Ad-hoc Study No.54

A STUDY ON

DEMAND, SUPPLY AND IMPACT OF CERTIFIED SEEDS

IN

MADHYA PRADESH

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February, 1988

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List of Tables

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CHAPTER I

INTRODUCTION

1.1 Crop yield is a function of many factors such as seed, soil, climate, irrigation water, fertiliser, plant protection measures and many other management practices. Among these, seed, water and fertiliser have played the major role in making the country self sufficient in foodgrains production. And they are expected to continue to do so in future as well.

1.2 Seed is the basic input in agriculture which holds the key to crop productivity, profitability and farm prosperity. If the quality of seed sown happens to be inferior, other inputs like irrigation, fertiliser, plant protection and all other efforts on cultural and management practices will go waste. The quality of the seeds largely determine the success of modern farming system, as all other inputs come into play only when germination and stand establishment of the crop is achieved. Since it is often the cheapest of all inputs, choice of appropriate varieties and use of quality seeds offer great potential for boosting our agricultural production.

1.3 The recent developments in the seed industry had a significant and salutary effect on increasing India's food production. The demand for improved and quality seed in the country is growing and it is expected to grow further, although the gap between the demand and supply in most cases has been very wide.

1.4 According to a comprehensive action programme drawn up by the Union Agricultural Ministry, a six-fold increase in the production of seeds has been proposed during the seventh five

year plan. The Scheme aims at raising the production from 3.98 million quintals in 1983-84 to 22.6 million quintals by 1989-90. While during 1983-84, 35 lakh quintals of certified seeds, 4.5 lakh quintals of foundation seeds and 30,000 quintals of breeders' seeds were produced and distributed, under the proposed scheme, figures will go up to 200, 13 and 3 lakh quintals, respectively.

Importance of Seeds in Increasing crop Productivity

1.5 The introduction, development and release of high yielding dwarf varieties of rice and wheat and the hybrids of maize, jowar and bajra to a great extent has been instrumental in breaking the yield barriers in these crops and in helping to raise the ceiling on their current yield levels. The discovery of drawfing genes and the high fertiliser responsiveness in these modern varieties have paved way to modern agronomic manipulations for increasing the yield levels of almost all the cultivated crops. The investments on irrigation, fertilisers and inputs will not pay rich dividends in the absence of good quality seeds, as has been demonstrated by the results of IADP in India.

1.6 The modern scientific research would be of little value to the farmer unless he gets seeds, which are genetically pure (true to type) and possess other desired qualities viz., high germination percentage and vigour, high purity, sound health etc. When the farmers do not get seeds possessing all such qualities, the yields they obtain may not be as expected.

1.7 The indifference towards quality seed which hitherto prevailed should, however, cause no surprise. It epitomised the more general indifference towards scientific agriculture. Since it is a biological industry, good agriculture depends upon good

seed and vice-versa. One cannot exist or advance without the other. The pace of progress in future food production, therefore, will largely depend upon the speed with which we are able to multiply and market good quality seeds.

1.8 Classess and Sources of Certified Seed

There are four classes of seed viz., Breeders' seed, Foundation seed, Registered Seed and Certified seed. But in practice only three classes of seed are under production viz., Breeder, Foundation and Certified seed.

(i) Breeder's Seed : Breeder's seed is the seed directly controlled by the originating or sponsoring plant breeder. The breeding programme of the institution and its production is supervised personally by a qualified plant breeder. This also provides the source for the initial and recurring increase of Foundation Seed.

(ii) Foundation seed : Foundation seed is the progeny of breeder's seed or foundation seed which can be clearly traced to breeder seed. Production is being supervised and approved by the Certification Agency. It is being handled in order to maintain specific genetic identify and purity and shall conform to certification standards specified for the crop being certified.

(iii) Registered Seed : Registered seed is the progeny of foundation seed and that it is being handled to maintain its genetic identify and purity. It is also in accordance with the standards specified for the particular crop being certified as per the India Minimum Seed Certification Standards prescribed by the Central Seeds Committee.

(iv) Certified Seed : Certified Seed is the progeny of Foundation Seed. The production of which shall be so handled to maintain specific genetic identity and purity according to standards specified for the crop being certified. Certified seed may be the progeny of certified seed, provided its reproduction does not exceed two generations beyond foundation seed.

