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Release and Popularisation of Cultivars in Madhya Pradesh

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Characteristics of Agriculture in Madhya Pradesh

Madhya Pradesh (MP) means Central Province, which was the colonial name for the state. As the name denotes, MP lies at the heart of India and is the largest state, covering 44 million hectares. In 1989-90, nearly 20 million hectares (44%) was cropped, 1.6 million hectares (4%) was fallow and 4.3 million hectares (10%) was double cropped. The state has a population of 66 million, but parts are quite sparsely populated.

Two mountain ranges—the Vindhya range and the Satpura range—pass through the state, dividing it into hilly, plateau and valley regions. Central-western MP has two major rivers, the Narmada and the Chambal, and the Sone and the Mahanadi rivers flow in the eastern parts of the state. Agro-climatically MP is divided into 12 zones.

Soil types vary considerably. The Malwa, Vindhya, and Nimar plateaux and the Narmada valley—in west and central MP—have black to deep black soils. In the north, Bundelkhand and part of Gird have black to red laterites. The far north has sandy loams, whereas the plateaux and plains in the east and south have yellow and red soils.

Cropping patterns are determined by rainfall and soil moisture retention capacity. Rainfall varies greatly over MP, from over 1600 mm in highland areas to under 800 mm in the far north and far west.

South-east high rainfall regions grow rice in the upland and lowland plains, followed by *Lathyrus* and linseed; the hilly areas grow minor millets, maize and niger seed. The north-eastern Kaymore plateau grows rice, wheat and chickpea on conserved moisture and minor millets in hilly terrain. The central wheat bowl, which used to remain mostly fallow during *kharif*, is switching over to soybean, which is replacing crops such as sorghum and black gram (*urid*). In the south central districts, wheat and chickpea during *rabi*, and soybean, cotton, and sorghum during *kharif* are grown. The northern and north-western belt have wheat and rape-mustard as winter crops where there is irrigation; in rainfed areas sorghum, pearl millet and soybean in *kharif* and chickpea and lentil in *rabi* are popularly grown. On the Malwa plateau sorghum, soybean and black gram are the main crops during *kharif*, and wheat and chickpea during *rabi*. In the Nimar valley the main crops are cotton and groundnut, but maize, rice and wheat are also grown extensively.

In terms of acreage, cotton is the leading crop, but it is restricted mainly to Indore and Bhopal divisions. Production-wise cotton is seventh, after rice, wheat, sorghum, soybean, maize and chickpea (*gram*). Rice is grown mostly in the eastern districts, but some is grown in western MP under irrigation.

Yield per hectare is highest for irrigated wheat, followed by maize, rice and sorghum. Minor millets are cultivated widely but give a low yield of only 216 kg ha^{-1}, because they are grown on poor land with little fertiliser (Table 8.1). Chickpea and pigeonpea are the most consumed pulses. Pigeonpea is generally inter-cropped, often with sorghum and pearl millet. Production of soybean has increased in recent years because of the raising value of soybean oil and cake. In 1990, nearly 1.9 million hectares were under soybean, and the state has been declared the "Soybean State".

Table 8.1 Production of major crops in MP, 1989-90.

Crop	Season	Total area (000 ha)	Total Prod. (000 ton)	Yield (kg ha^{-1})
Rice	Irrigated	1019	1344	1388
	Rainfed	3985	3148	829
Wheat	Irrigated	1543	2826	1908
	Rainfed	1740	1293	775
Sorghum	*Kharif*	1737	1725	994
Maize	*Kharif*	879	1458	1674
Minor millets	*Kharif*	1248	269	2016
Pearl millet	*Kharif*	169	134	792
Chickpea	*Rabi*	2157	1426	662
Pigeonpea	*Kharif*	442	412	949
Black gram	*Kharif*	610	171	281
Green gram	*Kharif*	158	42	289
Lathyrus	After rice	524	202	386
Groundnut	*Kharif*	367	272	743
Sesamum	*Kharif*	237	74	312
Rape-mustard	*Rabi*	450	343	768
Soybean	*Kharif*	1878	1497	797
Cotton†	*Kharif*	5768	412	363

† Production of cotton in '000 bales, each of 170 kg lint

Varietal Identification and Release System

Madhya Pradesh's regulations for state release are similar to those at central level: new cultivars must go through specified procedures for testing. Proposals for release are submitted to the State Seed Sub-Committee, which has final authority. Proposals for notification of state released varieties are sent to the Central Seed Committee.

