

## FIELD AND SEED INSPECTION - GUIDELINES

Field inspection is an essential step in verifying conformity of seed crops to prescribed certification standards.

### Objectives of Field Inspection

The field inspections are done to achieve the following objectives:

1. To verify seed origin (source seed) and identity of the variety.
2. To collect information on cropping history of the seed field, i.e. to verify whether the seed field meets the prescribed land requirements.
3. To check crop and cultivation conditions.
4. To check isolation distance.
5. To check freedom from impurities, namely other crop plants and weeds plants.
6. To check freedom from other cultivars and off-types.
7. To check freedom from seed borne diseases.

The field observations made for the above mentioned factors are compared with a set of prescribed standards which are specific to each crop.

### General principles of Field Inspection

The general principles mentioned below are basic in nature and apply to most crop plants.

1. All field inspections must be made by well-trained and qualified personnel. The Inspector has to know the pre requisites and standards for seed growing and has to be familiar with the character of the varieties to be inspected.
2. The prescribed procedures and techniques of field inspection and the minimum number of inspections specified in the certification standards should be strictly adhered to.
3. Inspection of cross pollinated crops during flowering, and those self pollinated crops which are infected by designated seed-borne diseases during flowering stage, (e.g. wheat gets infected by loose smut during the flowering stage) should be done by surprise inspection i.e. without prior notice. In all other cases, inspections can be made with prior notice.
4. The seed inspector should achieve full cooperation from the seed growers, even in the case of rejection of a field. This is possible if the inspector possesses a thorough knowledge, good conduct and good manners. This is necessary for the smooth operation of a certification scheme. The seed grower or his representative should be present at the time of field inspection and if possible, acknowledge the suggested correction and advice by a signature on the inspection report.
5. Upon arrival at the seed farm, the inspector should check all information about the species, variety, seed origin, cultivated area, class of seed, cropping history of the field to be inspected and known adjacent fields of the same species, which may be dangerous from the point of view of isolation. It is advisable, especially in tall crops and crops requiring sizable isolation distances, to go completely around the outside of the seed field and observe it and its border areas once before entering it.
6. Each field and its boundaries must be pointed by the seed grower. All parts and rows should be covered and crossed by the inspector on foot as also the sensitive areas such as the vicinity of farm buildings, threshing areas and roads into or through the field, where the seeds of various species and origin may have been dropped in waste or in transport. The walking in the field should be done in a schematic pattern so that the maximum area possible can be covered (See figure). However, If the plant population in the seed field is so thin that the entire population is less than the number required for taking counts in a schematic manner, the entire population should be counted and walked through. The inspector should also move out of the field when necessary, to check isolation. When more than one inspection is made in a field, commence each inspection from a different point.
7. During the walk in the field, the inspector must make estimates of other varieties and impurities, diseases plants, general condition of the crop, applied farm practices and possible yield. Estimates of impurities



8. and diseased plants should invariably be made through actual counts. These should never be written on a visual basis, even if by observation it is clear that the seed crop will not conform to the required standards. Barren rows or long gaps encountered during counts should be skipped and not considered as part of the row steps. While counting patches or rows containing off-types, diseased plants and impurities not covered in the counts may be observed and observation recorded separately in the inspection report. If necessary, their location should be shown by drawing a map.
9. For short crops, squat or bend periodically during inspection so that eye level observations can be made at the top height of the plants.
10. Impurities, off-types and diseased plants need not normally be pulled out. However, if pulling them and showing them helps in convincing the seed producer, it may be done.
11. In self-pollinated seed crops, if one third or more of the area is so heavily lodged that taking field counts is impossible, the seed crop should be recommended for rejection. That is unless there is a likelihood that the crop will stand up again before maturity and that it will be possible to conduct a proper inspection subsequently.
12. In cross pollinated crops and hybrid seed fields, if one third or more of the seed crop has lodged just prior to, or during flowering, and the inspection during flowering is difficult, the seed crop should be recommended for rejection without taking field counts.
13. If rouged plants or heads etc., are observed lying on the ground within or on the outskirts of seed fields where they could possibly cause contamination, the grower should be directed to gather and remove them. These should not be included in the counts.
14. During an inspection, if the seed field is found to be liable for rejection, in part or in full, the prescribed number of field counts for that inspection must still be taken for the entire field.
15. If during inspection, it is observed that contamination of the field has taken place and the removal of contaminating factor and contaminated material could make the crop conform to the prescribed standards, then their removal from the field may be recommended or permitted. Re-inspection to confirm removal and conformity to standards must be made. However, such re-inspection is permitted only once, over and above the minimum number of inspections prescribed for the crop concerned.

