Tectona grandis	134	Xerenthemum annum
129	Thai orchids	135	Zinnia Sp
130	Thuja orientalis		

**MINIMUM STANDARDS FOR SEED AND PLANTING
MATERIALS CERTIFICATION**

**COUNCIL FOR RNR RESEARCH OF BHUTAN
MINISTRY OF AGRICULTURE**

May 2002

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1. GENERAL STANDARDS AND GUIDELINES FOR CERTIFICATION

The General Seed Certification Standards are applicable to all crops, which are eligible for certification, and with Field and Seed Standards for the individual crops, shall constitute the Minimum Seed Certification Standards.

1.1 Purpose of Seed Certification

The purpose of seed certification is to maintain and make available to the farmers and other clients, through certification, high quality seeds and propagating materials of notified species and varieties so grown and distributed as to ensure genetic identity and genetic purity. Seed certification is also designed to achieve prescribed standards.

1.2 Certification Agency

Certification shall be conducted by the Certification Agency appointed by the National Seed Board, Ministry of Agriculture, Royal Government of Bhutan; in this case the Bhutan Agriculture Food Regulatory Authority (BAFRA) is the appointed Certification Agency.

1.3 Certified Seed Producer

Certified seed producer means an organisation or an individual who grows or distributes certified seed in accordance with the procedures and standards of the certification.

1.4 Eligibility Requirements for Certification of Crop Varieties

Seed of only those varieties, which are notified by the Bhutan Seed Act, 2000 shall be eligible for certification.

1.5 Classes and Sources of Seed

1.5.1 Breeder Seed

Breeder seed is seed or vegetative propagating material directly controlled by the originating or sponsoring plant breeder of the breeding program or institution and/or seed whose production is personally supervised by a qualified plant breeder and which provides the source for the initial and recurring increase of Foundation seed.

Breeder seed shall be genetically so pure as to guarantee that the subsequent generation of seeds shall conform to the prescribed standards of genetic purity. The other quality factors of Breeder seed such as physical purity, inert matter, germination etc. shall be indicated on the label on actual basis. The Breeder seed shall be supplied by the breeder/breeding institution to the seed producer as mutually agreed.

1.5.2 Certified Seed

Certified seed shall be the seed certified by Certification Agency as notified under Seed Act, 2000. Certified seed shall consist of two classes, namely, Foundation and certified seed and each class shall conform to the following description:

Foundation seed shall be the progeny of Breeder seed, or be produced from Foundation seed, which can be clearly traced to Breeder seed. During the production of Foundation seed, the following guidelines shall be observed:

Foundation seed produced directly from Breeder seed shall be designated as Foundation seed stage-I

Foundation seed produced from Foundation seed stage-I shall be designated as Foundation seed stage II

Foundation seed stage – II will not be used for further increase of Foundation seed and shall be used only for production of certified seed. Minimum Seed Certification Standards shall be the same for both foundation seed stage – I and II unless otherwise prescribed. Production of Foundation seed stage-I and II shall be supervised and approved by the Certification Agency and be so handled as to maintain specific genetic identity and genetic purity and shall be required to conform to certification standards specified for the crop/variety being certified.

Certified seed shall be the progeny of foundation seed and its production shall be so handled as to maintain specific genetic identity and purity according to standards prescribed for the crop being certified. Certified seed may be the progeny of certified seed provided this reproduction does not exceed three generations beyond foundation seed stage-I and; it is determined by the Certification Agency that genetic identity and genetic purity will not be significantly altered; and when the Certification Agency that there is genuine shortage of Foundation seed despite all the reasonable efforts made by the seed producer.

1.6 Phases of Seed Certification

1. Certification shall be completed in seven broad phases listed as under:
2. registration of varieties for certification purpose
3. receipt and scrutiny of application;
4. verification of seed source, class and other requirements of the seed used for raising the seed crop;
5. field inspections to verify conformity to the prescribed field standards;
6. supervision at post-harvest stages including processing and packing;
7. seed sampling and analysis, including genetic purity test and/or seed health test, if any, in order to verify conformity to the prescribed standard; and
8. grant of certificate and certification tags, tagging and sealing.

1.7 Unit of Certification

For the purpose of field inspections, the entire area planted under seed production by an organization/individual shall constitute one unit provided:

1. it is all under one variety;
2. it does not exceed ten hectares;
3. it is not divided into fields separated by more than fifty meters between them;
4. it is planted with or is meant to produce seed belonging to the same class and stage in the generation chain;
5. the crop over the entire area is more or less of the same stage of growth so that observations made are representative of the entire crop;
6. the total area planted, by and large, corresponds to the quantity of seed reported to have been used; and the Certification Agency's permission had been obtained to sow a larger area by economising on seed rate;
7. raised strictly as a single crop and never as mixed;
8. not so heavily and uniformly lodged that more than one third of the plant population is trailing on the ground leaving no scope for it to stand up again thus making it impossible for the Certification Agency to inspect the seed crop at the appropriate growth stage in the prescribed manner;
9. as far as possible, so maintained as to show adequate evidence of good crop husbandry there by improving the reputation for certified seeds; and
10. not grown as inter, companion or ratoon crop unless otherwise specified

1.8 Field Inspection

The field inspection work which requires technically-trained personnel shall be performed by the persons who have been so authorised by the Certification Agency. Field inspection meant to verify those factors which can cause irreversible damage to the genetic purity or seed health shall be conducted without prior notice to the seed producer. Soon after the completion of the field inspection, a copy of the report shall be submitted to Certifying Agency, who in turn shall communicate the report to the producer or representative at the shortest possible time.

1.9 Re-inspection

Seed fields not conforming to prescribed standards for certification at any inspection, the Certification Agency shall, upon the request of seed producer and after he removes the sources of contamination in the seed field and within the prescribed isolation distance and/or the contaminated plants in the seed field (if so directed by the Certification Agency) perform one or more re-inspections provided such removal can ensure conformity of the seed crop to the prescribed standards and provided further that no irreversible damage has been caused to the quality of seed by the contaminant(s). The Certification Agency may at its

discretion, also perform one or more re-inspections over and above the minimum number of inspections prescribed, if considered necessary.

1.10 Harvesting, Threshing and Transportation

Seed crop meeting field standards for certification shall be harvested, threshed and transported to the seed processing plant in accordance with the guidelines issued by the Certification Agency. During these operations, seed producer will take all precautions to safeguard the seed from admixture and other causes of seed deterioration.

1.11 Bulking

Bulking of unprocessed seed stocks to obtain larger homogeneous seed stocks may be permitted by the Certification Agency provided the stocks to be bulked meet the following requirements:

1. belong to the same certified seed producer;
2. belong to the same crop, variety, class of seed and stage in the generation chain;
3. were produced in the same season and under similar agro-climatic conditions;
4. were subject to certification by the same certification agency;
5. have more or less similar physical appearance and levels of moisture;
6. are adequately homogeneous in composition.

1.12 Seed Processing and Packing Schedule

The Certification Agency shall prepare and communicate seed processing and packing schedule to the seed producer soon after the certification of seed crops at field stage. The seed producers shall adhere to the schedule specified by the Certification Agency. However, re-scheduling may be accepted by the Certification Agency on the request of seed producer on genuine grounds.

1.13 Seed Lot

A seed lot is a physically identifiable quantity of seed, which is homogeneous.

1.14 Lot Size

A seed lot would represent any quantity of seeds up to a maximum of 20,000 kg of seeds of the size of rice or larger (except seed potato for which the maximum size of the lot may be 40,000 kg) and 10,000 kg for seed smaller than rice subject to a tolerance limit of 5%. The quantities in excess of the above maximum limits shall be sub-divided and separate lot identification shall be given.

1.15 Construction of Seed Lot Number

Each seed lot shall be assigned a specific number in order to facilitate maintaining its identity, tracing back to its origin, handling in stores, transit etc., accounting and inventory maintenance and referring/communicating purposes.

1.16 Seed Processing

Seed processing means cleaning, drying, treating, grading and other operations, which will improve the quality of seeds. Seed from fields, which conformed to the standards of certification at field stage shall, as soon as possible after the harvest will be brought at processing plant for processing. Cleaning and grading of seeds shall be done so that typical contaminants such as weed seeds, ergoty, diseased /insect damage, small seeds, damaged seeds, broken and shrivelled seeds, straw, chaff, leaves, twigs, stones, soil particles etc. are removed.

1.17 Seed Treatment

When a variety, seed of which is under certification is susceptible to a seed borne disease or when seed under certification is carrying a seed borne pathogen and a seed treatment is available which may control the disease or pathogen when properly applied, the Certification Agency may require such seed to undergo such treatment before certification.

1.18 Sample and Sampling of Seeds

Soon after completion of the seed processing or after seed treatment as the case may be, the Certification Agency shall draw a representative composite sample as per standard procedures. The quantity of seed samples so drawn shall be sufficient to provide three samples. The composite sample will be divided into three equal parts, and one shall be sent for analysis to a notified Seed Testing Laboratory, the second part to the seed producer and retain the third part as a guard sample.

1.19 Seed Analysis Report

The Seed Testing Laboratory shall analyse the seed samples in accordance with the prescribed procedure and deliver the Seed Analysis Report to the Certification Agency as soon as may be, but not later than 30 days from the date of receipt of the sample unless the seed is subject to such tests which require more than 30 days for completion of the test.

1.20 Seed Standards of Genetic Purity

All certified seed lots should conform to the following Minimum Standards for genetic purity unless otherwise prescribed:

Seed class	Minimum genetic purity %
Foundation	99
Certified	98

1.21 Grow-out Test

The Certification Agency shall conduct grow-out test to determine genetic purity of a seed wherever it is a pre-requisite for grant of the certificate and also on the seed lots where a doubt has arisen about the genetic purity. The grow-out test shall be conducted as per standard procedures (following recommended cultural/agronomic practices and with a control for comparison).

1.22 Recleaning, Resampling and Retesting

When a seed lot does not meet the prescribed seed standards, the Certification Agency on the request of seed producer may permit recleaning, resampling and retesting. The recleaning, resembling and retesting shall be permitted only once.

1.23 Seed Standards for Insect Damage

A seed lot under certification shall not have apparent or visible evidence of damage by insects for both Foundation and Certified seed classes in excess of 1.0 % for the seeds of maize and legumes and 0.50% for the seeds other than maize and legumes unless otherwise prescribed.

1.24 Seed Moisture Content

Seed standards in respect of seed moisture shall be met at the time of packing of seed.

1.25 Downgrading of Seed Class

If a seed field or a seed lot is not found meeting prescribed standards for the class for which it has been registered but conforms to the prescribed standards to the immediate lower class, the Certification Agency may accept such seed fields/ seed lots for certification to the immediate lower class provided a request has been made to this effect by the seed producer.

1.26 Packing, Tagging, Sealing and Issuance of the Certificate

On receipt of Seed Analysis Report and the results of the grow out test wherever prescribed, and if seed lot has met prescribed standards, the Certification Agency shall ensure packing, tagging and sealing and issuance of certificate expeditiously. An authorised official of the Certification Agency shall endorse the signature on the reverse of each certification tag and shall affix rubber stamp indicating the official's name and designation. Advance tagging may be permitted at the discretion of the Certification Agency with proper safeguards.

1.27 Refusal for Certification

The Certification Agency shall have the authority to refuse certification of any seed production field or any seed lot that does not conform to the Minimum Standards prescribed for that particular crop, either for field or for seed or for both. Such refusal will be subject to any appeal made to the Appellate Authority constituted under the Seed Act, 2000.

1.28 Validity Period of the Certificate

The validity period shall be nine months from the date of test at the time of initial certification. The validity period could be further extended for six months provided on retesting seed conforms to the prescribed standards in respect of physical purity, germination and insect damage for all seeds except vegetative propagating material for which lot shall be re-examined for seed standards specified for respective crop. A seed lot will be eligible for extension of the validity period as long as it conforms to the prescribed standards.

1.29 Revocation of Certificate

If the Certification Agency is satisfied, either on reference made to it in this behalf or otherwise that: the certificate granted by it has been obtained by misrepresentation as to an essential fact; or the holder of the certificate has, without reasonable cause, failed to comply with the conditions subject to which the certificate has been granted or has contravened any of the provisions of the Act or the rules made thereunder, then, without prejudice to any other penalty to which the holder of the certificate may be liable under the Act the Certification Agency may, after giving the holder of the certificate an opportunity of showing cause, revoke the certificate under the provisions of the Sees Act.

1.30 Retention of Certification Records

The Certification Agency shall preserve in order all the documents including the guard samples pertaining to certification of each seed lot for two years from the date of grant/extension of the certificate and four years in respect of rejected seed crops or lots from the date of communication of rejection unless and otherwise required for longer period.

1.31 Certified planting material producer

Means a person/ organization who grows or distribute planting material in accordance with the procedure and standards of the certification.