Varieties released in other states and doing well in MP are proposed for release if they have not already been released nationally. Out-of-state varieties are sanctioned for cultivation in MP only after adequate performance in state level trials or after proven popularity with farmers.

MP has two Agricultural Universities, a regional wheat breeding centre of the Indian Agricultural Research Institute (IARI), and the National Agricultural Research Centre for Soybean. New varieties have been evolved by the universities and research institutes in MP, and varieties developed by national institutes, international institutes, and institutes and universities elsewhere in India have also been introduced into the state (see Annex 4).

The Madhya Pradesh State Seed Sub-Committee

The MP State Seed Sub-committee has its headquarters at Bhopal and is responsible for the release of new varieties in the state. It also monitors the performance of newly released varieties in the state, plans for different varieties to be grown in different regions of the state, and reviews the requirements for breeder, foundation and certified seed.

The sub-committee is required to meet at least once quarterly to review the situation and plan varietal strategies. It also recommends to the Central Sub-Committee on Crop Standards, Notification and Release of Varieties those varieties which need to be de-notified and withdrawn from the list of cultivars that attract subsidies because they are not performing well in any region of the state, are not in demand, or were notified more than 15 years ago.

The membership of the Madhya Pradesh State Seed Sub-Committee is as follows:

- Secretary, Dept. of Agriculture, Government of MP (GOMP) - Chairman;

- Director of Research (Services), JNKVV;
- Director of Research (Services), IGKVV;
- Director of Agriculture, Bhopal, GOMP;
- Two representatives of seed producers;
- Two farmers;
- Managing Director, MP Seeds and Farm Development Corporation;
- Regional Manager, National Seeds Corporation, Bhopal;
- Managing Director, MP State Seed Certification Agency, Bhopal;
- Seed Testing Officer, Seed Testing Laboratory, Indore;
- Additional Director of Agriculture (Crop Production), GOMP—Co-convenor, and
- Secretary, Central Seed Committee & Director (National Seeds Project), Ministry of Agriculture, and Department of Agriculture and Cooperation, New Delhi, GOI—Co-convenor.

Agricultural universities

Jawaharlal Nehru Krishi Vishwa Vidyalaya (JNKVV), the largest state agricultural university in MP, has its headquarters at Jabalpur and centres at Rewa, Gwalior, Sehore, Indore, Khandwa and Mandsaur. Crop research centres are located at Dindori for minor millets and niger; Chhindwara for maize; Wasaseoni for rice; Powarkheda for wheat; Khandwa, Badnawar and Ujjain for cotton; Khargone for pulses and groundnut; Mandsaur for poppy and maize; Jaora for sugarcane; and Morena for oilseeds. Rainfed wheat improvement is carried out at Sagar.

The other agricultural university, Indira Gandhi Krishi Vishwa Vidyalaya (IGKVV) based at Raipur, is mainly concerned with improving rice and carrying out varietal performance tests on cereals, pulses and oilseeds in the Chhattisgarh region.

Both universities have a sub-committee to direct research and make recommendations on varieties. Membership is:

- Director of Research - Chairman;
- Head of Plant Breeding;
- Senior Plant Breeders working on crops listed for identification;
- Head of Plant Pathology;
- Head of Entomology;
- Representatives of various disciplines such as agronomy, seed quality, seed multiplication, and
- Director of Extension Education.

Qualification for release

For a variety to be put forward for state release it must have undergone performance trials for a minimum period of three years (Fig. 8.1). Varieties of all crops undergo state level trials; varieties of major crops are also tested in all India coordinated trials. Entries at State Varietal Trials (SVT)-II stage may be tested in independent state trials or, as is the case in wheat, are tested in AICCIP AVTs as additional entries. In the final stages of the SVTs they are also tested in adaptive trials on farmers' fields.

However because of improper conduct of trials—for example wrong layout, sowing beyond stipulated dates, and poor facilities for recording data and insect pest reactions—30-40% of trials are rejected. This results in improper assessment.

