

SEED PRODUCTION IN NAGALAND



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Seed is the part of the plant used for raising seed or commercial crop. It includes seedlings, tubers, bulbs, rhizomes, roots, grafts, vegetative parts, tissue culture generated material *i.e.*, any living embryo which is able to regenerate and give rise to a plant that is true to its type, and is therefore, the most vital and critical input in agriculture. Quality seed production ensures food security one way and also conserves potent indigenous varieties of promise. With the advent of Green Revolution, hybrids with its high yielding ability has made a great impact in agriculture for which even State Governments have taken massive steps towards evolving, multiplying and propagating improved seeds under the successive Five Year Plans. The Government of Nagaland has also initiated programmes for the multiplication and distribution of improved seeds since 1965. It can be very well taken up as an enterprise because there is all the time demand for quality seed material in an agrarian country.

Classes of seeds : In order to meet the demand of crop production, a huge quantity of seed is required every year. The availability of quality seeds in India is around 1.24 million tonnes /year. Seeds of improved varieties cannot be generated in a single season or year and hence, are produced in several stages, each stage generating a particular class of seed. The different classes are:

- ❖ **Basic or Nucleus seed :** Initial seeds obtained from selected individual plants of a particular variety and form the basis of the total seed production chain. The parental lines are multiplied by selecting individual plants/pods and growing individual plants/pods progenies. Thus, 100% genetic and physical purity alongwith high standards of all other quality parameters are maintained.
- ❖ **Breeder seed (golden brown tag):** Seed or

vegetative propagating material directly controlled by the originating or the sponsoring plant breeder, institution or firm which provides the source for the initial and recurring increase of Foundation seed. This is the seed of a new variety that has the highest purity, and the progeny of nucleus seed, which guarantees that the subsequent generation's *i.e.*, foundation and certified classes confirm to the prescribed standards of the genetic purity.

- ❖ **Foundation seed (white tag) :** Produced from Breeder seeds by trained personals in conformity with regulated national standards and maintaining genetic purity and identity of the variety. Foundation seed is the source of Registered and/or Certified seed.
- ❖ **Certified seed (blue tag) :** Progeny of foundation or certified seeds, handled to maintain sufficient varietal identity and purity. It is grown by selected farmers under prescribed conditions of cultivation. Prior to approval by the certifying agency, field and seed inspections are carried out regularly. Certified seed is the planting stock recommended for commercial production.

Certain requirements for certified and foundation seed are :

- ❖ Genetic and physical purity: Genetic purity means absence of seeds of other crop species as well as other varieties of the same crop species and the amount of contamination permitted ranges from 0-0.1%. Physical purity means freedom of seed from inert matter (sand, pebbles, straw etc) and defective seed (broken, diseased, insect-infested, shriveled and unfit for germination)
- ❖ The certified seed must be free from weed seeds and seed-borne diseases. The

maximum amount of weed seeds permitted varies from 0% in crops like maize, tomato and 0.2% in cauliflower, onion etc. Some examples of maximum permissible frequency of diseased seeds are, rice (Paddy bunt-5%), wheat (Karnal bunt-5%), bajra (ergot-0.04%) etc. For efficient processing and safe storage, the seeds must be dried to an optimum moisture level. It varies from 13% in rice to 7% in cauliflower and watermelon.

As high standard of purity must be maintained, the production of breeder and foundation seeds is costly. While requirements for production of certified seed is less rigid and hence is cheaper. The various classes help in maintenance of genetic purity of the variety and ensure a continuous supply of good quality seed at a reasonable cost.

HYBRID SEEDS

Hybrid seeds are produced by crossing two or more separate lines within or between varieties. Hybridization is done to bring together two or more traits in each of the chosen varieties so that the resulting seed has both the traits. For ex; a drought-tolerant tomato plant and a high yielding tomato plant may be cross pollinated to produce a drought-tolerant tomato plant that gives high yield. The basis of hybrid seed production is heterosis, which means superiority of F1 (first generation) over its parents. Production of hybrids is input-demanding, accompanied by higher costs of cultivation.