1.32 Certification shall be completed in four broad phases listed under

1. The Producer should apply for the certification of the planting materials prior to the distribution of the materials. The Certification Agency in turn will scrutinize.
2. The Certification Agency should verify the source, class and other requirements of the materials used for raising the Fruit crop;
3. The Certification Agency should inspect the materials in the field during full growth and prior to distribution to verify conformity of the materials to the prescribed standards;
4. Grant of certificate and certification tags and tagging

1.33 Tags or Labels

All certified seed and seedlings offered for sale shall have the official certification tag or label properly affixed to each bundle or container. Even if all standards have been met, planting materials will not be considered certified unless properly labeled.

The certification tag attached to each bundles or container serves as evidence of the genetic purity, identity and other quality standard of the planting materials contained therein. Every package should have a tagged label with the following information:

1. Common and Scientific Name of the variety
2. Complete address of producer, packer / importer
3. Class of seed: Breeder seed, foundation seed I or II, or Certified seed

4. Physical purity, inert matter, germination, moisture content
5. Year of seed crop production
6. Origin of seed
7. Producer seed lot number
8. Label serial number
9. Colour of the Tag :
 - a. White for foundation seed
 - b. Blue for certified seed

2 SPECIFIC SEED STANDARDS FOR CEREAL AND OILSEED CROPS

2.1 RICE

2.1.1 Land Requirements

Land intended to be used for rice seed production shall be free of volunteer plants of any variety.

2.1.2 Field Inspections

A minimum of two field inspections shall be made from pre-flowering to harvest stage of the crop.

Field Standards

Isolation distance and other plant contaminants shall be as specified in the table below:

Contaminants	Isolation distance	
	Foundation	Certified
Fields of other varieties	3 m	3 m
Fields of same variety not conforming to purity	3 m	3 m
Off-types	0.05%	0.20%
Objectionable weeds*	0.01%	0.02%

* objectionable weeds include wild rice and *Echinochloa* species

Standards for off-types and objectionable weeds shall be met at the final inspection.

2.1.3 Seed Standards:

Parameters	Foundation	Certified
Germination (minimum)	85%	80%
Pure seed (minimum)	98%	97%
Inert matter (maximum)	2%	3%
Other crop seeds (max)	10 per kg	20 per kg
Other variety seeds (max)	10/kg	20/kg
Weed seeds (max)	10/kg	20/kg
Objectionable weed seeds* (max)	2/kg	5/kg
Blast and seed-borne diseases	0.10% (by number)	0.50% (by number)
Seed moisture	12%	13%

* Wild rice seeds

2.2 Wheat

2.2.1 Land Requirements

Land intended to be used for seed production shall be free of volunteer plants of any variety or closely related species.

2.2.2 Field Inspections

A minimum of two field inspections shall be made between ear emergence and harvesting of the seed crop.

Field Standards

Isolation distance and other plant contaminants shall be as specified in the table below:

Contaminants	Isolation distance	
	Foundation	Certified
Fields of other varieties	3 m	3 m
Fields of same variety not conforming to purity	3 m	3 m
Fields of wheat, triticale or rye with loose smut infection	150 m	150 m
Off-types	0.05%	0.20%
Inseparable other crops*	0.01%	0.05%
Plants affected by seed-borne diseases	0.10%	0.50%

*include barley, oats, triticale

2.2.3 Seed Standards

Parameters	Foundation	Certified
Germination (minimum)	90%	85%
Pure seed (minimum)	98%	97%
Inert matter (maximum)	2%	3%
Other crop seeds (max)	10 per kg	20 per kg
Other variety seeds (max)	10/kg	20/kg
Weed seeds (max)	10/kg	20/kg
Objectionable weed seeds* (max)	2/kg	5/kg
Loose smut and other seed-borne diseases	0.10% (by number)	0.50% (by number)
Seed moisture	12%	12%

* seeds of *Phalaris minor*

2.3 Maize (Open-pollinated varieties/composites/synthetics)

2.3.1 Land Requirements

Land to be used for seed production of maize composites, synthetics and OPs shall be free of volunteer plants.

2.3.2 Field Inspections

A minimum of two field inspections shall be made, one before flowering and the other during flowering. Ear inspection after maturity shall also be done by the Certification Agency.

Field Standards

Isolation distance and other plant contaminants shall be as specified in the table below:

Contaminants	Isolation distance	
	Foundation	Certified
Fields of other varieties	400 m	200 m
Fields of same variety not conforming to purity	400 m	200 m
Off-types shedding pollen during flowering of seed variety	1%	1%

2.3.3 Seed Standards

Parameters	Foundation	Certified
Germination (minimum)	90%	90%
Pure seed (minimum)	98%	98%
Inert matter (maximum)	2%	2%
Other crop seeds (max)	5 per kg	10 per kg
Other distinguishable variety seeds (max)	10/kg	20/kg
Weed seeds (max)	None	None
Seed moisture	12%	12%

Note: Seed ears after harvest shall not contain in excess of 1% of off-type ears including ears of off-colored kernels. Shelling of the seeds ears is to be done after obtaining approval from the Certification Agency.

2.4 Rapeseed-mustard (*Brassica campestris* and *B. juncea*)

2.4.1 Land Requirements

Land to be used for seed production of rape seed and mustard shall be free of volunteer plants.

2.4.2 Field Inspections

A minimum of three field inspections shall be made, the first before flowering, the second from flowering to fruiting and the third at maturity and prior to harvesting.

Field Standards

Isolation distance and other plant contaminants shall be as specified in the table below:

Contaminants	Isolation distance	
	Foundation	Certified
Fields of other varieties of same species	150 m	100 m
Fields of same variety not conforming to purity	150 m	100 m
Fields of other Brassica spp.*	150 m	100 m
Off-types (max)	0.10%	0.50%
Objectionable weed plants**	0.05%	0.10%

* including *B. chinensis*, *B. rapa*, *B. napus*, *B. nigra*

** *Argemone mexicana*

2.4.3 Seed Standards

Parameters	Foundation	Certified
Germination (minimum)	90%	85%
Pure seed (minimum)	97%	97%
Inert matter (maximum)	3%	3%
Other crop seeds (max)	10 per kg	20 per kg
Other distinguishable variety seeds (max)	10/kg	20/kg
Total weed seeds (max)	10/kg	20/kg
Objectionable weed seeds (max)*	5/kg	10/kg
Seed moisture	8%	8%

* seeds of *Argemone mexicana*

2.5 Soyabean

2.5.1 Land Requirements

Land intended to be used for rice seed production shall be free of volunteer plants.

2.5.2 Field Inspections

A minimum of two field inspections shall be made –first during flowering and the second before harvesting after the leaves have shed.

Field Standards

Isolation distance and other plant contaminants shall be as specified in the table below:

Contaminants	Isolation distance	
	Foundation	Certified
Fields of other varieties	3 m	3 m
Fields of same variety not conforming to variety purity requirements for certification	3 m	3 m
Off-types*	0.10%	0.50%

* Off-types – maximum permitted at the final inspection.

2.5.3 Seed Standards

Parameters	Foundation	Certified
Germination (minimum)	70%	70%
Pure seed (minimum)	98%	98%
Inert matter (maximum)	2%	2%
Other crop seeds (max)	None	10 per kg
Weed seeds (max)	5/kg	10/kg
Seed moisture	12%	12%

2.6 Mungbean

2.6.1 Land Requirements

Land intended to be used for rice seed production shall be free of volunteer plants.

2.6.2 Field Inspections

A minimum of two field inspections shall be made – first before flowering and the second at flowering/fruit stage.

Field Standards

Isolation distance and other plant contaminants shall be as specified in the table below:

Contaminants	Isolation distance	
	Foundation	Certified
Fields of other varieties	10 m	5 m
Fields of same variety not conforming to variety purity requirements for certification	10 m	5 m
Off-types*	0.10%	0.20%

* Off-types – maximum permitted at the final inspection.

2.6.3 Seed Standards

Parameters	Foundation	Certified
Germination (minimum)	75%	75%
Pure seed (minimum)	98%	98%
Inert matter (maximum)	2%	2%
Other crop seeds (max)	5/kg	10/kg
Weed seeds (max)	5/kg	10/kg
Seed moisture	9%	9%

2.7 Finger millet

2.7.1 Land Requirements

Land intended to be used for rice seed production shall be free of volunteer plants.

2.7.2 Field Inspections

A minimum of two field inspections shall be made – first during flowering and the second at maturity/before harvesting.

Field Standards

Isolation distance and other plant contaminants shall be as specified in the table below:

Contaminants	Isolation distance	
	Foundation	Certified
Fields of other varieties	3 m	3 m
Fields of same variety not conforming to variety purity requirements for certification	3 m	3 m
Off-types*	0.05%	0.10%

* Off-types – maximum permitted at the final inspection.

2.7.3 Seed Standards

Parameters	Foundation	Certified
Germination (minimum)	75%	75%
Pure seed (minimum)	97%	97%
Inert matter (maximum)	3%	3%
Other crop seeds (max)	10/kg	20/kg
Weed seeds (max)	10/kg	20/kg
Seed moisture	12%	12%

3 SPECIFIC SEED STANDARDS FOR VEGETABLE CROPS

3.1 Radish (*Raphanus sativus* L)

3.1.1 Land requirements

Land to be used for seed production of radish shall be free of volunteer plants

3.1.2 Field Inspection

Mother root production stage:

A minimum of two inspections shall be made as follows:

The first inspection shall be made after 20-30 days of sowing in order to determine isolation, off types and other relevant factors;

The second inspection shall be made after the roots have been lifted to verify the true characteristics of roots

Seed production stage:

A minimum if one inspection shall be made during flowering to check isolation, off types, designated and other relevant factors.

3.1.3 Field standards

Seed fields shall be isolated from the contaminants shown in column 1 of Table below by the distances specified in columns 2,3,4 and 5 of the said Table:

Contaminants	Minimum distance (meters)			
	Mother root production stage		Seed production stage	
	Foundation	Certified	Foundation	Certified
1	2	3	4	5
Fields of other varieties of the same species	5	5	1600	1000
Fields of the same variety not confirming to varietal purity requirements for certification and rattail radish (<i>Raphanus caudatus</i> L)	5	5	1600	1000

Specific requirements

Factor	Maximum permitted	
	Foundation	Certified
*Roots not confirming to varietal characteristics	0.10% (by number)	0.20% (by number)
**Offtypes	0.10%	0.20%
***Plants affected by seed borne diseases at final inspection	0.10%	0.50%

* Maximum permitted at second inspection at mother root production stage

** Maximum permitted at flowering at seed production stage

*** Seed borne diseases shall be:

Black rot (*Xanthomonas campestris* pv. *campestris*)

Black leg (*Leptosphaeria maculans*)

3.1.4 Seed standards

Factor	Standards for each class	
	Foundation	Certified
Pure seed (minimum)	98.0%	98.0%
Inert mater (maximum)	2.0%	2.0%
Other crop seeds (maximum)	5/kg	10/kg
Weed seeds (maximum)	10/kg	20/kg
Germination (minimum)	70%	70%
Moisture (maximum)	6.0%	6.0%
For vapour proof containers (Maximum)	5.0%	5.0%

3.2 Carrot (*Dacus carota L*)

3.2.1 Land requirements

Land to be used for seed production of carrot shall be free of volunteer plants and other root crops.

Field Inspection:

Mother root production stage

A minimum of two inspections shall be made as follows:

the first inspection shall be made after 2-30 days of the sowing in order to determine isolation, volunteer plants, outcrosses, offtypes and other relevant factors

the second inspection shall be made after the mother roots have been lifted to verify the true characteristics of roots

Seed Production Stage

A minimum of four inspections shall be made as follows:

the first inspection shall be made before flowering in order to determine isolation, volunteer plants, outcrosses and other relevant factors;

the second and the third inspections shall be made during flowering to check isolation, offtypes and other relevant factors;

the fourth inspection shall be made at maturity to verify the true nature if umbels

3.2.2 Field standards

Carrot seed field shall be isolated from the contaminants shown in the column1 of the Table below by the distances specified in columns 2,3,4 and 5 of the said Table.

Contaminants	Minimum distance (meters)			
	Mother root production stage		Seed production stage	
	Foundation	Certified	Foundation	Certified
1	2	3	4	5
Fields of other varieties of the same species	5	5	1000	800
Fields of the same variety not confirming to varietal purity requirements for certification	5	5	1000	800

Specific requirements

Factor	Maximum permitted	
	Foundation	Certified
*Roots not confirming to varietal characteristics including forked roots (by number)	0.10%	0.20%
**Offtypes	0.10%	0.20%
***Plants affected by seed borne diseases at final inspection	0.10%	0.50%

* Maximum permitted at second inspection at mother root production stage

** Maximum permitted at and after flowering at seed production stage

*** Seed borne diseases shall be: *Alternaria porri*.f.sp *Daucu* (F), *Cercospora caratae*, Carrot red leaf virus

3.2.3 Seed Standards

Factor	Standards for each class	
	Foundation	Certified
Pure seed (minimum)	95.0%	95.0%
Inert mater (maximum)	5.0%	5.0%
Other crop seeds (maximum)	5/kg	10/kg
Weed seeds (maximum)	10/kg	20/kg
Other distinguishable varieties (maximum)	5/kg	10/kg
Germination (minimum)	60%	60%
Moisture (maximum)	8.0%	8.0%
For vapour proof containers (Maximum)	7.0%	7.0%

3.3 Onion (*Allium cepa* L)

3.3.1 Land requirements

Land to be used for seed production of onion shall be free of volunteer plants

3.3.2 Field Inspection

Mother bulb production stage

A minimum of two inspections shall be made as follows:

The first inspection shall be made after transplanting of seedlings in order to determine isolation, volunteer plants, offtypes including bolters and other relevant factors;

The second inspection shall be made after the bulbs have been lifted to verify the true characteristics of bulbs.