To succeed, a variety must be suitable for the agro-climatic conditions of the zone for which it was bred, tolerant/resistant to pests and diseases, able to withstand abiotic stress conditions such as high temperature, drought and high salinity-alkalinity. It should also show a distinct advantage over the existing equivalent variety.

Trials data on agronomic performance—such as fertiliser responsiveness, and response to varied date of planting—and data on performance against popular check varieties on farmers' field are

included in submissions for release. Proposals are submitted in the prescribed proforma to the university level Variety Evaluation Committee with the Director of Research (Services) as its chairman and representatives of allied departments. This committee puts forward a recommendation to the State Seed Sub-Committee, which decides on whether to release the variety. This is followed by a proposal for its notification by the Central Sub-Committee.

Several new varieties that are popular with farmers have been slow to gain the official stamp of approval. For example, this has been the case with three varieties of soybean (Table 8.2).

Some of the old varieties which have been grown widely in MP have not been recommended by state committees for release but they have been accepted in the state because of their popularity with farmers (Table 8.3).

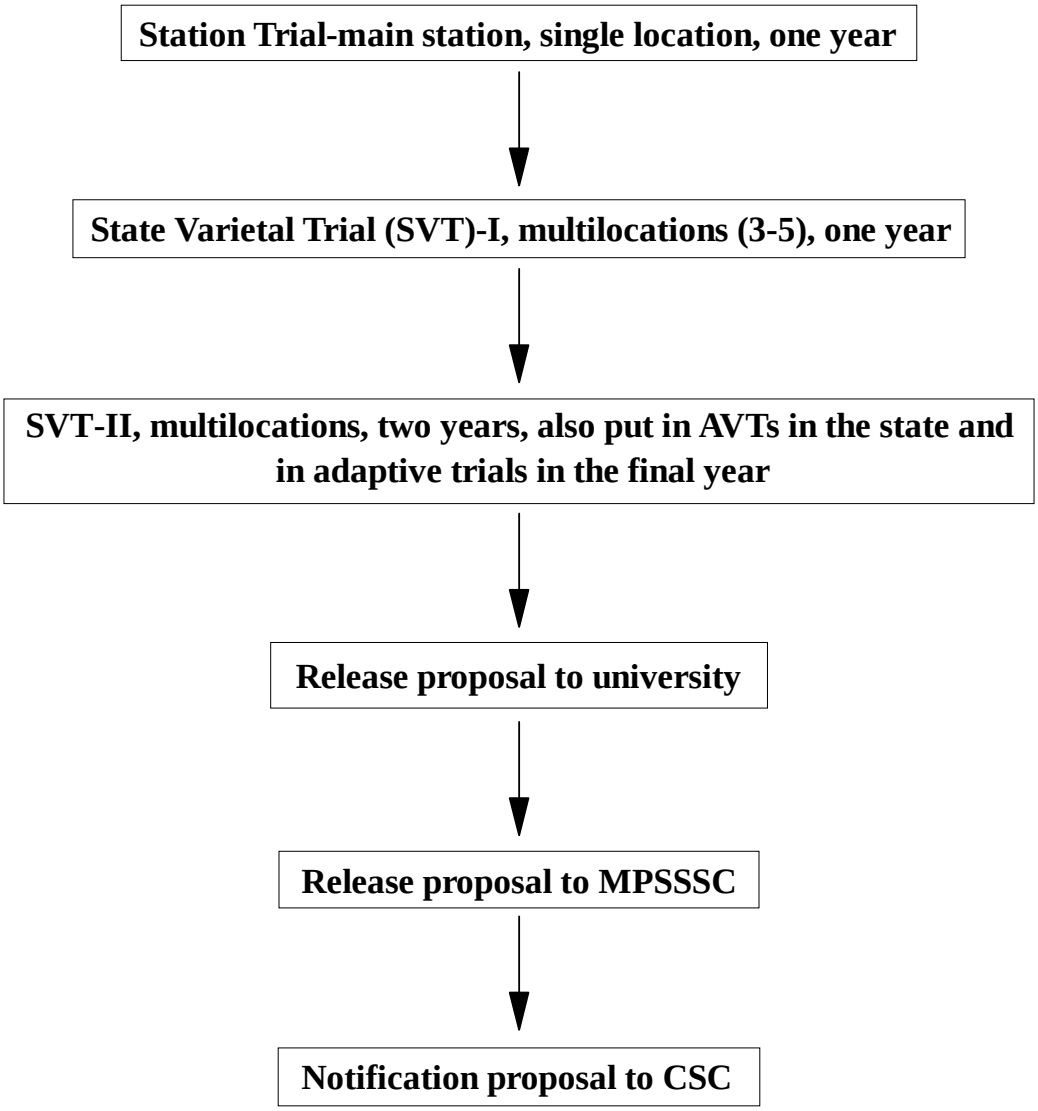

Figure 8.1 Varietal testing and release procedure in MP.