Measures to bridge the gap between demand and supply of quality seeds

1.9 The modern seed concept in India had its origin with the Royal Commission on Agriculture in 1928, which proposed the intorudction of improved seeds, testing in farmers'fields and large scale distribution based on these test results. Improved scientific production of seeds and their efficient distribution were given a special thrust only during the first two five year plans. The first five year plan launched in 1951-52, laid emphasis on the distribution of improved seeds, and the second plan on setting up seed farms in various Community Development Blocks. The third plan, however, pinpointed the short-comings in the seed industry. It discovered the mis-match in the demand and supply of quality seeds and took note of the poor standards of processing and marketing.

1.10 The real modernisation came with the introduction of hybrid seeds. The first hybrid maize variety adopted to Indian conditions was multiplied and distributed for large scale cultivation during the year 1961, which incidentally was celebrated by the F.A.O. as the "World Seed Year". This was closely followed by the hybrids of sorghum and bajra becoming very popular.

1.11 The need for a Central Seed Organisation was felt at this time, and the National Seeds Corporation (NSC), a Company of the Government of India under the Companies Act was formed in 1963 to function as an agency to promote the healthy growth of Indian seed industry. Production of certified seeds in large quantities was taken up by the NSC, through different cooperative agencies. It also handled the multiplication and distribution of foundation seeds of improved varieties and hybrides.

1.12 In the mid-seventies, the National Seed Programme (NSP) was launched with the World Bank assistance. This followed the recommendation of a review team in 1968 and of the National Commission on Agriculture, that the NSC should serve as a multiplying agency for foundation seeds of selected varieties of national importance and that the State Agricultural Universities should play a significant role in seed production. The committee was in favour of the States having their own seed certification agency and the NSC to withdraw from this field.

1.13 The National Seed Programme was aimed at a comprehensive development of seed industry. Operating in 9 states with 11 agricultural Universities and 8 ICAR Institutes participating in it, the Project involved setting up the infrastructure for seed production and distribution. It has programmed to put up 22 seed processing plants for certified seeds and 26 for foundation seeds, of which 8 have been commissioned and the remaining ones are expected to be ready as per schedule.

1.14 The seventh Plan Programme also envisages setting up of atleast one seed farm in the blocks not covered during the second and third five year plans, when about 2,700 block level farms were

set up, of which 1,800 are presently in operation. In addition, the central organisations like the National Seeds Corporation and the State Farms Corporation of India, and State level organisations like the State Seeds Corporations will develop large seed farms to act as models.

1.15 While the farms run by Central and State Government will produce only breeder and foundation seeds, certified seeds will be produced in the farmers fields. It is also proposed to set up about 2,000 seed processing plants during the seventh plan period when small farm level mechanical graders will also be selected. Regulation of quality, price and distribution of seeds, will be ensured by strengthening the seed certification and seed testing laboratories and the enforcing agencies of the States. The retail points for the sale of seeds are also proposed to be increased. While the national-level organisations will have atleast one outlet in each district, the State level organisations will provide one more retail point through primary cooperative societies, fertiliser manufacturers and/or private traders. Mobile seed sales points will also be run by the State level organisations or private parties in the interior areas.

1.16 The National Seed Corporation, State Seed Corporations and State Farms Corporation of India will maintain buffer stocks to the extent of 10 per cent of the previous years' requirements for certified seeds, 20 per cent for foundation seeds, and 50 per cent for breeders seed. Short-term and equity bank loans are also proposed to be given during the seventh plan to the Seed producers and distributors for streamlining their functions.

Impact of Developmental Efforts

1.17 With increase in demand for quality seeds, there has been a significant increase in the number of seed producing agencies in the public, cooperative and also private sectors. Quite a large number of progressive farmers became conversant with the production techniques in respect of certified/quality seeds. HYV and hybrids developed through the relentless efforts of ICAR institutions, Agricultural Universities and R&D activities of the State Government and private seed companies by successful application of biological engineering have revolutionized the concept and vital role of quality seeds in Indian agriculture.

1.18 There has been a tremendous impact on the seed industry during the last two decades. During 1985-86, distribution of quality seeds went up over 55 lakh quintals as against only 1.83 lakh quintals in 1953-54 with realistic expectation to the extent of 107 lakh quintals by 1989-90. According to an estimate of NCA (1976), the requirement of quality seed would be about 220 lakh quintals for production of estimated 225 million tonnes of food-grains in 2000 AD.