## **VARIOUS CROP STAGES OF INSPECTION**

The inspection of a seed crop is done at different stages of crop growth so as to make various verifications and estimates of various impurities, off types and diseases etc. Mentioned below are the objectives to be accomplished at a given stage of crop inspection.

### **1. Inspection at the time of sowing**

Sowing time inspections to educate the farmers participating in a certified seed programme for the first time, or at times when a new crop is introduced, are very useful in maintaining good quality of seed. The purpose is to explain to the growers the land and isolation requirements to check whether their seed field meets such requirements; to verify their seed bags; planting; planting ratios; sowing time; seed treatment etc. In biennial crops the main objective is to verify the purity of roots/stem at the time of transplanting.

### **2. Inspection during pre-flowering/vegetative stage**

The purpose is to educate growers regarding plants to be rouged and to suggest other corrective measures, if required, after the following verifications:

- i) The seed planted to produce the seed crop was eligible for use and was obtained from an approved source. This can be done by inquiry, verification of sale and purchase records, or the certification tags with the grower
- ii) The planting ratios (in hybrid seed production), isolation requirements and land requirements have been met. Note any shortcomings in this regard. If contaminants are present within isolation distance, verify the stage of seed crop and contaminant crop within the isolation distance, name of contaminant, closest direct distance between seed field and contaminant, area of seed field and

approximate area of contaminant field, direction and location of the contaminant, percentage of varietal impurity in contaminant field, if it is of the same variety, number of plants of contaminant (if it occurs as stray plants), the percentage of disease infection in contaminant field etc.

iii) The seed crop has not been grown as a mixed crop, intercrop or companion crop or ratoon crop. The actual counts for various factors may or may not be taken for all factors at this stage. However, the counts at this stage must be taken for designated diseases.

After making the above verifications, the grower should be thoroughly educated in correcting any shortcomings in isolation; identification of rogues and method of rouging etc. The importance of completing corrective measures, and rouging before flowering should also be explained.

### **3. Inspection during flowering stage**

Flowering time inspection should be done as follows

- i) Check whether various corrective measures, if suggested earlier have been carried out.
- ii) Check/ re-check the land and isolation requirements.
- iii) Take detailed counts for various contaminating factors as per procedure described earlier.
- iv) Advise farmer to continue rouging during flowering season.

### **4. Inspection during post flowering and pre harvest stage**

During these inspections, detailed counts should be taken to determine the extent of various contaminants present in the seed field, and to educate farmers regarding rogues which were not identifiable earlier so as to remove them before final inspection. The corrective measures suggested earlier may also be checked to ensure whether these have been done.

### **5. Harvest time inspection**

This is the last inspection conducted on a seed crop. During this inspection detailed counts are taken for various factors, and isolation requirements are finally checked to confirm that the seed has met the requisite field standards. If the seed crop meets the requirements for seed certification, the farmer should be given necessary instructions regarding precautions he should take during harvesting/threshing and supply of the material to processing plants.

## **CONTAMINANTS TO BE OBSERVED DURING FIELD INSEPCIONS**

The various contaminants to be observed during field inspection can be broadly classified into the following categories.

### **1. Offtypes**

Plants of the same crop species as the seed crop, differing in the expression of morphological characters such as plant type, branching type, pigmentation etc. are classified as off types. To designate a plant as an off type, it is not necessary to identify it definitely as of another variety.

While taking field counts, an off type is always counted as an off type irrespective of its stage of growth. However, if the stage of the growth of the seed crop and the off type differ so widely that the off type cannot possibly contaminate the seed crop at any stage, either genetically or physically, special note of such off types should be made so that the observation is complete. For the purposes of field counts, such off types need not be counted. The grower should be informed of the presence of such off types so that they may be removed. Off types not causing contamination at the time of recording field counts, but likely to cause contamination later must be counted.

### **2. Inseparable other crop plants**

Inseparable other crop plants are plants of cultivated crops found in the seed field and whose seeds are so similar to the crop seed that it is difficult to separate them economically by mechanical means. An inseparable other crop plant is counted if it's stage of growth is such that it would bear seed when the seed crop matures, and possibly cause mechanical admixture during harvesting and threshing. If it's stage of growth is so widely different form that of the seed crop that it cannot bear seed by the time the seed crop

matures; it need not be counted. However special mention of the presence of an inseparable other crop plant in widely differing stages is made for verification during subsequent inspections.