Rice improvement, research stations and trials

In the early quarter of this century, work on rice in MP was based at the Rice Improvement Centre at Raipur, which developed many varieties. One was Cross-116, a derivative of Bondu x Parewa cross, which was notified in 1978 and is still being grown in Uttar Pradesh.

Improvements resulting from *indica* x *japonica* crosses started after 1950. But for rainfed conditions, crosses between local landraces were preferred, and Laloo 14 was released as a scented variety. Safri 17 was a selection from the local variety Safri. These improved varieties (Laloo 14 and Safri 17) were released in 1976 but are still very popular, even though they are not resistant to major pests and diseases and are tall with weak stalks.

The development of dwarf varieties in MP started in the 1960s. The first was Anupama and since then many dwarf varieties, bred in MP or introduced from outside the state, have been released. No rice cultivar has been released by JNKVV since 1986.

Research coverage is uneven in MP. There are centres in Chhattisgarh region (Raipur, Bilaspur, Jagdalpur, Waraseoni and Ambikapur) and one at Bagwai (Gwalior).

Table 8.2 Details of soybean varieties that have been slow to gain official approval.

Variety	Detail
JS-71-5	Was identified only in 1993, even though it had been cultivated on a large scale after consecutive periods of drought over the previous 6-7 years.
JS-80-335	Was released in 1994 after having become very popular with farmers for many years.
JS-75-19	Is being grown on a large scale in Bhopal division but remains an unidentified variety.

Table 8.3 Varieties of rice and chickpea popular in MP without being released by the State Seed Sub-Committee.

Crop	Variety
Rice	Chatri, Gurmuthia, Jira Shankar, Dubraj, Chinoor, Kalimooch. These varieties occupy almost 53% of the rice area.
Chickpea	Chickpea variety Narsingpur Bold is very popular in parts of the Narmada Valley.

Wheat improvement, research stations and trials

Wheat breeding was initiated at Powarkheda in 1942, and the varieties Hy 23 (durum) and Hy 65 (bread) were developed. Hy 65 has been the most popular variety in MP since its release in 1956.

During the 1950's a number of varieties developed at the Indian Agricultural Research Institute were adopted in the wheat growing areas of MP. C 591 was the choice *Chandausi* (amber) wheat for semi-irrigated conditions. This was introduced in 1947 after the severe rust epidemic, which destroyed local wheat varieties. Later, several varieties bred by the regional IARI wheat breeding centre at Indore became popular in MP, such as the durum varieties NP 400, NP 401, NP 404 and NP 412, and the bread varieties NP 832, NP 839 and NP 842.

C 306, from Punjab-Haryana, released in 1965, was introduced for the rainfed central region of MP and now occupies top position. However, a selection from C 306, called Sujata, has proved to be a better genotype and is now replacing C 306. Meghdoot (durum) was developed at IARI Indore, and Narmada 4 at Powarkheda. Several varieties bred at Powarkheda, such as Narmada 195 and MPO 215, were released but later de-notified and withdrawn because they were not acceptable to farmers.

With the introduction of dwarf wheats from the International Centre for Maize and Wheat Improvement (CIMMYT) in Mexico in 1962, varieties highly responsive to fertiliser spread across

the irrigated wheat-growing tracts of India. Sonalika and Kalyan became the most popular amber varieties in the late 1960s and early 1970s. They are still grown in some pockets of MP.

Today, the most popular dwarf wheat varieties are WH 147 and Lok 1 for bread and Raj 1555 for durum, and the recently released Mangla (bread) variety is gaining in popularity. With new pathological races of rusts attacking the irrigated wheats, there is a need to replace WH 147.