Seed production stage

A minimum of four inspections shall be made as follows:

The first inspection shall be made before flowering in order to determine isolation, volunteer plants, offtypes including bolters and other relevant factors;

The second and third inspections shall be made during flowering to check isolation, offtypes and other relevant factors;

The fourth inspection shall be made at maturity to verify the true nature of plant and other relevant factors.

3.3.3 Field standards

Onion seed fields shall be isolated from the contamination shown in column 1 of the Table below by the distance specified in columns 2,3,4 and 5 of the said Table.

Contaminants	Minimum distance (meters)			
	Mother root production stage		Seed production stage	
	Foundation	Certified	Foundation	Certified
1	2	3	4	5
Fields of other varieties	5	5	1000	500
Fields of the same variety not confirming to varietal purity requirements for certification	5	5	1000	500

Specific requirements

Factor	Maximum permitted	
	Foundation	Certified
*Bulbs not confirming to varietal characteristics	0.10% (by number)	0.20% (by number)
**Offtypes	0.10%	0.20%
***Plants affected by seed borne diseases at final inspection	0.10%	0.50%

* Maximum permitted at second inspection at mother bulb production stage

** Maximum permitted at and after flowering at seed production stage

*** Puccinia allii, Botrytis allii, Colletotrichum acutatum, Onion yellow dwarf virus

3.3.4 Seed Standards

Factor	Standards for each class	
	Foundation	Certified
Pure seed (minimum)	98.0%	98.0%
Inert mater (maximum)	2.0%	2.0%
Other crop seeds (maximum)	5/kg	10/kg
Weed seeds (maximum)	5/kg	10/kg
Germination (minimum)	70%	70%
Moisture (maximum)	8.0%	8.0%
For vapour proof containers (Maximum)	6.0%	6.0%

3.4 Cauliflower & Broccoli

(Brasica oleracea L var botrytis & Brassica oleracea L var italiaca Plenck)

The General seed certification standards are basic and together with the following specific standards constitute the standards for certification of the seeds of cauliflower and broccoli.

3.4.1 Land requirements

Land to be used for seed production of cauliflower and broccoli shall be free of volunteer plants.

3.4.2 Field Inspection

A minimum of three inspections shall be made, the first before the marketable stage, the second at the marketable stage and the third at the flowering stage.

3.4.3 Field Standards

Seed fields shall be isolated from the contaminants shown in the column 1 of the Table below by the distances specified in columns 2 and 3 of the said Table.

Contaminants	Minimum distance (meters)	
	Foundation	Certified
1	2	3
Fields of other varieties	1600	1000
Fields of the same variety not confirming to varietal purity requirements for certification and from the following varieties of <i>Brassica oleracea</i> (L); <i>Brassica oleracea</i> (L) var <i>oleracea</i> : wild cabbage <i>Brassica oleracea</i> (L) var <i>capitata</i> L: cabbage <i>Brassica oleracea</i> (L) var <i>ramose</i> DC: branching bush kale <i>Brassica oleracea</i> (L) var <i>millecapitata</i> (Lev) Helm: thousand headed kale <i>Brassica oleracea</i> (L) var <i>geminifera</i> DC: Brussels sprouts <i>Brassica oleracea</i> (L) var <i>acephala</i> DC: fodder kale <i>Brassica oleracea</i> (L) var <i>viridis</i> L: collards, tree kale <i>Brassica oleracea</i> (L) var <i>gongylodes</i> L: khol rabi <i>Brassica oleracea</i> (L) var <i>costata</i> DC: Portugal cabbage <i>Brassica oleracea</i> (L) var <i>sabuda</i> L: savoy cabbage	1600	1000

Specific requirements

Factor	Maximum permitted %	
	Foundation	Certified
*Offtypes	0.10	0.20
** Plants affected by seed borne diseases	0.10	0.50

* standards for offtypes shall be met at and flowering and for seed borne diseases at final inspection

** seed borne diseases shall be:

Black leg (*Leptosphaeria maculans* (Desm) Ces & de Not)

Black rot (*Xanthomonas campestris* pv *campestris* (Pamm) Dawson)

Soft rot (*Erwina carotovora* L.R. Jones)

3.4.4 Seed Standards

Factor	Standards for each class	
	Foundation	Certified
Pure seed (minimum)	98.0%	98.0%
Inert mater (maximum)	2.0%	2.0%
Other crop seeds (maximum)	5/kg	10/kg
Weed seeds (maximum)	5/kg	10/kg
Germination (minimum)	65%	65%
Moisture (maximum)	7.0%	7.0%
For vapour proof containers (Maximum)	5.0%	5.0%

3.5 Cabbage (*Brassica oleracea* var *capitata* L.)

The General seed certification standards are basic and together with the following specific standards constitute the standards for certification of the seeds of cabbage

3.5.1 Land requirements

Land to be used for seed production of cabbage shall be free of volunteer plants

3.5.2 Field Inspection

A minimum of three inspections shall be made, the first before the marketable stage, the second at the marketable stage and the third at the flowering stage.

3.5.3 Field Standards

Seed fields shall be isolated from the contaminants shown in the column 1 of the Table below by the distances specified in columns 2 and 3 of the said Table.

Contaminants	Minimum distance (meters)	
	Foundation	Certified
1	2	3
Fields of other varieties	1600	1000
Fields of the same variety not confirming to varietal purity requirements for certification and from the following varieties of <i>Brassica oleracea</i> (L); <i>Brassica oleracea</i> (L) var <i>oleracea</i> : wild cabbage <i>Brassica oleracea</i> (L) var <i>ramosa</i> DC: branching bush kale <i>Brassica oleracea</i> (L) var <i>millecapitata</i> (Lev) Helm: thousand headed kale <i>Brassica oleracea</i> (L) var <i>geminifera</i> DC: Brussels sprouts <i>Brassica oleracea</i> (L) var <i>acephala</i> DC: fodder kale <i>Brassica oleracea</i> (L) var <i>viridis</i> L: collards, tree kale: <i>Brassica oleracea</i> var <i>gongylodes</i> L: khol rabi <i>Brassica oleracea</i> (L) var <i>costata</i> DC: Portugal cabbage <i>Brassica oleracea</i> (L) var <i>sabuda</i> L: savoy cabbage <i>Brassica oleracea</i> (L) var <i>botrytis</i> L: cauliflower <i>Brassica oleracea</i> (L) var <i>italica</i> Plenek: broccoli	1600	1000

Specific requirements

Factor	Maximum permitted %	
	Foundation	Certified
*Offtypes	0.10	0.20
** Plants affected by seed borne diseases	0.10	0.50

* standards for offtypes shall be met at and flowering and for seed borne diseases at final inspection

** seed borne diseases shall be: Black leg (*Leptosphaeria maculans* (Desm) Ces & de Not), Black rot (*Xanthomonas campestris* pv *campestris* (Pamm) Dawson), Soft rot (*Erwina carotovora* L.R. Jones)

3.5.4 Seed Standards

Factor	Standards for each class	
	Foundation	Certified
Pure seed (minimum)	98.0%	98.0%
Inert mater (maximum)	2.0%	2.0%
Other crop seeds (maximum)	5/kg	10/kg
Weed seeds (maximum)	5/kg	10/kg
Germination (minimum)	70%	70%
Moisture (maximum)	7.0%	7.0%
For vapour proof containers (Maximum)	5.0%	5.0%

3.6 Spinach & Spinach beet (*Spinacia oleracea* L & *Beta vulgaris* (L) var *falvesence* DC)

The General seed certification standards are basic and together with the following specific standards constitute the standards for certification of the seeds of spinach and spinach beet.

3.6.1 Land requirements

Land to be used for seed production of spinach and spinach beet shall be free of volunteer plants

3.6.2 Field Inspection

A minimum of two inspections shall be made, the first before flowering, the second at the flowering stage.

3.6.3 Field Standards

Seed fields shall be isolated from the contaminants shown in the column 1 of the Table below by the distances specified in columns 2 and 3 of the said Table:

Contaminants	Minimum distance (meters)	
	Foundation	Certified
1	2	3
Fields of other varieties	1600	1000
Fields of the same variety not confirming to varietal purity requirements for certification	1600	1000
Fields of the Swiss chard (chard, sea kale beet, silver beet): <i>Beta vulgaris</i> Linn.var. <i>cicla</i> Moq., sugar beet (<i>Beta vulgaris</i> L), and garden beet (beet root, mangels or stock beet): <i>Beta vulgaris</i> (L) var. <i>rubra</i> oq. For spinach beet only	1600	1000

Specific requirements

Factor	Maximum permitted %	
	Foundation	Certified
*Offtypes	0.10	0.20

* standards for offtypes shall be met at and flowering and for seed borne diseases at final inspection

3.6.4 Seed Standards

Factor	Standards for each class	
	Foundation	Certified
Pure seed (minimum)	96.0%	96.0%
Inert mater (maximum)	4.0%	4.0%
Other crop seeds (maximum)	5/kg	10/kg
Weed seeds (maximum)	5/kg	10/kg
Germination (minimum)	60%	60%
Moisture (maximum)	9.0%	9.0%
For vapour proof containers (Maximum)	8.0%	8.0%

3.7 Lettuce (*Lactuca sativa* L)

The General seed certification standards are basic and together with the following specific standards constitute the standards for certification of the seeds of lettuce.

3.7.1 Land requirements

Land to be used for seed production of lettuce shall be free of volunteer plants

3.7.2 Field Inspection

A minimum of three inspections shall be made, the first before heads have formed in heading types, and before full growth stage in non-heading types, the second when heads have formed in heading types, and at full grown stage in non-heading types and the third at the flowering stage.

3.7.3 Field Standards

Seed fields shall be isolated from the contaminants shown in the column 1 of the Table below by the distances specified in columns 2 and 3 of the said Table.

Contaminants	Minimum distance (meters)	
	Foundation	Certified
1	2	3
Fields of other varieties	50	25
Fields of the same variety not confirming to varietal purity requirements for certification and wild lettuce (<i>Lactuca scariola</i> L)	50	25

Specific requirements

Factor	Maximum permitted %	
	Foundation	Certified
*Offtypes	0.10	0.20
** Objectionable weed plants	0.010	0.020
***Plants affected by seed borne diseases	0.10	0.50

* maximum permitted at final inspection

**objectionable weed shall be: wild lettuce

***seed borne disease shall be: Lettuce mosaic virus

3.7.4 Seed Standards

Factor	Standards for each class	
	Foundation	Certified
Pure seed (minimum)	98.0%	98.0%
Inert mater (maximum)	2.0%	4.0%
Other crop seeds (maximum)	none	none
Total Weed seeds (maximum)	5/kg	10/kg
*Objectionable weed seeds (maximum)	2/kg	5/kg
Other distinguishable varieties (maximum)	10/kg	20/kg
Germination (minimum)	70%	70%
Moisture (maximum)	8.0%	8.0%
For vapour proof containers (Maximum)	6.0%	6.0%

3.8 Asparagus (*Asparagus officinalis* L.)

The General seed certification standards are basic and together with the following specific standards constitute the standards for certification of asparagus seed

3.8.1 Land requirements

Land to be used for seed production of asparagus shall be free of volunteer plants

3.8.2 Field Inspection

A minimum of three inspections shall be made, the first at crowning stage, the second during flowering and fruiting stage and the third at maturity and prior to harvesting.

3.8.3 Field Standards

Seed fields shall be isolated from the contaminants shown in the column 1 of the Table below by the distances specified in columns 2 and 3 of the said Table.

Contaminants	Minimum distance (meters)	
	Foundation	Certified
1	2	3
Fields of other varieties	500	300
Fields of the same variety not confirming to varietal purity	500	300

requirements for certification		
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Specific requirements

Factor	Maximum permitted %	
	Foundation	Certified
*Offtypes	0.10	0.20

* maximum permitted at and after flowering.

3.8.4 Seed Standards

Factor	Standards for each class	
	Foundation	Certified
Pure seed (minimum)	96.0%	96.0%
Inert mater (maximum)	4.0%	4.0%
Other crop seeds (maximum)	5/kg	10/kg
Weed seeds (maximum)	5/kg	10/kg
Germination (minimum)	70%	70%
Moisture (maximum)	8.0%	8.0%
For vapour proof containers (Maximum)	6.0%	6.0%

3.9 Tomato (*Lycopersicon esculentum* Mill)

The General seed certification standards are basic and together with the following specific standards constitute the standards for certification of tomato seed

3.9.1 Land requirements

Land to be used for seed production of tomato shall be free of volunteer plants

3.9.2 Field Inspection

A minimum of three inspections shall be made, the first before flowering, the second during flowering and fruiting stage and the third at maturity and prior to harvesting.