Quality seed production:

The potentialities of a crop is realized only when they are grown and multiplied on a large scale for commercial cultivation. High quality seed production requires considerable technical skill and a number of specific requirements. Progressive farmers usually take up seed

production since they have all the required resources for raising a good seed crop. However, with some dedication, skill and effort, any farmer, youth and farm women can go for quality seed production and create employment as well as revenue generation avenues. Quality seed production as an enterprise can solve the problems of scarcity or non-availability of quality seeds or seed materials locally or in otherwise remote areas. The concept of contract farming is very much prevalent in recent times. Interested persons can go for contract farming in seed production with many of the seed certifying agencies and also big companies.

To obtain the potential harvest, sowing of crops at the right time along with providing other optimum conditions is essential, hence availability of seed at the right time is of utmost importance. Some of the dos and don'ts are

Do's

- ❖ A crop suitable to the climatic as well as soil conditions of the area should be selected. Preferably indigenous, healthy, and good performing or locally important crops can be selected and sown in the recommended season.
- ❖ A fertile land free of noxious weed and soil borne pathogens must be used for cultivation.
- ❖ Proper package of practices should be strictly followed such as proper ploughing of field, recommended time of sowing and seed rate, plant spacing, application of manures and fertilizers, weeding, rouging of undesirable/ off type plants, mulching, earthing up, plant protection measures, etc
- ❖ Irrigation should be provided as per crop requirement based on soil type, season and stage of the crop.

- ❖ Clean cultivation practices and proper drainage should be maintained to prevent breeding of soil borne pathogens.
- ❖ Quality seed production should be taken up in an area where no other variety or other crop species is planted nearby to prevent pollination from unwanted pollen or to avoid mechanical mixture and chance cross pollination in self pollinated species. For example, crops like rice and soybean need **minimum isolation distance** of 100m, maize and jowar-500m, cotton- 30m etc.
- ❖ Regular monitoring and inspection of the field for disease, pests etc. should be practiced.
- ❖ Selection of more vigorous plants should be done for their seeds.
- ❖ The seed crop should be harvest at its physiological maturity to get maximum seed quality and to avoid quantity loss. It should be done with considerable care to prevent mechanical mixture from other crop or weed seeds.
- ❖ Threshing floor and machineries should be clean to avoid damage to seeds and to prevent contamination by inert matter.
- ❖ Seeds should be stored after proper drying and with recommended moisture content in well ventilated areas, safe from rodents or other pests.
- ❖ A good study of the market can help the farmer earn even higher returns at times.
- ❖ Diseased or inferior seed material should not be used for sowing.
- ❖ Entry of visitors and cattle should be restricted to avoid contamination of the field.
- ❖ Excess irrigation should not be given to the crop.
- ❖ After harvest, the seed should not be stored beyond an optimum moisture level to prevent mechanical injury and reduction in the viability of seed. Do not dry the seed under hot sun.
- ❖ Hybrid seeds should not be used as they segregate and show variation in the next generation or season and hence there will be loss of productivity. Thus, hybrids cannot be used in seed production programmes.

Economics of seed production

For quality seed production, investment may be higher and more input may be required, however the profit that is obtained from a successful production makes it worthwhile. The economics/cost of cultivation of some specific crops are given below which are not exact figures and may vary with place and time.

Cost of cultivation of Paddy (per hectare)

Rice is the staple food of the Nagaland and *Jhum* paddy comprises 96,570 hectare of the total agricultural land and 1,73,830 MT of production was recorded during the year 2010-11. Initially seed yields obtained were less than 1.0 t/ha but now an average seed yield of 1.5 t/ha or more are being obtained routinely due to the introduction and use of good quality paddy seeds in many parts of the country. Maximum seed yield of 3.8 t/ha has been recorded in a seed production plot of 2.0 ha area by a private sector company. In China, it took more than five years to attain an average seed yield of 1.0 t/ha and a decade to attain average seed yields of 1.5 t/ha. However, in India, average

Don'ts

- ❖ A land contaminated with pests, diseases and weeds in the previous years should not be used for cultivation as some soil borne pathogen or weed seeds may be carried over. Also do not select a land in which different variety of same crop was grown.

seed yields of 1.5 t/ha has been obtained after five years of initiating large scale seed production. Now 3,000-3,5000 tons of hybrid rice seed is produced annually in India, Hybrid rice is likely to become popular and adopted in large acreage

during the next decade for which huge quantities of hybrid rice seed will be needed. Thus, there is ample scope for all the private and public sector seed agencies in India to produce large quantities of hybrid seed in the years ahead.