The main research centres for wheat are Indore, Powarkheda, Sagar, Jabalpur and Tikamgarh. Data on all India coordinated wheat trials conducted in MP for the six years 1988-94 show that a high percentage (10-50%) were not conducted properly. The number of locations of trials (29 to 45 over six years) of various types fairly represented the wheat growing tract of MP.

In comparing new varieties with check varieties, WH 147 and Raj 1555 (among dwarfs for high fertility, and timely sowing), Lok 1 (for late sowing), and Sujata and A 9-30-1 (for rainfed conditions) have always remained in the top yielding group. Therefore, identification of new cultivars has been difficult. If traits other than yield had been given more emphasis this may not have been the case.

Chickpea improvement, research stations and trials

Work to improve chickpea focused on developing local material. Early in the 1940s MP varieties such as Ujjain 21, Ujjain 24 and Pink 2 were introduced as selections from local material, and, later, Gwalior 2, JG 62 (double podded) and JG 74. Annigeri, a local variety from Karnataka, also became popular.

Varieties now prevalent are introductions from neighbouring states and from IARI. However, the most cultivated is MP's own Ujjain 21 released in 1956. This is followed by JG 315, from Uttar Pradesh released in 1981.

Research on chickpea is carried out at Jabalpur, Khargone, Khandwa, Sehore, Gwalior, Raipur and Jagdalpur. Data for 1988-89 to 1993-94 show that the number of all India Coordinated trials conducted was small (a total of 69 trials in the state over these years) and the rate of rejection high (10-33%), meaning that proper assessment of the performance of varieties could not be made, and promotion from Initial Evaluation Trials (IETs) to Advanced Varietal Trials (AVTs) was based on insufficient field data.

However, tests comparing the check variety JG 315 and the new cultivar JG 218 carried out at three locations in MP for six years, and at seven centres during 1990-91, gave 16% and 11% yield superiority for JG 218. JG 218 has also compared favourably with JG 315 in disease and pest incidence. JG 218 was released in the state in 1993 but, up until 1995, was not notified.

Maize improvement, research stations and trials

Maize improvement work at Chhindwara research centre resulted in the introduction of Chandan Makka 1, Chandan Makka 2 (Chandan Safed 2), Chandan Makka 3 and other composites in the 1960's. Some of the Punjab hybrids, like Ranjeet, and some of the Deccan hybrids from Bihar and Ganga hybrids from Uttar Pradesh have also been introduced, as have many hybrids developed by private companies, such as Mahyco.

Eight trials were carried out on the maize composite CHH 8 at two zonal centres (Chhindwara and Jhabua) of the All India Coordinated maize Improvement Project, between 1990 and 1992. This level of field research does not produce sufficient data for proper assessment of a cultivar.

Varieties withdrawn from the system

For many years a number of varieties approved for release have kept on giving poor performance under farmers' fields conditions. Some have been withdrawn from notification (Table 8.4).

Table 8.4 List of varieties denotified in MP because of poor performance on farmers' fields.

Crop	Variety
Rice	Anupama, Garima, Samradhi, Asha, Pragati, Jagriti
Wheat	Sharbati Sonora, Narmada-195, MPO 215, Jairaj, Meghdoot
Maize	Chandan 1, Chandan Safed 2, Ranjit hybrid
Pigeonpea	JA 3
Green gram	Khargone 1, JM 45
Cotton	Khandwa 1, JKHY 11

Since 1987 a provision has existed whereby after a period of time (15 years) varieties can be withdrawn from the state seed programme. Under this, the rice varieties Ratna, Phalguna, P2-21, Govind, Tulsi, Ruchi, Surekha, Tara and Hari, and the wheat varieties wheat HD 1553 and HD 1593 have been withdrawn.

Most rice cultivars released by JNKVV between 1975 and 1980 have been withdrawn or are not in demand.

Popularisation With Farmers

ICAR initiated National Demonstrations (NDs) in 1966, and these helped popularise new varieties, particularly high yielding wheat, rice, sorghum and pearl millet hybrids. Fourteen crops were taken up for NDs covering 22 states, with more than 1,000 demonstrations being held per year. Even under rainfed conditions wheat yields more than 2.8 times the state average were obtained. Eight districts of MP were covered by NDs - Gwalior, Raipur, Indore, Jabalpur, Bilaspur, Hoshangabad, Rewa, Chhindwara and Balaghat. However, NDs have now been replaced by other methods of popularising varieties.