Demand Assesment for Seed Production Planning

1.19 Systematic approach to a planned production of certified/ quality seeds of different crop varieties involves a realistic demand survey which is not an easy task. Coordination of supply and demand of certified seed in India has been a problem for many years. There is little information on the rate at which the demand is expanding. Demand is closely linked with expansion of areas or replacement of traditional varieties of crops under HYVs. hybrids and improved varieties. In the short-term, demand mostly depends upon the seed replacement policies of the farmers

which in turn, are affected by local tradition, intensity of extension education and publicity, seed prices and timely availability of good quality seeds of required varieties.

1.20 On the basis of the replacement rates of various crops fixed by GOI, 10 per cent for wheat, paddy, barley, ragi, improved varieties of maize, jowar, bajra and cotton, oilseeds and potato, 15 per cent of pulses; 50 per cent for jute and 100 per cent for hybrids of maize, jowar, bajra, and cotton, the total requirement of certified/quality seeds at the end of Seventh Five Year Plan (1989-90) works out to 117 lakh quintals. However, taking into consideration the rate of progress in this area the assessment tends to be around 107 lakh quintals.

Production Infrastructure

1.21 In order to produce a given quantity of certified seed by multiplication of foundation seeds, production programme for corresponding quantity of breeder seed has to be implemented by advance planning for three years. It is a prerequisite for any well-knitted seed programme that the breeding institutions organise production of sufficient quantities of nucleus and breeder seed. During the past few years, the system of multiplication and distribution of breeder seeds by the ICAR institutions, Agricultural Universities, NSC and SFCI (State Farms Corporation of India) has been streamlined. Under the present system, breeder seeds are also distributed to the private seed companies. This has enlarged the scope for production of larger quantities of foundation and hence certified seeds.

1.22 According toNCA (1976) projecting the nature and number of main infrastructural facilities for production of estimated quantities of breeder, foundation and certified seeds in 2000 AD

we would require 70 breeder seed institutions, 75 foundation seed agencies, 360 certified seed agencies, 3000 seed processing plants (of 1000 quintals capacity each) and an equal number of seed stores and on the technical manpower side, 10,000 Seed Technologist. Thus, there is a great need to support the basic infrastructure already created by its strengthening adequately in keeping with the growth potential of seed demand over the years.

The Next Step

1.23 It is expected that farmers would be benefited by using 'certified seeds' for their crops by way of higher production and protection against risk of disease infestation from inferior quality of seeds available through trade channels. However, the actual scale of distribution of the certified seeds and their use by farmers and the impact of the 'certified seed' on the yield rate, compared to farmers seed or seeds of other origin is a matter to be investigated upon, therefore, a study of the problem and constraints in the working of the scheme in the state of Madhya Pradesh and study the impact of certified seeds on farmers fields is of considerable importance.

II Objectives

1.24 Broadly, the objectives of the study were :

(i) to study the present scale of working of the "Certified Seed" Scheme, production and distribution arrangement of the Certified Seed in Madhya Pradesh.

(ii) to study the impact of certified seeds on yield rates of crop compared to the yield rate of crops- non certified seeds at farmers level.

(iii) to study the degree of awareness, acceptance and adoption of certified seed by farmers and

(iv) to examine the farm level problems of using Certified Seeds and suggest measures for improvement, if necessary, based on the findings of the study.

III. Data and Methodology

1.25 The study is based on two sets of data :-

(i) The data collected from official agencies.

(ii) The data collected from a selected sample of 100 households using certified seeds.

1.26 The districts for the survey have been selected on the basis of maximum area under the selected crops viz. wheat, paddy, jowar and cotton and extent of use of certified seeds. A three stage sampling design has been adopted for the selection of farmers with district forming the first unit, C.D. blocks as well as villages within each district as the second stage unit and farmers using certified seeds as the ultimate sampling unit. Four district, viz. Dhar, Raipur, Chhindwara and Khandwa have been selected purposively from the state of Madhya Pradesh and the scope of study is confined to major rabi crop viz. wheat and kharif crops viz. paddy, jowar and cotton respectively.

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CHAPTER II

SEED DEVELOPMENT IN INDIA

General

2.1 In traditional agriculture, seed is not generally a purchased input. Most of the farmers produce their own seeds. The commercial seed production increased substantially in advanced agriculture after the innovation of hybrid seeds was accepted by most of the farmers. It is no wonder, therefore, that in India commercial seed production has just started when the innovation of hybrid seeds is introduced. The production technique for hybrid seed is difficult and also costly for an individuel farmer to produce his own hybrid seeds. The innovation of high yielding varieties of self pollinated crops like paddy and wheat also requires that the home produced seed should be replaced by the fresh stock of proven genetical characters from outside at least after five years. These innovations have helped in initiating the commercial seed production and thus an infant seed industry has come into existence in the country.