3.9.3 Field Standards

Seed fields shall be isolated from the contaminants shown in the column 1 of the Table below by the distances specified in columns 2 and 3 of the said Table.

Contaminants	Minimum distance (meters)	
	Foundation	Certified
1	2	3
Fields of other varieties	50	25
Fields of the same variety not confirming to varietal purity requirements for certification	50	25

Specific requirements

Factor	Maximum permitted %*	
	Foundation	Certified
Offtypes	0.10	0.20
**Plants affected by seed borne diseases	0.10	0.50

* Maximum permitted at final inspection

** Seed borne diseases shall be: Early blight (*Alternaria solani* Sorauer), Leaf spot (*Semphylium solani* Weber)

Tobacco Mosaic virus (TMV)

3.9.4 Seed Standards

Factor	Standards for each class	
	Foundation	Certified
Pure seed (minimum)	98.0%	98.0%
Inert mater (maximum)	2.0%	2.0%
Other crop seeds (maximum)	5/kg	10/kg
Weed seeds (maximum)	None	None
Germination (minimum)	70%	70%
Moisture (maximum)	8.0%	8.0%
For vapour proof containers (Maximum)	6.0%	6.0%

3.10 Okra (*Abelmoschus esculentus* (L.) Moench)

The General seed certification standards are basic and together with the following specific standards constitute the standards for certification of okra seed

3.10.1 Land requirements

Land to be used for seed production of okra shall be free of volunteer plants

3.10.2 Field Inspection

A minimum of three inspections shall be made, the first before flowering, the second during peak flowering and fruiting stage and the third at mature fruit stage and prior to harvesting.

3.10.3 Field Standards

Seed fields shall be isolated from the contaminants shown in the column 1 of the Table below by the distances specified in columns 2 and 3 of the said Table.

Contaminants	Minimum distance (meters)	
	Foundation	Certified
1	2	3
Fields of other varieties	400	200
Fields of the same variety not confirming to varietal purity requirements for certification and wild okra (<i>A.ficulneus</i> (L) Wt. & Arn <i>A.manihot</i> (L.) Medic. And <i>A.moschatus</i> (L.) Medic.)	400	200

Specific requirements

Factor	Maximum permitted %	
	Foundation	Certified
*Offtypes	0.10	0.20
**Objectionable weed plants	None	None

* maximum permitted at and after flowering.

**Objectionable weeds shall be : wild okra: (*A.ficulneus* (L) Wt. & Arn *A.manihot* (L.) Medic. And *A.moschatus* (L.) Medic.)

3.10.4 Seed Standards

Factor	Standards for each class	
	Foundation	Certified
Pure seed (minimum)	99.0%	99.0%
Inert mater (maximum)	1.0%	1.0%
Other crop seeds (maximum)	none	None
Total Weed seeds (maximum)	none	none

Objectionable weed seeds	none	none
Other distinguishable varieties (maximum)	10/kg	20/kg
Germination (minimum)	65%	65%
Moisture (maximum)	10.0%	10.0%
For vapour proof containers (Maximum)	8.0%	8.0%

3.11 Capsicum (Sweet pepper) & Chilli (*Capsicum annum L.*)

The General seed certification standards are basic and together with the following specific standards constitute the standards for certification of capsicum and chilli seed.

3.11.1 Land requirements

Land to be used for seed production of capsicum and chilli shall be free of volunteer plants

3.11.2 Field Inspection

A minimum of three inspections shall be made, the first before flowering, the second at the flowering and fruiting stage and the third at mature fruit stage and prior to harvesting.

3.11.3 Field Standards

Seed fields shall be isolated from the contaminants shown in the column 1 of the Table below by the distances specified in columns 2 and 3 of the said Table

Contaminants	Minimum distance (meters)	
	Foundation	Certified
1	2	3
Fields of other varieties	400	200
Fields of the same variety not confirming to varietal purity requirements for certification	400	200
Fields of capsicum form chilli and vice versa	400	200

Specific requirements

Factor	Maximum permitted %	
	Foundation	Certified
*Offtypes	0.10	0.20
**Plants affected by seed borne diseases	0.01	0.50

* maximum permitted at and after flowering in the case of offtypes and at the final inspection in the case of seed borne diseases. **Seed borne diseases shall be : Leaf blight: (*Alternaria solani* Sorauer); Anthracnose (Ripe rot and Die back): (*Colletotrichum capsici* (Syd.) Butler & Bisby)

3.11.4 Seed Standards

Factor	Standards for each class	
	Foundation	Certified
Pure seed (minimum)	98.0%	98.0%
Inert mater (maximum)	2.0%	2.0%
Other crop seeds (maximum)	5/kg	10/kg
Weed seeds (maximum)	5/kg	10/kg
Germination (minimum)	60%	60%
Moisture (maximum)	8.0%	8.0%
For vapour proof containers (Maximum)	6.0%	6.0%

3.12 Brinjal (*Solanum melongena L.*)

The General seed certification standards are basic and together with the following specific standards constitute the standards for certification of brinjal seed.

3.12.1 Land requirements

Land to be used for seed production of brinjal shall be free of volunteer plants

3.12.2 Field Inspection

A minimum of three inspections shall be made, the first before flowering, the second at the flowering and fruiting stage and the third at mature fruit stage and prior to harvesting.

3.12.3 Field Standards

Seed fields shall be isolated from the contaminants shown in the column 1 of the Table below by the distances specified in columns 2 and 3 of the said Table:

Contaminants	Minimum distance (meters)	
	Foundation	Certified
1	2	3
Fields of other varieties	200	100
Fields of the same variety not confirming to varietal purity requirements for certification	200	100

Specific requirements

Factor	Maximum permitted %	
	Foundation	Certified
*Offtypes	0.10	0.20
**Plants affected by seed borne diseases	0.01	0.50

* Maximum permitted at and after flowering in the case of offtypes and at the final inspection in the case of seed borne diseases. **Seed borne diseases shall be: Phomopsis blight (*Phonopsis vexans*)

3.12.4 Seed Standards

Factor	Standards for each class	
	Foundation	Certified
Pure seed (minimum)	98.0%	98.0%
Inert mater (maximum)	2.0%	2.0%
Other crop seeds (maximum)	none	None
Weed seeds (maximum)	None	None
Germination (minimum)	70%	70%
Moisture (maximum)	8.0%	8.0%
For vapour proof containers (Maximum)	6.0%	6.0%

3.13 Watermelon (*Citrullus lanatus Thumb*)

The General seed certification standards are basic and together with the following specific standards constitute the standards for certification of watermelon seed.

3.13.1 Land requirements

Land to be used for seed production of watermelon shall be free of volunteer plants

3.13.2 Field Inspection

A minimum of three inspections shall be made, the first before flowering, the second at the flowering and fruiting stage and the third at mature fruit stage and prior to harvesting.

3.13.3 Field Standards

Seed fields shall be isolated from the contaminants shown in the column 1 of the Table below by the distances specified in columns 2 and 3 of the said Table:

Contaminants	Minimum distance (meters)	
	Foundation	Certified
1	2	3
Fields of other varieties	1000	500
Fields of the same variety not confirming to varietal purity requirements for certification and wild watermelon <i>Citrullus colocynthis</i> L.	1000	500

Specific requirements

Factor	Maximum permitted %	
	Foundation	Certified
*Offtypes	0.10	0.20
**Objectionable weed plants	None	None

* Maximum permitted at and after flowering.

**Objectionable weed shall be: wild watermelon *Citrullus colocynthis* L.

3.13.4 Seed Standards

Factor	Standards for each class	
	Foundation	Certified
Pure seed (minimum)	98.0%	98.0%
Inert mater (maximum)	2.0%	2.0%
Other crop seeds (maximum)	none	None
Total Weed seeds (maximum)	None	None
Objectionable weed seeds (maximum)	None	None
Other distinguishable varieties (maximum)	5/kg	10/kg
Germination (minimum)	60%	60%
Moisture (maximum)	7.0%	7.0%
For vapour proof containers (Maximum)	6.0%	6.0%

3.14 Cucumber (*Cucumis sativus* L.)

The General seed certification standards are basic and together with the following specific standards constitute the standards for certification of cucumber seed.

3.14.1 Land requirements

Land to be used for seed production of cucumber shall be free of volunteer plants

3.14.2 Field Inspection

A minimum of three inspections shall be made, the first before flowering, the second at the flowering and fruiting stage and the third at mature fruit stage and prior to harvesting.

3.14.3 Field Standards

Seed fields shall be isolated from the contaminants shown in the column 1 of the Table below by the distances specified in columns 2 and 3 of the said Table:

Contaminants	Minimum distance (meters)	
	Foundation	Certified
1	2	3
Fields of other varieties	1000	500
Fields of the same variety not confirming to varietal purity requirements for certification and from <i>Cucumis hardwickii</i> Royle.	1000	500

Specific requirements

Factor	Maximum permitted %	
	Foundation	Certified
*Offtypes	0.10	0.20
**Objectionable weed plants	None	None

* Maximum permitted at and after flowering.

**Objectionable weed shall be: *Cucumis hardwickii* Royle

3.14.4 Seed Standards

Factor	Standards for each class	
	Foundation	Certified
Pure seed (minimum)	98.0%	98.0%
Inert mater (maximum)	2.0%	2.0%
Other crop seeds (maximum)	5/kg	10/kg
Total Weed seeds (maximum)	None	None
Objectionable weed seeds (maximum)	None	None
Germination (minimum)	60%	60%
Moisture (maximum)	7.0%	7.0%
For vapour proof containers (Maximum)	6.0%	6.0%

3.15 Bottle Gourd (*Lagernaria siceraria* Molina)

The General seed certification standards are basic and together with the following specific standards constitute the standards for certification of bottle gourd seed.

3.15.1 Land requirements

Land to be used for seed production of bottle gourd shall be free of volunteer plants

3.15.2 Field Inspection

A minimum of three inspections shall be made, the first before flowering, the second at the flowering and fruiting stage and the third at mature fruit stage and prior to harvesting.

3.15.3 Field Standards

Seed fields shall be isolated from the contaminants shown in the column 1 of the Table below by the distances specified in columns 2 and 3 of the said Table:

Contaminants	Minimum distance (meters)	
	Foundation	Certified
1	2	3
Fields of other varieties	1000	500

Fields of the same variety not confirming to varietal purity requirement	1000	500
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Specific requirements

Factor	Maximum permitted %	
	Foundation	Certified
*Offtypes	0.10	0.20

* Maximum permitted at and after flowering.

3.15.4 Seed Standards

Factor	Standards for each class	
	Foundation	Certified
Pure seed (minimum)	98.0%	98.0%
Inert mater (maximum)	2.0%	2.0%
Other crop seeds (maximum)	None	None
Weed seeds (maximum)	None	None
Germination (minimum)	60%	60%
Moisture (maximum)	7.0%	7.0%
For vapour proof containers (Maximum)	6.0%	6.0%

3.16 Bitter Gourd (*Momordica charantia L.*)

The General seed certification standards are basic and together with the following specific standards constitute the standards for certification of bitter gourd seed.

3.16.1 Land requirements

Land to be used for seed production of bitter gourd shall be free of volunteer plants

3.16.2 Field Inspection

A minimum of three inspections shall be made, the first before flowering, the second at the flowering and fruiting stage and the third at mature fruit stage and prior to harvesting.

3.16.3 Field Standards

Seed fields shall be isolated from the contaminants shown in the column 1 of the Table below by the distances specified in columns 2 and 3 of the said Table:

Contaminants	Minimum distance (meters)	
	Foundation	Certified
1	2	3
Fields of other varieties	1000	500
Fields of the same variety not confirming to varietal purity requirements for certification and from balsam apple : <i>Momordica balsamina L.</i> ; <i>M. cochinchinensis Spreng.</i> ; <i>.dioica Roxb.</i>	1000	500

Specific requirements

Factor	Maximum permitted %	
	Foundation	Certified
*Offtypes	0.10	0.20
**Objectionable weed plants	None	None

* Maximum permitted at and after flowering.

** Objectionable weeds shall be: *Momordica balsamina L.*; *M. cochinchinensis Spreng.*; *.dioica Roxb.*

3.16.4 Seed Standards

Factor	Standards for each class	
	Foundation	Certified
Pure seed (minimum)	98.0%	98.0%
Inert mater (maximum)	2.0%	2.0%
Other crop seeds (maximum)	None	None
Total weed seeds (maximum)	None	None
Objectionable weed seeds	none	None
Other distinguishable varieties (maximum)	5/kg	10/kg
Germination (minimum)	60%	60%
Moisture (maximum)	7.0%	7.0%
For vapour proof containers (Maximum)	6.0%	6.0%

3.17 Beans (*Phaseolus vulgaris*)

The General seed certification standards are basic and together with the following specific standards constitute the standards for certification of beans seed.

3.17.1 Land requirements

Land to be used for seed production of beans shall be free of volunteer plants

3.17.2 Field Inspection

A minimum of three inspections shall be made, the first before flowering, the second at the flowering and fruiting stage and the third at mature fruit stage and prior to harvesting.