To help small farmers, minikit sets were distributed on a large scale through the State Farms Corporation of India (SFCI). However, in MP many of these demonstration materials were either received late or demonstrations were not conducted. No responsible officer was put in charge of the demonstrations and follow-up was poor. In remote districts seed was even sold to merchants and sometimes consumed as grain, for example in Bastar. Seed treatment was not undertaken.

Out of thousands of minikits distributed, the feed-back was only 2-3%. An important objective the programme was to obtain farmers' opinions and performance reports and this has not been achieved. While the promising varieties could be easily identified in on-farm district trials, the process of quick spread of varieties was delayed. The rainfed cultures were particularly slow to spread. Overall the minikit programmes have made only a small contribution to popularising new varieties in MP.

In recent years the most popular cultivars, according to breeder and other seed indents, have been those which are relatively old, and many were released 15 years ago, e.g., in rice Safri was released in 1965, Mahsuri in 1971 and Karanti in 1976; in wheat WH 147 was released in 1979 and Lok 1 in 1981 (Table 8.5).

Table 8.5 Most popular crop varieties on the basis of breeder and other seed demand in MP.

Crop	Variety	Year of release	Crop	Variety	Year of release	Crop	Variety	Year of release
Wheat	Lok 1	1981	Chickpea	Annagiri	1978	Rice	IR36	1981

	WH 147	1979		Ujj 21	1956		Kranti	1976
	HD 1553	1967		JG 315	1981		Swarna	1982
	HD 2285	1982		Phule G 5	1986		Annada	1987
	HD 2329	1985		JG 74	1983		IR64	1992
	HD 2236	1981		K 850	1978		Mahsuri	1971
	HI 1077	1989		Radhey	1968		Govind	1989
	Sujata	1983					Surekha	1976
	Raj 1555	1982					Safri 17	1976
							Phalguna	1979
							Kalinga III	1983
Soybean	JS-75-46	1986	Maize	Chandan 3	1976	Sorghum	CHS 5	1974
	PK 472	1985		Deccan 103	1982		CHS 9	1981
	Pb. Soybean 1	1975		Ganga 5	1968			
	JS 80 21	1991		Ganga Safed 2	1963			
	JS-72-44	1982						
	JS 71-05	1985						
	JS 72-280	1981						
	MACS 13	1985						
	JS 335	1994						

Take-up of new varieties is often slow. This was the case with the wheat varieties HD 2329 (late sown), HI 977 (late sown), HI 1077 and Sujata, which were released before 1985 but have only recently started to become popular.

Role of NGOs

In MP there are very few NGOs connected with the seed industry. Those with some involvement are:

- Kasturbagram Krishi Kshetra (Indore District);
- Samaj Pragati Sahyog (Dewas District);
- Krishi Vigyan Kendra (Kasturbagram, Bastar, Beitul and Raisen), and
- Cooperative seed societies at Sanawad and Khargone.

The Kasturbagram Krishi Kshetra seed multiplication programme for wheat, chickpea, pigeonpea, maize, soybean and sorghum has been going on for several decades. The seed has been sold as Truthfully Labelled (TL), and only to farmers in the adjoining areas and districts. Around 3,00 t seeds of various varieties are multiplied each year.

Samaj Pragati Sahyog recently multiplied seed of cotton hybrids and sorghum and supplied it to farmers.

KVKs have not played a major role in seed multiplication, but have helped in the popularisation of newly released cultivars through small-scale trials, demonstrations and farmer training programmes. It is mandatory for KVKs to lay out first-line demonstrations to generate production data and to conduct adaptive trials, and they have performed these tasks well. There are KVKs managed by the university at Jhabua, Chhindwara, Bilaspur, Shehdol, Sidhi, Guna, Rajgarh, Khandwa, Sagar and Balaghat, but the impact of the programmes has been hampered by lack of funds and limited transport facilities.

The co-operative societies mainly deal with cotton, chillies and groundnut.