Sl. No.	Item	Unit	Qty	Rate (Rs.)	Total cost (Rs.)
1	Land Preparation	LS	-	-	2500.00
2.	Seed rate /ha	Kg	40	28.00	1120.00
3.	Compost	MT	10	200.00	2000.00
4.	Urea (N @ 60 kg)	Kg	131	7.00	917.00
5.	SSP (P2O5 @ 20 kg)	Kg	125	7.00	875.00
6.	MOP (K2O @40 kg)	Kg	67	15.00	1005.00
7.	Plant Protection	LS	-	-	1300.00
8.	Zinc Sulphate	Kg	10	80.00	800.00
9.	Irrigation	LS	-	-	1500.00
10.	Wages	Mandays	120	100.00	12000.00
11.	Bagging, Tagging etc.	LS	-	-	1500.00
12.	Seed certification cost	Hectare	-	1000.00	1000.00
	Total cost				26,517.00
13.	Minimum seed yield/ha	tonnes	1.5	28.00	42,000.00

Cost of cultivation of Maize (per hectare)

In Nagaland, maize occupies the position next to paddy in terms of area (68430 ha) and production (134000MT) in 2010-11. Maize cultivation is generally considered more rewarding as hybrid maize not only gives better returns but also there is less requirement of water as compared to crops like paddy. The multifarious uses of the crop as food and feed as well as the ease in cultivation practices have increased the preference for the crop over the years.

Sl. No.	Item	Unit	Qty	Rate (Rs.)	Total cost (Rs.)
1.	Land Preparation	LS	-	-	2000.00
2.	Seed rate /ha	Kg	25	30	1300.00
3.	Compost	MT	5	200.00	1000.00
4.	Urea (N @ 60 kg)	Kg	134	7.00	938.00
5.	SSP (P2O5 @ 40 kg)	Kg	250	15.00	3750.00
6.	MOP (K2O @40 kg)	Kg	67	15.00	1005.00
7.	Plant protection	LS	-	-	500.00
8.	Irrigation	LS	-	-	1000.00
9.	Weeding				1500.00
10.	Wages	Mandays	80	100.00	8000.00
11.	Bagging, Tagging etc.	LS	-	-	1800.00
12.	Seed certification cost	Hectare	-	-	1000.00
	Total cost				23,793.00
13.	Minimum seed yield/ha	tonnes	2.5	30.00	75,000.00

Cost of cultivation of Chilli (per hectare)

Chilli is one of the most important commercial crops of India. It is an indispensable item in the households of Nagaland as it is being consumed daily as a condiment in one or the other form. It is cultivated in an area of 3400 ha in the state and the production is 23700MT during 2010-11. The cost of inputs in the cultivation of chilli is given below

Sl. No.	Item	Unit	Qty	Rate (Rs.)	Total cost (Rs.)
1	Land Preparation	LS	-	-	3000.00
2.	Seed rate /ha	Kg	1.5	60.00	90.00
3.	Compost	T	20	200.00	4000.00
4.	Urea	Kg	215	-	1500.00
5.	DAP	Kg	245	-	2000.00
7.	P.P. Chemicals	LS	-	-	3000.00
8.	Irrigation	LS	-	-	2900.00
9.	Weeding	-	-	-	2500.00
10.	Wages (Sowing-Harvesting)	Mandays	-	70.00	5000.00
10.	Bagging, Tagging etc.	LS	-	-	1500.00
11.	Seed certification cost	Hectare	-	-	1000.00
	Total cost				26,490.00
12.	Minimum seed yield/ha	tonnes	2.0	60.00	120,000.00

Seed requirement for some important crops of Nagaland

Seeds of different varieties of crops should be reserved as seed buffer stock by seed controlling agencies to ensure the continuous availability of reasonable quantities of seeds of the selected crops to meet the planting needs of farmers following agricultural emergencies such as natural calamities, shortfalls in production, etc. For this, Seed Banks should be established for stocking specified quantities of seed of required crops/varieties and be suitably strengthened with cold storage and pest control facilities.

Crops	Area (000'ha) in 2011	Seed rate (Kg/ha)	Seed requirement (MT)
Paddy (Upland)	96.57	60	5794.2
Paddy (low land)	84.82	30	2382.6
Maize	68.43	25	1710.75
Rape seed & mustard	27.05	5	135.3
Arahar	2.50	20	49.8

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