3.17.3 Field Standards

Seed fields shall be isolated from the contaminants shown in the column 1 of the Table below by the distances specified in columns 2 and 3 of the said Table:

Contaminants	Minimum distance (meters)	
	Foundation	Certified
1	2	3
Fields of other varieties	50	10

Specific requirements

Factor	Maximum permitted %	
	Foundation	Certified
*Offtypes	0.10	0.20

* Maximum permitted at flowering and pod formation.

3.17.4 Seed Standards

Factor	Standards for each class	
	Foundation	Certified
Pure seed (minimum)	98.0%	98.0%
Inert mater (maximum)	2.0%	2.0%
Other crop seeds (maximum)	None	None
Total weed seeds (maximum)	None	None
Objectionable weed seeds	None	None
Other distinguishable varieties (maximum)	0.1%	0.1%
Germination (minimum)	75%	75%
Moisture (maximum)	9.0%	9.0%

3.18 Peas (*Pisum sativum*)

The General seed certification standards are basic and together with the following specific standards constitute the standards for certification of peas seed.

3.18.1 Land requirements

Land to be used for seed production of peas shall be free of volunteer plants

3.18.2 Field Inspection

A minimum of three inspections shall be made, the first before flowering, the second at the flowering and fruiting stage and the third at mature fruit stage and prior to harvesting.

3.18.3 Field Standards

Seed fields shall be isolated from the contaminants shown in the column 1 of the Table below by the distances specified in columns 2 and 3 of the said Table:

Contaminants	Minimum distance (meters)	
	Foundation	Certified
1	2	3
Fields of other varieties	20	10

Specific requirements

Factor	Maximum permitted %	
	Foundation	Certified
*Offtypes	0.10	0.20

* Maximum permitted at and after flowering.

3.18.4 Seed Standards

Factor	Standards for each class	
	Foundation	Certified
Pure seed (minimum)	98.0%	98.0%
Inert mater (maximum)	2.0%	2.0%
Other crop seeds (maximum)	None	None
Total weed seeds (maximum)	None	None
Objectionable weed seeds	None	None
Other distinguishable varieties (maximum)	0.05%	0.05%
Germination (minimum)	75%	75%
Moisture (maximum)	9.0%	9.0%

3.19 Seed Potato (*Solanum tubersum L*)

3.19.1 General requirements

Registration of cultivars for certification

- All potato seed growers must be registered with an association of seed growers having a set of bi-laws which is approved by the Seed Board or with DSC or similar emerging organizations.
- Only registered cultivars will be certified.

Maintenance of cultivars

- The RNR-RC Yusipang will be responsible for maintaining all potato cultivars officially released in the country in in-vitro form.

- In the initial phase the DSC will be responsible for the production of pre-basic and basic seed. Both categories will be produced in the Phobjikha farm only under the direct supervision of DSC.

Categories of certified seeds:

The accepted categories of seed shall be:

- **Pre-basic:** Meaning tuber-seeds produced in vector free/ closed environments (laboratory, glasshouses, screen houses, high elevation) from pathogen-tested *in vitro* plants or tubers or through clonal selection with indexing methods or from rooted plants produced originally from *in vitro* plants
- **Basic:** Seed multiplied from Pre-basic seed
- **Certified:** Seed multiplied from Basic seed or from any previous approved high quality stocks/lots of certified seed.

Production zone for certified seeds:

- Fields must be located in areas with very low to minimal populations of virus vectors. Preferably choose area with altitudes above 3000 masl.
- Fields for multiplication of any seed category should be free of wart and bacterial wilt incidences.
- The areas that must be used for the production of the seed tubers should as far as possible be free from virus transmitting aphids.
- The distance between seed fields and other potato fields must be at least three metres if the possibility of the contact virus exists. Where virus transmission is through aphids then the isolation distance should be at least twenty metres.

Field Inspections

- The first inspection will be made immediately before or after planting in order to verify the origin and identity of the seed, amount of seed to be planted or that has been planted, and also to verify the previous history of the field, altitude, rotation, isolation and other agronomic aspects of the field.
- The second inspection made in the period of 40-60 days after planting but before the plants touch each other so that the movement of the inspectors can be done without touching the plants. The inspectors will verify the identity of the cultivar, its purity, the sanitary conditions (virus and other disease), and the field condition in general.
- The optional third inspection will be held between 60-80 days after planting depending on the discretion of the inspector in order to verify any particular practices or to measure again any pending factors.
- All classes will have to be certified by BAFRA
- Certification fees fixed and notified from time to time by the NSB for every seed of notified kind or variety shall apply

For the above crop certification the inspectors will follow standard methods described below:

- i. Minimum 4 counts of 100 plants each are taken randomly on four spots in a zigzag manner in one hectare area. For every additional hectare or part thereof two samples of 100 plants each are observed for all visible mosaics, other diseases and off types.
- ii. All relevant observation of each individual counts are filled in the prescribed Performa (developed by BAFRA). The overall appraisal of all these counts, thus inspected, will decide the rejection or selection of the seed crop in a particular field.

Finally the graded seed will be inspected for tuber grades and surface damages/infection along with packing standards. During this time the inspector will

Crop rotation

In order to avoid volunteers and ground keepers from mixing with the planted seed lots a minimum of three years rotation should be followed. Volunteer plants are also important host plants for diseases and viruses and therefore rotations will avoid spread of the diseases to the seed lots.

Rouging

Rouging is the removal of unwanted plants, which are usually off-types (variety mixtures and diseased plants). The growers should do rouging on a regular basis and field inspectors should check that the practice is being done in the right way. It is necessary to remove the whole plant along with the tubers. These rouged plants must be removed from the seed plots and preferably destroyed.

3.19.2 Specific Requirement

- The seed tubers should not weigh less than 35 grams.
- The seed lot should be reasonably clean and free from stones, soil, and firm with characteristic eyes, colour and shape of the variety.
- The proportion of tubers with cuts and bruises, cracks and other mechanical damages should not exceed 3 % by count.
- The seed tubers should be free from damages caused by insects and worms and free from visible symptoms arising through infections from late blight, dry or wet rots, charcoal rot, wart, black heart and freezing injury. Tolerance limits of the damage caused by the above factors should not exceed 1 % by count.

Maximum tolerances based on field inspections

	Pre-basic	Basic	Certified
Variety mixture and off-type plants	<0.1	0.2	1
Leaf roll and severe mosaic	<0.1	0.2	1
Mild mosaic and Rhizoctonia	<0.1	0.5	1
Total virus diseases	0.1	0.7	1.5
Black leg	0	0.2	1
Bacterial wilt	Not allowed in any category		
Wart	Not allowed in any category		

4 FRUIT PLANTS CERTIFICATION STANDARDS

4.1 General Standards

1. The word 'seedling' or 'graft' as used in these standards shall include all propagating materials. The following minimum requirements should be met:
2. The seedlings should have strong and well established root system.
3. The stem diameter of the planting material should be more than 10 mm above the graft / bud union.
4. For grafted or budded materials, the union should be at least 20-30 cm from the first lateral roots.
5. The height of the seedlings/grafts should be at least 1 metre from graft/bud union.
6. The planting material should have straight trunk.
7. The seedlings/grafts should be free from visible pests and diseases.
8. Prior to distribution, the plants should be treated with appropriate insecticide and fungicide.
9. Grafted/budded scion/ seedlings should be of released variety labelled specifying the scion and root stock used.

4.1.1 Field Inspection of Fruits Mother plants/Scion Bank

All the Fruits and Nuts Nursery Growers shall need a collection of mother plants or scion bank for producing rootstock and scion wood prior to establishment of nursery. At least one field inspection of fruits mother plants/scion bank collection shall be made by BAFRA to see whether the scion to be collected and used are free from graft transmissible diseases mentioned against each fruits and nuts crops. The field visit and inspection should be carried out between May and August for certification of mother plant to be used for propagation in the following year.

4.1.2 Field Inspection of fruits Nursery

One or more Nursery inspections shall be made each time a planting materials of any certified class is grown before distribution to the customers for genetic purity, identity or any other standards affecting planting materials certification. The nursery shall be in such condition to permit an adequate inspection to determine genetic purity and identity and any other standards mentioned against each fruits and nuts crops. If the standards mention against each crop is not met, it will provide sufficient ground for rejection of that nursery or part of the planting materials.

4.1.3 Re-inspection of Rejected Fields

If a nursery grower desires to have re-inspection of a rejected nursery or planting materials, he must notify the BAFRA when shortcomings pointed out in the previous inspection have been corrected. Re-inspection will be done to see if the shortcomings observed in the first inspection are rectified. However, the age of the seedlings do not cross the limits mentioned in the minimum quality standard of planting material for each fruits and nut crops.

4.1.4 Seed-Borne Diseases and Seed Treatment

Every field for which certification is requested shall show evidence that reasonable precaution has been taken to control seed-borne diseases in cases where seed has been used for propagation. The field at time of inspection shall not contain seed-borne plant diseases beyond established tolerances limit in the individual crop seed standards. New diseases may create a need for new standards before they can be published. In such situations, the BAFRA shall seek the support of subject matter specialist to impose standards as are in the best interests of Certified seed and seedlings. When seed of a variety without resistance to a seed-borne disease has been subjected to possible infection with the disease it is desirable that such seed be treated with recommended seed treatment chemicals.

4.2 Specific standards

Specific standards are given in the following sections.

4.2.1 Apple

1. The materials should be either grafted or budded only.

2. The seedling should have strong and well established root system.
3. The graft union should be at least 30cm from the first lateral roots.
4. It should be at least 1m high from the point of grafting.
5. The stem diameter should 10 mm above the graft union.
6. It should have straight trunk.
7. The scion should not be grafted on stool saplings.
8. The source of the scion should be labelled properly.
9. The mother plant of the rootstock and scion should be healthy and free of major pest diseases (apple virus, stem canker, wooly aphids, scale insects, apple rust, apple scab, apple blotch and powdery mildew).
10. Apple grafted on to MM106 rootstock should be recommended only for well drained soil to avoid incidence of *Phytophthora* rot.
11. The materials should be in complete dormancy at the time of distribution.
12. The roots of the plants should be healthy and fresh and should be packed properly with appropriate packing materials (sphagnum moss).

4.2.2 Pear

1. The materials should be either grafted or budded only.
2. The seedling should have strong and well established root system.
3. The graft union should be at least 30cm from the first lateral roots.
4. It should be at least 1m high from the point of grafting.
5. The stem diameter should be 10 mm above the graft union.
6. It should have straight trunk.
7. The scion should not be grafted on stool saplings.
8. The source of the scion should be labelled properly.
9. The mother plant of the rootstock and scion should be healthy and free of major pest diseases (blight and canker)
10. The materials should be in complete dormancy at the time of distribution.
11. The roots of the plants should be healthy and fresh and should be packed properly with appropriate packing materials (sphagnum moss).
12. If grafted materials are imported, they should be labelled specifying the variety and origin of the plants imported from
13. The mother plant of scion should be of known variety

4.2.3 Peach

1. The seedling should have strong and well established root system.
2. The graft union should be at least 30cm from the first lateral roots.
3. It should be at least 1m high from the point of grafting.
4. The stem diameter should be 10 mm above the graft union.
5. It should have straight trunk.
6. The scion should not be grafted on stool saplings.
7. The source of the scion should be labelled properly.
8. The mother plant of the rootstock and scion should be healthy and free of major pest diseases (blight and canker)
9. The materials should be in complete dormancy at the time of distribution.
10. The roots of the plants should be healthy and fresh and should be packed properly with appropriate packing materials (sphagnum moss).
11. If grafted materials are imported, they should be labelled specifying the variety and origin of the plants imported from
12. The mother plant of scion should be of known variety
13. The materials should be either grafted or budded only.
14. The source of the scion and rootstock should be labelled properly and of known and released varieties.
15. The Plant material should be free of Gumosis, Peach Leaf Curl disease and Peach aphids.

4.2.4 Plum and Apricot

1. The seedling should have strong and well established root system.
2. The graft union should be at least 30cm from the first lateral roots.
3. It should be at least 1m high from the point of grafting.
4. The stem diameter should be 10 mm above the graft union.
5. It should have straight trunk.
6. The scion should not be grafted on stool saplings.
7. The source of the scion should be labelled properly.
8. The mother plant of the rootstock and scion should be healthy and free of major pest diseases (blight and canker)
9. The materials should be in complete dormancy at the time of distribution.
10. The roots of the plants should be healthy and fresh and should be packed properly with appropriate packing materials (sphagnum moss).
11. If grafted materials are imported, they should be labelled specifying the variety and origin of the plants imported from
12. The mother plant of scion should be of known variety
13. The materials should be either grafted or budded only.
14. The source of the scion and rootstock should be labelled properly and of known and released varieties.
15. The Plant material should be free of Gumosis and helmet scale.

4.2.5 Cherry

1. The materials should be either grafted or budded only.
2. The source of the scion and rootstock should be labelled properly and of known variety.
3. If grafted materials are imported, they should be labelled specifying the variety and origin of the plants imported from
4. The mother plant of scion should be of known and released variety
5. The material should be free of virus and Gumosis.
6. The materials should be in complete dormancy at the time of distribution.
7. The roots of the plants should be healthy and fresh and should be packed properly with appropriate packing materials (sphagnum moss).