Seed Production, Certification and Dissemination

Seed producers

Production and sale of certified seed of various crops during 1993-94 as obtained from zonal conferences on seed, Ministry of Agriculture and Cooperation, New Delhi, have been given in Table 8.6. Distribution of seed in certain crops (e.g. maize, oilseeds, cotton) exceeded the production figures because of seed obtained from outside sources.

Table 8.6 Production and sale of certified seed in MP†.

Crop	Production (t)	Distribution (t)
Wheat	18510	16088
Rice	7484	6722
Maize	2	355
Sorghum	(n.a.)	1142
Pearl Millet	8	33
Pulses	3356	2982
Oilseeds	14801	15429
Cotton	165	700

† Excess in distribution due to seed obtained from outside.

Certified seed of varieties released by the MP state, nationally and by international institutes suitable for MP was distributed in 1994. State releases accounted for the major share of certified seed in soybean. Nationally released varieties were important in wheat, sorghum and maize. Varieties from IRRI were important in rice.

Of the various agencies involved in seed trade, in 1993-94, the MPSSC distributed about 70% of the seed, the National Seeds Corporation (NSC) distributed only 1%, while the private sector distributed 10% (Fig. 8.2). Private seed growers are particularly important in supplying hybrid seeds and seeds for cash crops. The breakdown by crops of the private sector's contribution was: wheat 12%, rabi oil seeds 37%, *kharif* oil seeds 6%, sorghum 92%, maize 90% and *kharif* pulses 24%. Outside agencies contributed 44% of available soybean seed.

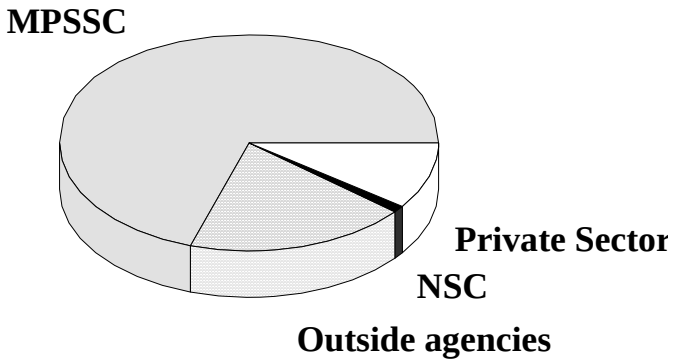

Figure 8.2 Percent contribution in certified seed production by various agencies in MP during 1993-94, *kharif* and *rabi* seasons

NGOs are mainly involved in social uplift programmes and only a few are working on agricultural education and seed production. NGOs obtain seed from different sources within or outside the state. For example, ICRISAT varieties of chickpea and pigeonpea are grown and distributed by Kasturba Krishi Kshetra at Kasturbagram, Indore and distributed. Cooperative seed societies at Sanawad and Khargone (Nimar) distribute cotton and chilli seed.

Present regulations do not restrict seed movement into the state. Farmers from districts adjoining other states obtain seed of varieties being grown successfully across the border and these get introduced and popularised through progressive farmers. Examples of varieties introduced in this way are the rice varieties Annada and Kalinga III from Orissa and Swarna from Andhra Pradesh, and the chickpea variety Phule G-5, from Maharashtra, and varieties Radhey and K 850 from Uttar Pradesh.

Conclusions

Identification and release system

- ***Inadequate recommendations.*** Varieties become popular that are not recommended (Table 8.3) and others are slow to gain approval (Table 8.2).
- ***Inadequate improvement in yield.*** New cultivars are not as high yielding as farmers would like them to be. WH 147, released in 1978, has become susceptible to rusts, but it remains high yielding under normal conditions and is still first among wheats in terms of acreage. Ujjain 21, a chickpea variety released in the 1940's, has no recommended replacement. In the case of rice, IR36 and Kranti are in most demand even though more pest and disease resistant varieties have been identified.
- ***Trials take insufficient account of local needs.*** Cultivars may perform poorly in coordinated trials but well locally, for example the rice variety Kalinga III.
- ***No improvement in disease/pest resistance in susceptible areas.*** Many varieties are proposed for release because they are high yielding, even though they are highly susceptible to diseases like rusts, mildews, bacterial blight, and stem and stalk rots. Most research stations do not have facilities to test against epiphytotic conditions of disease and pests, and susceptibility does not

show up until material is tested in particularly prone areas. It is then rejected, even though it could be useful elsewhere. Research effort that could help some farmers is therefore wasted.