### 3. Objectionable weed plants

These are plants of weed species whose seed size and shape are similar to that of crop seeds and which are difficult to remove from the seed economically by mechanical means. In addition to these species, such weed species whose eradication is difficult if once introduced, or those who serve as alternate hosts for crop pests or diseases, are also classed as objectionable weed plants.

For counting, an objectionable weed plant is counted if it's stage of growth is such that it will bear seed when the seed crop matures and possibly cause mechanical admixture during harvesting and threshing. However, if its stage of growth is so widely different from that of the seed crop that it will not bear seed by the time the seed crop matures, it need not be counted, but special mention of the presence of the objectionable weed seed plant in a stage widely different from that of the seed crop is made for verification in subsequent inspections.

### 4. Diseased plants

The plants affected by designated diseases should invariably be counted. The grower should be advised to rogue them out from seed fields.

#### Number of plants/heads per count

| Crop   | Number of plants/heads per count |
|--|----------------------------------|
| Wide spaced row crops:<br>Okra, Egg plant, Bulb crops, Chillies, Cole crops, Cucurbits, groundnut, maize, potato, rot crops, tomato etc. | 100 plants                       |
| Medium spaced row crops:<br>Beans, leaf crops, mustard, peas etc   | 500 plants                       |
| Thickly sown crops:<br>Barley, Oats, Paddy, Wheat etc  | 1000 plants                      |

## REPORTING RESULTS

The results of the field inspection must be reported on a prescribed proforma as attached herewith.

#### References used:

1. Seed technology (second edition)  
- Rattan Lal Agarwal (1995)
2. Indian Minimum Seed Certification Standards  
- The Central Seed Certification Board (July 1988)

**Annexure 1**

**FIELD INSPECTION REPORT**

Field No..... Report no.....

Crop..... Variety.....

Date of sowing..... Date of inspection.....

Expected date of harvest..... Time: From..... To.....

1. Name of producer/grower.....
2. Village..... Geog..... Dzongkhag.....
3. Location of farm.....
4. Source of seed.....
5. Total acreage under production of this seed crop.....
6. Acreage of the field no. inspected.....
7. Previous crop..... Isolation distance.....
8. Stage of seed crop at this inspection.....
9. Field counts: Take field counts as directed in the guidelines

| Count no.  | No. of heads/plants |                         |                     |  |
|------------|---------------------|-------------------------|---------------------|--|
|            | Off types           | Inseparable other crops | Objectionable weeds | Plants affected by seed borne diseases |
| 1.         |                     |                         |                     |  |
| 2.         |                     |                         |                     |  |
| 3.         |                     |                         |                     |  |
| 4.         |                     |                         |                     |  |
| 5.         |                     |                         |                     |  |
| 6.         |                     |                         |                     |  |
| 7.         |                     |                         |                     |  |
| 8.         |                     |                         |                     |  |
| 9.         |                     |                         |                     |  |
| 10.        |                     |                         |                     |  |
| Total      |                     |                         |                     |  |
| Percentage |                     |                         |                     |  |

10. Name(s) of
  - (a) Seed borne diseases.....
  - (b) Inseparable other crop plants.....
  - (c) Objectionable weed plants.....
11. Names of non seed borne diseases present.....
12. Condition of crop.....
13. Does this crop conform to the standards of certification.....
14. Quality of seed production work.....
15. Is this the final report?.....
16. Estimated seed yield.....
17. Was the grower or his representative present at inspection time?.....
18. Remarks.....

Signature of grower or his representative

Signature of Inspector:  
Name:



## REPORT OF FIELD INSPECTION FOR SEED CERTIFICATION

Crop..... Variety.....

Date of sowing..... Date of inspection.....

Expected date of harvest..... Time: From..... To.....

1. Name(s) of producer(s)/grower(s).....
2. Village..... Geog..... Dzongkhag.....
3. Location of farm.....
4. Source of seed.....
5. Total acreage under production of this seed crop.....
6. Acreage of the field inspected.....
7. Previous crop..... Isolation distance.....
8. Stage of seed crop at this inspection.....
9. Name(s) of
  1. Seed borne diseases.....
  2. Inseparable other crop plants.....
  3. Objectionable weed plants.....
10. Names of non seed borne diseases present.....
11. Condition of crop.....
12. Does this crop conform to the standards of certification.....
13. Quality of seed production work.....
14. Is this the final report?.....
15. Estimated seed yield.....
16. Was the grower or his representative present at inspection time?.....
17. Remarks.....  
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