4.2.6 Strawberry

1. The source of the material should be mentioned and labelled properly.
2. Only the runners produced through stolon should be used as the planting material, since propagation through seeds does not produce plants that are true to type.
3. The runners (seedlings) should be healthy with good root system and of at least 40 cm in length and that have not borne any crop.
4. The runners should be free of *Alternaria*, rust, red core (*Phytophthora fragariae*)and viral disease.
5. The mother plant should be healthy and of known origin.

4.2.7 Grapes (*Vitis vinifera*)

1. The planting material for grapes can be either from cuttings of one year old canes or graft.
2. If the cutting is used as the planting material it should be at least one year old.
3. For grafted plants, the material should be at least two years old. For both the types, the material should contain about 3-4 vegetative buds.
4. The height of the plants should be between 30 to 35 cm. from the first lateral root with a stem diameter of 1.5 to 2cm.
5. The plants should be healthy with a strong root system and supplied only during the dormant season.
6. The material should be free of Downey mildew, Powdery mildew, Grape mites and Thrips.

4.2.8 Walnut (*Juglans regia* L.)

4.2.8.1 Rootstock standard

1. Either soft-shell or hard-shell walnut seedlings of 1-2 years old.
2. Plant height should be at least 50cm from the ground level.
3. The seedling diameter should be at least 20mm at the collar region.
4. The seedlings should be used only for root stock purposes.
5. It should be sold at the dormant stage only (before new leaves sprouts).
6. It should be free from walnut aphid (*Chromahis juglandicola*) which is active from April to September.
7. It should be free from walnut blight caused by *Xanthomonas campestris* pv. *Jugalandis*.
8. The rootstock should be free from Phytophthora root and crown rot caused by number of *Phytophthora* spp.

4.2.8.2 Graft Standards

1. Grafted walnut should be at least 8 months old during sale from the time of grafting
2. It should be identified as cultivars that are released by VRC or source of scion wood.
3. It should have minimum height of 50 cm from graft union
4. Grafted walnut should be in complete dormancy at the time of distribution.
5. Plants should have well-developed root and shoot system free from any insect pests and diseases as described for walnut rootstock seedlings above

4.2.9 Pecan (*Carya illinoensis*, Wang)

1. The seedling should be vegetatively propagated (grafting or budding) with cultivars label.
2. It should be at least one year old grafted plant of 0.5-1m height.
3. It should have a collar diameter of 10 to 15 mm.

4.2.10 Almond (*Prunus dulcis*)

1. The source of the budded plants should be labelled properly and of known and released variety.
2. It should be at least one year old budded plants of 0.5 to 1m height.
3. It should have a collar diameter of 10-20mm.
4. The seedlings should be healthy and free from insects pests like twig borer (*Anarsia lineatella*) attacking buds and shoots which causes them to wither. Use the scion wood free of “Infectious bud failure” caused by a strain of PNRV. Symptoms are the failure of vegetative and flower buds to open.
5. Control: avoid using infected scion wood for grafting since it is spread through vegetative materials.
6. Use scion wood and seeds free from “Non-infectious bud failure” tree. It is genetic disorder and also known as crazy top and mule tail. It is transmitted by vegetative propagation and through seeds and this disorder result in failure of the vegetative buds, which appear necrotic.

4.2.11 Mango (*Mangiferae indica*)

1. The planting materials should be grafted with identified cultivar of known and released varieties.
2. The seedling should be at least one year old grafted mango with plant height of 0.5m measured from the graft union to the tip.
3. The seedling should have collar diameter of 10-15mm. (What happens if more)

4.2.12 Mandarin Orange (*Citrus reticulata* Blanco)

4.2.12.1 Seedlings

1. The planting material should be healthy and at least 1m tall.
2. The seedling should be at least 1 cm in diameter.
3. The source of the seeds should be labelled.
4. The planting material should be at least one-year old.
5. The planting materials should be free from any known citrus pest and diseases at the time of sale.

6. The material should be raised in poly-bag to enable safe handling and prevent damage or mortality during distant transport.
7. The material should be certified free from any known pests or diseases of citrus.

4.2.12.2 Budded plants

Local mandarin seedlings could be used as rootstock for budding until an appropriate rootstock is released. The following are the requirements for healthy budded materials.

1. The planting material should be healthy and at least 60 cm tall.
2. The planting material should be at least 1 cm in diameter
3. The source of the budwood and stock should be labelled
4. The budded plant should be at least 1 year old during sale from the time of budding.
5. The bud joint/union should be at least 15 cm above the soil surface
6. The planting materials should be free from any known citrus pest and diseases at the time of sale

4.2.13 Lime (*Citrus trifoliata* Swingle).

4.2.13.1 Seedlings

1. The planting material should be healthy and at least 1m tall.
2. The seedling should be at least 1 cm in diameter.
3. The source of the seeds should be labelled.
4. The planting material should be at least one-year old.
5. The planting materials should be free from any known citrus pest and diseases at the time of sale.
6. The material should be raised in poly-bag to enable safe handling and prevent damage or mortality during distant transport.
7. The material should be certified free from any known pests or diseases of citrus.

4.2.13.2 Budded plant

1. The planting material should be healthy and at least one metre tall.
2. The planting material should be at least 1 cm in diameter.
3. The rootstock and cultivar used should be labelled.
4. The budded plant should be at least 9 months old during sale from the time of budding.
5. The bud joint/union should be at least 15 cm above the soil surface.
6. The planting materials should be free from any known citrus pest and diseases at the time of sale.

4.2.14 Lemon (*Citrus reticulata* L)

4.2.14.1 Seedlings

1. The planting material should be healthy and at least 1m tall.
2. The seedling should be at least 1 cm in diameter.
3. The source of the seeds should be labelled.
4. The planting material should be at least one-year old.
5. The planting materials should be free from any known citrus pest and diseases at the time of sale.
6. The material should be raised in poly-bag to enable safe handling and prevent damage or mortality during distant transport.
7. The material should be certified free from any known pests or diseases of citrus.

4.2.14.2 Budded plant

1. The planting material should be healthy and at least one metre tall.
2. The planting material should be at least 1 cm in diameter.
3. The rootstock and cultivar used should be labelled.
4. The budded plant should be at least 9 months old during sale from the time of budding.
5. The bud joint/union should be at least 15 cm above the soil surface.

6. The planting materials should be free from any known citrus pest and diseases at the time of sale.

4.2.15 Arecanut (*Areca catechu* L)

1. Seedlings should be at least 18 months old.
2. It should have been transplanted at least 3 times in the nursery.
3. Seedlings should have a minimum height of 1 metre with at least 2-3 leaf nodes.
4. Seedlings should have a minimum diameter of 5 cm.
5. Seedlings should be healthy and free from known pests and diseases such as collar rot.

4.2.16 Avocado (*Persea spp*)

1. The grafted seedlings should be at least 1 year old with known cultivar and labelled.
2. The seedling height should be 50-70 cm.

4.2.17 Chestnuts

1. Seeds should be selected from the tree with good record of quality nut production
2. Chestnut seedlings should be of 1-2 years old at the time of sale
3. The seedling should be at least 50-70 cm from the ground level.
4. The seedling diameter should be at least 20-30 mm at the collar region
5. It should be sold at the dormant stage only (before new leaf sprouts).
6. Taproot, 20-30 cm below the ground level is cut at least a season before sale.

4.2.18 Banana (*Musa paradisiaca* L.)

1. The suckers should be at least 30cm in stem height and 10cm(?) girth at the collar with narrow tapering leaves.
2. The material should be despatched immediately after lifting.
3. The large leaves should be removed and the roots trimmed to 2-3cms before despatching.
4. They should be free of the pseudostem weevil.
5. The material should carry proper label indicating the cultivar

4.2.19 Pineapple (*Ananas comosus* L (Merr)

1. The planting material for pineapple should be the suckers and not the crown and slips which are of inferior quality.
2. They should be cured by stripping off the lower leaves followed by drying in partial shade for 3-4 days before planting.
3. The material should be labelled with the cultivar name.

4.2.20 Papaya (*Carica papaya* L.)

1. The seedling should be raised in plastic tubes.
2. One-year-old seedlings should be of at least 15cm height with good stem girth.
3. They should carry labels of the cultivar.
4. They should be healthy and free from rotting at roots and collar region.

4.2.21 Guava (*Psidium guajava* L.)

1. The material should be propagated through air-layering and other vegetative methods from healthy mother plants of release cultivars.
2. The layers should be grown for a year after detaching from the mother plant and of at least 0.5 metre height.
3. It should be properly labelled indicating the cultivar name.

4.2.22 Jackfruit (*Artocarpus heterophyllus* Lamk.)

1. The material should be budded or grafted using seedlings of the same species as rootstocks.
2. They should be of minimum 0.5 metres height.
3. It should carry labels of the cultivar.

4.2.23 Litchi (*Litchi chinensis* Sonn.)

1. The material should be propagated by air-layering from healthy mother plants.
2. The layers should be of minimum 0.5metre height.
3. The seedlings should be at least one year old.
4. Should carry labels indicating the cultivar.

4.2.24 Pomegranate (*Punica granatum* L.)

1. The plants should be one-year-old rooted cuttings.
2. It should be of minimum 1 metre height.
3. It should be healthy and carry cultivar labels.

4.2.25 Cardamom (*Amomum subulatum*)

4.2.25.1 Slips for vegetative propagation

1) Selection in the field: The planting slips should come from healthy disease free and high yielding mother plants from a field of specific variety. However repeated vegetative propagation reduces plant vigour and hence should be avoided. Moreover, vegetatively multiplied cardamom slips have the disadvantage that root and soil-borne diseases can be carried on into new plantations. This will not only reduce the productivity of the new plantations but may also carry risks for other crops.

2) Planting slip specifications: The cardamom slips or planting material should consist of rhizomes/bulbs/slips along with 1-2 numbers of one year old shoots or pseudostem.

3) Measurements: The minimum measurements of the planting slips would depend upon the variety (table) since some varieties are more vigorous and taller than others.

Minimum requirements for cardamom slips ¹

Variety	Diameter of rhizome (mm)	Diameter of pseudo-stem (mm)	Height of the planting slip (cm)	Nos of pseudo stems	Nos of leaves/ pseudo-stem
Bharlange	30-75 mm	5-17 mm	25-110 cm	1 and above	1 and above
Golsey	20-65 mm	5-15mm	20-100cm	1 and above	1 and above
Sawhney	30-75mm	5-15mm	25-100 cm	1 and above	1 and above
Ramsey	30-75 mm	5-17 mm	25-110 cm	1 and above	1 and above

¹This measurements are tentative and are required to be confirmed from plant measurements. In the fourth column (height of the planting slips) height range is high because the slips are normally transported after cutting two thirds of the plant especially when transporting long distances to prevent from drying out during transportation.

4) Diseases: cardamom slips should be free from Foorkee and Chirkey viral diseases or any other diseases such as wilt, rotting and root knot. Special care should be given to check for any symptoms of root knot disease although they have not been reported in Bhutan so far.

4.2.25.2 Seeds for propagation

Since vegetative propagation has many disadvantages, the only option to obtain guaranteed disease free planting material is through seeds and tissue culture. The former is cheap and easy.

4.2.25.3 Plantation requirements

Plantation intended to be used for cardamom seed selection should be free from volunteer plants of other varieties and wild cardamom.

4.2.25.4 Field inspections

A minimum of three inspections is required: ie at flowering, during ripening and at maturity of capsules.

4.2.25.5 Field standards

Select well-matured seeds from healthy, disease free, high yielding individual plants from a uniform plantation of the specific variety. Minimum plantation/field size should be 1 acre. Seeds are viable for about 3-4 months after harvesting.

4.2.25.6 Seed standards

Parameters	
Germination (minimum)	30%
Pure seed (minimum)	98%
Inert matter (maximum)	1%
Other crop seeds (Max)	0.001%
Other variety seeds (max)	0.01
Weeds seeds (max)	0.01%
*Objectionable weed seeds (max)	0.01%
Seed moisture (Min for sowing immediately after harvest) air dried for 2 days	20%
Seed moisture (for spring sowing, minimum)	15-20%

*Objectionable weed seeds are wild cardamom

4.2.26 Ginger (*Zingiber officinale* Rosc)

There are about three types of ginger grown in Bhutan (variety unidentified) at present.

4.2.26.1 Seed rhizome standards

1. should be labelled with the type and the source of the rhizomes.
2. should be clean with no adhering soil particles.
3. should not be sprouting or extensive shrivelling.
4. should have 1-2 good undamaged buds.
5. should be intact whole rhizomes with minimum of 30 gms weight.
6. should be free from any visible disease symptoms (rhizome and root rot)

Note: Excessively large rhizomes have high water content and hence susceptible to rot if stored for longer periods

5 PLANTATION FORESTRY SEEDS AND PLANTING MATERIAL STANDARDS

5.1 General standards

In Bhutan, plantation forestry is relatively significant and tree improvement program has not taken off in a big way. However, with social forestry gaining importance, work on tree planting and tree improvement is becoming essential in order to enhance productivity of community forestry and other forestry plantations. This development will warrant for exchange/ procurement of quality reproductive material. In order to ensure that identity of material is maintained while handling there is a need to set a minimum standard through certification process during collection, seed conditioning and propagule production.