- ***State breeders are handicapped in assessing their material.*** They are poorly equipped to test new varieties against pests and diseases, and much otherwise promising material is lost because of poor performance in pest and disease prone areas.
- ***No improvement in by-products.*** More emphasis should be placed on criteria such as the oil, fibre and sugar content of varieties.
- ***Administrative malfunctions.***
  - Proposals are not submitted in the proper proforma with full details.
  - Varieties put forward for state release which are entered in all India coordinated trials for testing need the recommendation of the project co-ordinator, which is not normally given for state releases, and this delays release.

Popularisation with farmers

Minikits. Although a large number minikits were distributed in MP the:

- feed-back on minikits has been low (only 2-3%), and
- impact of minikits has been poor.

KVKs. They play a role in popularisation but their activities are limited due to lack of funds and transport facilities.

Demand for old varieties. The popularity index of varieties based on demand for breeder and other seed indents shows that varieties released many years ago are still in great demand (e.g., Lok 1, WH 147 and HD 1553 varieties of wheat released 15 years ago are popular).

Lack of recommendation of popular varieties. Many varieties that are popular in the state do not have official backing of being released, and hence are not popularised by the extension agencies, e.g., a chickpea variety Narsinghpur Bold is popular in Narmada valley but it is not released. Similarly, an unreleased variety of soybean, JS 75-19, has become popular.

Out of state-bred varieties are not promoted. Crop varieties bred outside the state, although recommended for release in the entire zone, are not properly promoted for seed multiplication in the state. For example, A-9-30-1 wheat from Gujarat is not grown in MP even though it is a good performing durum.

Popularisation of unsuitable varieties: Not all released varieties are adopted by farmers but the official popularisation agencies still recommend them. In rice 31 were identified but 15 were not adopted by farmers. Similarly, of the 24 recommended varieties of wheat only 12 were adopted by farmers.

Slow process of popularisation. The popularisation process starts after a variety has been released. The process is slow, and the delay between release and popularisation is 4 to 5 years, e.g., popularisation of wheat varieties Sujata (released in 1983) and Mangla (released in 1989) has started only recently.

Seed production, certification and dissemination

- ***Lack of seed of sufficient quantity.***

  - Initially, new varieties are multiplied by breeders. Multiplication of seeds of rainfed cultivars tends to be slow because growing them under irrigation, or under conditions of high fertility, can lead to lodging. Therefore, sufficient quantities may not be available for a long time.
  - Seed farms will not reproduce rainfed varieties because of low profits. Composite varieties are also not multiplied because the sales price compares unfavourably with that of hybrids.
  - Isolation distances of 500-600 m are often a constraint on seed farms, particularly for hybrid seed production. MP imports hybrid seed from other states, particularly seed of sorghum and pearl millet hybrids.
- ***Uncertain seed supply.*** The seeds of out-of-state varieties to be supplied by outside agencies depends on indents being placed well in advance. But early ordering does not guarantee timely delivery: diversion of seed to other states, or within the source state, often results in disruption of the supply chain to farmers.
- ***Uncertain demands.*** Farmers' choice of crops depends on the particular season. For example, in winter chickpea replaces wheat when rains stop early, which reduces the demand for wheat seed.
- ***Indented quantity of seed is not made available.*** During the 1993 *rabi* season many indents were not met in full. For example: 12 t of Lok 1 wheat breeder seed was indented but only 9.4 t was supplied; foundation seed was in short supply for wheat HD 2236 (shortfall of 33t) and chickpea Ujjain 21 (shortfall of 128 t); certified seed was in short supply for HD 2236 (1172 t shortfall).
- ***Transfer of personnel.*** The relocation of staff causes disruption to the seed multiplication programme.
- ***Lack of coordination.*** The involvement of the Department of Agriculture at farmer level is now limited to giving advice. Visits to villages and on-farm demonstrations are infrequent and irregular. Farmers are not getting proper advice.
- ***Delay in seed supply.*** Seed does not reach villages in remote areas. Early rains, or heavy late rains, and poor communications over difficult terrain lead to late supply of fertiliser and seed, or no supply. This slows the process of introducing new varieties. Well-to-do educated farmers make their own arrangements.