5.1.1 Species eligible for certificate

The certificate standards are for forest tree species, including shelterbelts and windbreaks in fields and farms. The certification standards provide minimum requirement for the handling of forest reproductive material to guarantee that genetic identity and purity is maintained. The term “reproductive material” is generally referred to seeds, nuts, seedlings, cuttings and other types of materials that will be used to grow new trees.

5.1.2 Classes and Sources of Seeds

Depending on the precision with which the material is procured, four classes of materials can be identified for certification. Only the material, which meets the standards, listed below for the various classes of certification shall be eligible for certification. These classes are defined as follows:

The source-identified material requires the least precise collection procedure. Such material can be collected from seed collection stands (natural forest stand or plantation stands), several stands in an area, a geog, a group of geogs, or and other defined geographic region. The source must be accurately described but cannot be more precise than the actual area of collection. For example, blue pine seeds collected from stands across Gidakom valley and then bulked into a single lot could be identified as Gidakom Source but not as Thimphu Dzongkhag source.

Selected material can be collected from an identified seed production area or from a selected individual tree (plus tree). It should show promise of phenotypic superior traits, identifiable traits or both when compared with other material of the same species.

Untested seed orchard material can be collected from seed orchards that satisfy all the basic requirement for fully developed seed orchards except progeny testing and subsequent roguing is not done. A “seed orchard” is plantation established primarily for production of seed of proven genetic quality. Material in untested seed orchard should be known genetic identity that show promise of superior traits, identifiable traits, or both, as compared to other material of the same species.

Tested material is obtained from a known tree with proven genetic traits. Material can be collected from tested or rogued seed orchards or from individual tested trees. Selection criteria and supporting comparative data are required. Progeny testing is required to prove the traits of interests are heritable.

5.1.3 Establishing the source

Geographic location of the sources of all classes shall be given by the country and legal description. If known, stand or tree history shall be provided to the certifying agency on request. Height and age (or site index if known) of the parent trees shall be included for selected material.

1. In case of seeds derived from seed orchards containing selected stock from a number of geographic areas, the location of the orchards shall be given and the original geographic sources of individual components (clones of families) shall be maintained in file and furnished on request. A map of the seed orchard which show the lay out and tree identification will be prepared and made available on request.

2. In case of material originated from planted or otherwise artificially established trees, the geographic origin of the parent material must be known.

5.1.4 Certification Labels

All certified materials must have an official label properly fixed to each plant, container, bale, bundle or package. Grower must follow procedures for administering Certification.

The certification label attests to the genetic identity of the material contained therein. The label shall contain the information on cones or seeds or propagules. Other information as needed by certification agency will be informed to the producers or growers and no information will be put on the label without approval from certification agency.

5.2 Field Inspections

Four different types of inspection are necessary to ensure adherence to the standards.

5.2.1 Approval inspection

Seed production areas, selected trees and seed orchards must receive one-time approval inspection to conduct thorough examination of the trees and sites for confirming compliance with field standards. Approval inspection must be made prior to flowering and pollination. In case of clonal reproductive material, approval inspection must take place before collection of materials.

5.2.2 Annual inspection

Annual inspections are used to confirm adherence to standards for propagation facilities and seed conditioning facilities

5.2.3 Periodic inspection

Periodic inspections are used to confirm adherence to standards for seed orchards and tested material at the time of material collection. Periodic inspections are required when certified material is being produced.

5.2.4 Spot inspection

Inspection may be done without prior notice at any time during the production of certified reproductive material.

5.3 Field Standards

5.3.1 Units of certification

A tree, an area or a portion of area may be certified. Plant material that may be used to produce the certified seed are as follows:

1. Seed collection stands
2. Seed production areas
3. Source-identified natural stands
4. Plantations of known source
5. Selected trees, including hybrids
6. Seed orchards, clonal or seedling from
7. Family lines or individual trees derived from open-pollinated origins
8. Family lines or individual trees from control-pollinated origins

5.3.2 Specific Requirements for Seed collection stands

Seed from seed collection stands may be identified as Source –identified provided that it meets the regulation pertaining to source of seed described above. No isolation zone is required.

For seed production area, the following criteria should be met to pass approval inspection:

The stand in seed production areas should contain full stocking of desired species to allow adequate roguing of inferior phenotypic quality trees and still maintain enough trees to ensure genetic diversity and adequate pollen supply.

Before approval inspection, the stand must be rogued leaving behind dominant and co-dominant trees that are insect and disease free and are superior in vigour, form and crown characteristics.

A minimum of 200 meters surrounding the seed production area should be free of inferior trees producing contaminated pollen.

5.3.3 Specific Requirements for a Single Tree

Each selected tree shall be permanently marked with identification numbers. The record of each tree will contain information that explains the basis for selection and map showing its exact location.

Seeds or vegetative propagules must come from a single tree.

Tested material (from a single tree): each tree shall be permanently marked with identification numbers.

The record of each tree will contain information that explains the basis for selection and map showing its exact location.

A selected tree must possess superior characteristics in growth, form etc that can be distinguishable from other trees of the same species on the same site.

Seeds collected from a selected tree must undergo progeny testing while vegetative propagules must be clonally tested.

5.3.4 Specific Requirements for Seed Orchards

1. For all species, a minimum of 200 meters surrounding the seed orchard must be free of all inferior trees producing contaminating pollen. The identity of each tree must be known and the record of known parentage must be provided. The arrangement of individual trees in the orchard should facilitate out-crossing.
2. Untested seed orchard material: Prior to completion of progeny tests seeds produced in seed orchard may be certified as untested seed orchard material
3. Tested Seed orchard material: A minimum of 200 meters surrounding seed orchard must be free of all inferior trees producing contaminating pollen.
4. The identity of each tree must be known and the record of known parentage must be provided.
5. The arrangement of individual trees in the orchard should facilitate out-crossing
6. At least 90% of the clones or family lines in a seed orchard must be progeny tested according to the testing standards. The orchard must be rogued based on the results of the progeny test.
7. Field inspection: Approval inspection is necessary for all productive material collection sites for production of selected material, untested seed orchard material and tested material.
8. Reproductive material handling: All reproductive material shall be handled so as to prevent contamination and to maintain the identity of the seed lot from time of collection through out conditioning,

5.4 Certification label

The productive material at the time of collection and when sent for certification must show the following:

- Certification class, Year of seed crop, Genus and Species, Variety (if applicable), Seed origin, Collection lot identification.

The certified reproductive material which is fixed to each seed container supplied by certification authority (BAFRA) should show the following:

- Certification class, Year of seed crop, Genus and Species , Variety (if applicable), Seed origin, Producer seed lot number, Label serial number (given by certification authority).

5.5 Field standards for propagation (nursery)

5.5.1 Units of certification

All certified seedlings must be grown from certified seeds of the respective class. The unit of production for bare root seedlings is the nursery while the unit of production for containerized seedlings is a seedlot grown in a single crop.

All certified vegetative propagules must be produced from selected trees, including hybrids. The unit of production for vegetative propagules is propagules produced from a single cone at one time.

5.5.2 Propagation facility inspection

Annual inspection of each inspection lot will be carried out between sowing, planting or micro-propagating and lifting of propagules.

5.5.3 Specific Requirements for seedlings and vegetative propagation

1. Each certified lot (e.g. seed lot, clone) must be handled separately during all stages of production.
2. Written record must be maintained that can be used to verify the identity of certified lots.
3. Bare-root Seedlings or vegetative propagules: Each bed area or row must be identified as to production lot with a marker. Genetic lots may not be mixed and must be separated by at least ½ meter parallel path to the sides of the bed and on the ends. Any portion of seed bed that is contaminated by chance windblown or waterborne seed from other sources and can not be rogued must be removed from the seed lot.
4. Containerized Seedlings and Propagation: Only one lot may be grown in each container “ block”. Each block must be identified as to production lot with a marker.
5. Laboratory Propagules: Each propagule unit (e.g. rooting tray, culture flask/container) must be identified all the times.

5.5.4 Minimum germination and purity standards

The seeds of all classes must conform to the standards as assessed using the national rules for seed testing. Since, we have not carried out any research on forest seed technology, we cannot set standards based on actual field experience. However, the following standards of forest seeds are based mainly on the studies carried out in the United States, by School of Forestry, Yale University (Toumey and Stevens 1928, Korstain 1927) and on certain experiences of field foresters in Bhutan while undertaking tree planting program (DoF 1995). These will be modified as when more field information is available. These standards will be applicable to the seeds and planting stock collected from the Source Identified Material and Selected Material only.

Main tree species for timber and industrial plantations

Tree species	Germination	Purity	Seed weight
<i>Pinus wallichiana</i>	65%	97%	15,000-20,000 Kg ⁻¹
<i>Pinus roxburghii</i>	80%	98%	8-12,000 Kg ⁻¹
<i>Abies densa</i>	40%	90%	16,000-20,000 Kg ⁻¹
<i>Picea spinulosa</i>	65%	90%	64,000 Kg ⁻¹
<i>Tsuga dumosa</i>	75%	86%	400,000 Kg ⁻¹
<i>Juglans regia</i>	65%	99%	35-120 Kg ⁻¹
<i>Quercus semecarifolia</i>	60 %	98 %	140 Kg ⁻¹
<i>Acer campbellii</i>	75 %	70 %	15,000-20,000 Kg ⁻¹
<i>Alnus nepalensis</i>	70%	50 %	400,000 -57,000 Kg ⁻¹

<i>Cupressus corneyana</i>	50%	70%	290,000 Kg ⁻¹
<i>Albizia procera</i>	65%	55%	15,000-21,000/Kg ⁻¹
<i>Cryptomeria japonica</i>	80%	60%	250,000-300,00 Kg ⁻¹
<i>Gmelina arborea</i>	13-50%	-	1600 kernel Kg ⁻¹
<i>Exbuckkandia populnea</i>	75%	70%	270,000 Kg ⁻¹
<i>Michelia champaca</i>	70%	70 %	14,000-17,000 Kg ⁻¹
<i>Teminalia belerica</i>	80%	90%	400-520 Kg ⁻¹
<i>Daubanga grandiflora</i>	30%	70%	24,000,000 Kg ⁻¹

Important multipurpose trees for Social Forestry Program

Tree species	Germination	Purity	Seed weight
<i>Aesandra butyracea</i>	50-80%	-	450-600 Kg ⁻¹
<i>Exbucklandia populnea</i>	75%	-	27,000-71,000 Kg ⁻¹
<i>Ficus neriifolia</i>	40%	-	100,000-600,000 Kg ⁻¹
<i>Ficus roxburghii</i>	75%	-	3000-8000 Kg ⁻¹
<i>Toona ciliate</i>	60%	70%	350,000 Kg ⁻¹
<i>Cherospondias axillaries</i>	60%	90%	300 Kg ⁻¹
<i>Melia azedarach</i>	70%	85%	1200-1500 Kg ⁻¹
<i>Syzigium cumini</i>	90%	95%	1000-1300 kg ⁻¹
<i>Quercus griffithii</i>	93%	90%	1800 Kg ⁻¹
<i>Robinia pseudocacia</i>	80%	85%	35,000-80,000 Kg ⁻¹
<i>Persea fructifera</i>	50%	95%	29 Kg ⁻¹

5.6 Standards for seedlings and stumps of forest tree crops

All planting materials (e.g. seedlings, stumps) of the above tree species for all types of planting purposes should meet following criteria. Seedlings should:

1. be 20-30 cm in height, to the base of the newest leaf or buds
2. have straight, undamaged and un-forked stems
3. have stem well lignified for at least half their length
4. have root collar diameter of over 4 mm
5. be of healthy deep green color
6. be quite free of insect and fungal disease

Stumps should:

1. have root collar diameter between 7 and 20 mm, and a root diameter of at least 7 cm
2. have no forked roots and stems
3. be undamaged and straight
4. be free from pests and diseases

Standards for Some Specific Species

2. *Abies densa* (Fir)

- Seeds are to be collected during October- November.
- Seeds should be stored in gunny bags.
- Seeds must be exposed to sun at regular intervals to prevent fungal attack.
- Soak the seeds for 12 hours before sowing.
- Seedlings should be grown in raised nursery beds under shade to prevent damage from rain, hail and snow, and should be protected from fungal attack.
- Seedlings raised in polypot or bare root should be planted when they attain 20-30 cm in height.
- Preferable altitude for planting this species is between 2600m – 4000m (asl).

- 2 ***Picea spinulosa* (Spruce)**
- Seeds are to be collected during September- November.
 - Clean and dried seeds should be stored in sealed container for 1-2 years.
 - Soak the seed in cold water for 6-12 hours.
 - Seedlings should be raised in poly pot in the nursery.
 - Seedling should be planted in planting sites when they attain 25-30 cm in height.
 - Young seedlings should be protected from fungal attack (*peridermium piceae*) by applying fungicides or spraying ash.
 - Seedlings should be planted within the altitudinal range of 2300-2600m (asl).
- 3 ***Pinus wallichina* (Blue pine)**
- Seeds are to be collected during September – November.
 - Seeds should be stored after cleaning and drying.
 - Soak the seed in cold water for 6-12 hours before sowing.
 - Seedlings should be raised in polythene bag or poly pot and should be raised under shade when young.
 - Direct sowing in shallow pit is also possible.
 - Seedlings should be planted when they attain a height of 25-35 cm.
 - Young seedlings should be protected from rust disease (*Cronartium ribicola*).
 - Seedlings should be preferably be planted between 1800 to 3000m altitude.
- 4 ***Pinus roxburghii* (Chirpne)**
- Seeds are to be collected during January –March
 - Seeds should be stored in sealed container.
 - Soak the seeds in fresh water for 12-24 hours before sowing.
 - Seeds should be treated with red lead before sowing to protect from pests.
 - Direct sowing in *thalis* (*prepared bed for direct seed dibbling*) is also recommendable.
 - Seedlings should be protected from rust disease (*Cronartium himalensis*).
 - The preferable planting size of seedlings is 20-30 cm
 - Seedlings should be preferably be planted between 900- 1800 m (asl) altitude.
- 5 ***Cupressus spp* (Cypress)**
- Seeds are to be collected during October – January.
 - Seeds should be stored in well-ventilated store up to 6-12 months but should be preferably sown fresh.
 - Soak the seed in fresh cold water for 6-12 hours before sowing.
 - Seeds should be sown in mother bed and pricked out in poly pot.
 - Seedlings should be planted when they attain 25-45 cm.
 - Seedlings should be planted preferably between 1800 – 2700m (asl) altitude.
- 6 ***Acacia catechu* (Khair)**
- Seeds are to be collected during November – March.
 - Seeds should be dried thoroughly and stored in well-sealed polythene bags and should not be stored for more than 8 months, as it will become susceptible to insect attack.
 - Seeds should be pre-treated in cold water for 12 hours before sowing.
 - Direct sowing of seeds in patches or strips with worked out soil is recommended.
 - Seedlings can also be raised in poly pot in nursery.
 - Seedling should be planted when they attain 20-30 cm in height.
 - This species prefers riverbed and edges along river channel and the seedlings should be planted up to 900 m (asl) elevation.
- 6 ***Acrocarpus fraxinifolius* (Mandaney)**
- Seeds are to be collected during April-May.

- Dried seeds should be stored in gunny bags or in airtight tin.
- Seeds should be pre-treated in fresh cold water for 6-12 hours before sowing.
- Direct sowing in patches or *thalis* is commonly practiced.
- Seedlings are also raised in polythene bags.
- Seedlings of this should be planted in sub-tropical area up to 1300 m (asl) altitude.

7 *Alnus nepalensis* (Utis)

- Seeds are to be collected during December-March.
- Dried seeds can be stored in sealed plastic bags for few months, it is preferable to sow fresh seeds as it loses viability when stored for long period.
- Seedlings are raised in poly pot in nursery.
- Seedling can be planted when they attain 25-40 cm in height.
- Seedlings are also be propagated by direct sowing.
- Seeds broadcasted directly in freshly eroded slopes also do well.
- It is sub-tropical to temperate species, which grow in between 1200-2300m (asl) elevation.

8 *Bombax ceiba* (Simul)

- Seeds are to be collected during March –May.
- Seeds should be collected along with floss and should be separated from floss manually or by threshing with stick.
- Seeds can be stored in sealed container or plastic bags for 1 year.
- Seeds should be pre-treated in cold water for one day before sowing.
- Bare root seedling can be grown in nursery.
- This species is good for cutting and stump planting prepared from nursery-raised seedlings.
- This is a tree of mixed deciduous forest grown between 200- 1400m (asl) altitude.

9 *Chukrasia tabularis* (Chekrasi)

- Seeds are to be collected during March-June.
- Clean dried seeds can be stored up to 5 months in gunny bags.
- Soak the seeds in fresh water cold water for 1-2 hours before sowing.
- Bare root or nursery-raised seedlings are planted.
- Direct sowing in patches or terrace also gives good result.
- It is subtropical species and grows in well-drained soil up to an elevation of 1000m (asl).

10 *Dalbergia sissoo* (Sisoo)

- Seeds are to be collected during March-May.
- Clean dried seed can be stored in sealed tin or gunny bays for about 6-12 months.
- Pre-treatment with soaking in water for 6-12 hours before sowing.
- This species is propagated by direct sowing method; seedlings can also be raised in nursery, stumps and by root suckers are also used for planting.
- Sisoo seedlings to be protected from weeds, cattle and fungal infection.
- This species prefer alluvial soil adjoining rivers and can grow up to 1000 meters (asl) elevation.

11 *Gmelina arborea* (Gamari)

- Seeds are to be collected April-June.
- Seeds are collected by de-pulping and dried in sun for 2-3 days.
- Seeds can be stored in dry ventilated room for about 6-12 months.
- Seeds collected from animal droppings are better.
- Seeds should be soaked in water for 2-3 days before sowing.
- Seedlings are raised in mother bed and transplant in secondary beds.

- Stumps are prepared for planting out when seedlings attain thump size girth.
- Directly sowing also gives good result.
- It is species of moist sub-tropical zone, prefers moist, fertile and well-drained soil up to 1200 m (asl) elevation.

12 *Juglan regia* (Walnut)

- Seeds are to be collected during September-December.
- Walnut seed loose viability when dry out, therefore it must be kept moist, cool and aerated. It can be buried them in pits since this species require cold stratification.
- It is advisable to sow them immediately after collection.
- Seedlings can be raised in shaded nursery beds and pricked out in polythene tube and placed them under shade.
- Seedlings attain plantable size within one year (25-35 cm height).
- Walnut species can also be propagated by grafting.
- It prefers moist deep and well-drained soil, grown between 1200 –2500 (masl) elevations.

13 *Melia azedarach*

- Seeds/stones are to be collected during November – March.
- Seed/stones are dried and stored in gunny bags or in sealed tins for about one year.
- Soak the stones in warm water for 5-6 hours or in cold water for 12 hours before sowing.
- Poly pot seedlings can be grown in nursery.
- Direct sowing in plantation site is also done.
- Propagation can also be done through stumps planting.
- Seedlings should be kept free from over head shade.
- The preferable planting size of seedling is 20-30 cm
- Seedlings of this species can grow up to 2500 m (asl) altitude.

14 *Michelia species* (Champ)

- Seeds are to be collected during July- August (*Michelia champaca*) and August-September (*Michelia doltsopa*).
- Fruits are collected from standing healthy mother trees.
- Seeds are extracted by gentle threshing, wash it with water and dry under shade (never dry it under direct sun) for 2-3 days.
- Seeds loose viability while storing, must be sown after collection.
- Soak the seeds in fresh water for few hours before sowing.
- Seedlings are raised in mother beds and then transplanted to poly pot under shade.
- Seedlings attain plantable size in one year (30 -45 cm)
- *Michelia champaca* can grow in moist subtropical zone up to 1500m (asl) where as *Michelia doltsopa* can grow between 900 – 2500 m (asl) elevations.

15 *Quercus spp* (Oak)

- Seeds are to be collected during November – February (*Q.griffithii*) and June-August (*Q.semicarpifolia*).
- Seeds loose viability while storing.
- Seeds to be sown immediately after collection.
- Soak the seeds in cold water for 6-12 hours before sowing.
- Seedlings are raised in polypots.
- Direct sowing can also be done.
- Seedling most attains at least 20cm tall before planting.
- *Quercus griffithii* can grow between 1500 – 2500m (asl) on drier sites while *Q.semicarpifolia* can grow between 1700 – 3800m (asl) on moist and shady area.

- 16 ***Shorea robusta* (sal)**
- Wing seeds are to collected during May-June.
 - Sal seeds cannot be stored as it loose viability rapidly.
 - Fresh fallen winged seeds should be sown before or within 7 days.
 - Direct sowing in plantation site (terrace or lines) with wings upward.
 - Plantation site should be ready before collection of seeds for immediate sowing.
 - This species occurs in southern foothills up to 1000m (asl) elevation.
- 17 ***Tectona grandis* (Teak)**
- Seeds are to be collected during December-February.
 - Seeds (bony drupe) can retain viability for long period and can be stored in well-aerated sack.
 - One-year-old drupe gives better result than fresh one.
 - Alternative soaking and drying under concrete sun for 2-3 weeks before sowing.
 - Seeds can be treated by light burning of drupe.
 - Seeds are sown in mother beds and pricked out in secondary beds when leaves appear.
 - Stumps are prepared for planting out when seedlings attain thump size girth.
 - Direct sowing can also be practiced.
 - Seedlings of *Tectona grandis* should be grown about 600m (asl) altitude & below and should not be planted in steep slopes as it deteriorate soil because of large foliage system.
- 18 ***Thuja* spp**
- Seeds are to be collected during October – December.
 - Soak the seeds in cold water for 6-12 hours before sowing.
 - Seedlings should be raised in shaded nursery beds and pricked out in poly pot when they attain 2-3” height.
 - Seedlings are ready for planting after 12-18 months.
 - This species can grow between 700 - 2000m (asl) altitude.

6. FODDER SEEDS CERTIFICATION STANDARDS

6.1. Grasses

	Criteria for Certification	Cocksfoot	Italian Ryegrass	Tall Fescue	Paspalum atratum	Brachiaria brizanthia	Molasses grass	Ruzi grass	Oat
A. Field Standard									
1	Field Inspection (frequency)	Twice	Twice	Twice	Twice		Twice	Twice	Twice
2	Isolation from fields of other varieties (m)	100.0	100.0	100.0	50.0		100.0	100.0	3.0
3	Field of the same variety not conforming to varietal purity requirements for certification (m)	100.0	100.0	100.0	50.0		100.0	100.0	3.0
4	Offtypes (%)	1.0	1.0		1.0		1.0	1.0	1.0
5	Objectional weed plants (%)	0.20	0.20	0.20	0.5		0.20		0.20
B. Seed Standards									
6	Pure seed (Min. in %)	75.0	85.0	75.0	80.0		55.0	80.0	95.0
7	Inert matter (Max. in %)	25.0	15.0	25.0	20.0		45.0	20.0	5.0
8	Other Crop Seeds (Max) per kg	100	100	100	100		200	100	50
9	Total Weed Seeds (Max) per kg	100	100	100g	100		200	100	50
10	Germination (Min. %)	70.0	70.0	70.0	30.0		47.0	13.0	90.0
11	Moisture (Max. %)	11.0	11.0	11.0	11.0		11.0	11.0	11.0

6.2 Legumes and Swede

	Criteria for Certification	White clover	Green leaf Desmodium	Stylo	Lucerne	Swede	Fodder beat	Turnip
A. FIELD STANDARD								
1	Field Inspection (frequency)		2	2	2	2	2	2
2	Isolation from fields of other varieties (m)	100	100.0	100.0	100.0	400.0	100	400
3	Field of the same variety not conforming to varietal purity requirements for certification (m)	100	100.0	100.0	100.0	100.0	100	100
4	Offtypes (%)	1.0	1.0	1.0	1.0	1.0	1.0	1.0
5	Objectional weed plants (%)	0.5	0.5	0.5	0.5	0.5	0.5	0.5
B. SEED STANDARD								
6	Pure seed (Min. in %)	94.0	94.0	90.0	97.0	95.0	99.0	99.0
7	Inert matter (Max. in %)	6.0	6.0	10.0	3.0	5.0	5.0	5.0
8	Other Crop Seeds (Max)	100/kg	100/kg	100/kg	100/kg	100/kg	100/kg	100/kg
9	Weed Seeds (Max.)	100/kg	100/kg	100/kg	100/kg	100/kg	100/kg	100/kg
10	Germination (Min. %)	75.0	70.0	40.0	90.0	90.0	85	90
11	Moisture (Max. %)	11.0	11.0	11.0	11.0	11.0	11	10

Slip Standards for *Ficus auricalata* seedlings, willow cuttings and *Paspalum atratum*, *Brachiaria brizantha*, Gautemala Grass, Napier and fodder peanut slips

Ficus auricalata/roxburghi seedlings

- The seedling should have strong and well established root system
- It should be atleast 1 meter in height
- It should have straight trunk
- The stem diameter should be 20 mm at a height of 20 cm from the base of the root

Willow (*Salix babylonica*) cuttings

- The cutting must be from healthy tree
- The cutting must be of semi hard wood
- The cutting should be at least 1.5 meters with the minimum of three nodes
- The material should be at complete dormancy at the time of distribution
- The material should not be dried/dead during the time of distribution
- The trunk should be straight
- The whole material should have intact bark

Fodder peanuts (*Arachis pintoii* var. Amarillo)

- The slip must be healthy
- It should have a minimum of 3 nodes
- For supply to distant places, the slip must be supplied in such a way that it gets enough moisture during transportation

Napier (*Pennisetum purpureum*)/Gautemala grass (*Tripesecum laxum*)

- The materials must be from a healthy matured plant
- The material must have minimum of 3 nodes per slip
- If tillers or the mother plant itself is supplied, it should have healthy root system

Paspalum atratum/Brachiaria brizantha

- The planting material must have 2-3 nodes with healthy roots