Seed programmes in past

2.2 The activity of seed production and distribution was never viewed as a commercial enterprise before 1966. The government considered the supply of improved seeds as one of the normal activities of the agricultural development. The Famine Enquiry Commission (1945) and Grow More Food Committee (1952) found that this activity was not satisfactorily carried out. The Programme Evaluation Organization (PEO) of the Planning Commission

observed in 1961 that the coverage of area under improved seeds increased only by five percent in paddy and eighteen percent in jowar during a period of twenty years from 1930 to 1950. During the Second Five Year Plan it was envisaged to set up a seed farm and a seed store in every Community Development Block. The State Department of Agriculture was in charge of the seed farms within the State. The foundation seed (or nucleus seed) was to be produced on the seed farm and its multiplication was to be done through the resigtered seed growers. The tasks of procurement of seed from the registered seed growers and its distribution to farmers were carried out by the cooperatives under the guidance of the Department of Agriculture. A target of 4328 seed farms with a total area of 8 lakh acres was fixed in the Second Five Year Plan. But by the end of the Plan, only 1,893 seed farms with a total area of 0.82 lakh acres were established. About 20 per cent of the area under food grains was brought under improved seeds at the end of the Second Plan. The Programme Evaluation Organization, the Committee on Plan Projects and the progress reviews done by the Ministry of Food and Agriculture, Government of India, brought out several short-comings of the seed programmes conducted during the Second Plan. This helped in revising the seed programmes in the Third Plan. It was decided to set up seed testing laboratories and foundation seed farms in the Third Five Year Plan. A target of 4,789 foundation seed farms was fixed for the Third Five Year Plan. But only 2,349 farms were established.

Beginning of the Seed Development Programme

2.3 After launching the High Yielding Varieties Programme in the country in 1966, the production and distribution of seeds began to take shape as an enterprise. The National Seeds Corporation (NSC) which was established in 1963 with the primary goal to develop, organize and promote the seed industry in the country took a leading part in organizing the supply of new seeds for the HYV programme.

National Seeds Corporation

2.4 The National Seeds Corporation Limited (NSC) is a Government of India Undertaking under the administrative control of the Ministry of Agriculture, Government of India. It was set-up in March, 1963 and started functioning from July, 1963.

2.5 The main objectives set before it, inter-alia, were

(i) To carry on in India the production, processing, drying, storing, distribution and transporation of agricultural seeds.

(ii) to enter into agreements with individuals, cooperative societies, corporations and government agencies in the growing, processing, drying, storing, distribution, transporating and selling of agricultual seeds.

(iii) to undertake by inspection and any other means, seed quality control measures in all the facets of seed business carried on behalf of or in cooperation of the Corporation.

(iv) to store and stockpile reserve supply of any seed needed for improvement of agriculture in India.

2.6 The NSC has pioneered the Indian seed industry. By virtue of its efficiently organising the seed industry over the last 20 years, best expertise is available with the NSC today in the following fields:

(i) foundation seed production.
(ii) certified seed production,
(iii) seed certification,
(iv) seed quality control,
(v) seed processing, handling, packaging,
(vi) seed storage,
(vii) seed testing,
(viii) seed marketing,
(ix) information communication and public relations.
(x) seles promotion and advertising,
(xi) training in seed technology,
(xii) project formulation and project management,
(xiii) consultancy services in all the above disciplines.

2.8 NSC handles quality, foundation and certified seeds of nearly 230 varieties of 70 crops.

Foundation Seed Production

2.9 NSC is the principal agency responsible for production, stocking and distribution of foundation seeds of varieties of major crops of all India and regional importance. NSC has largely been utilizing its own farms or the farms of the agricultural universities, State Farms Corporation of India and, under exceptional situation, private holdings for producing high quality foundation seeds.

Certified Seed Production

2.10 To ensure that adequate quantities of certified seeds for raising bumper crops are available to the farmers at reasonable rates and at the time and place where these are needed, the NSC has been arranging certified seed production through salected seed growers/farmers and agencies and organisations proficient in seed production and supply.

2.11 With the launching of the National Seeds Programme in 1975-76 the National Seeds Corporation is required to phase out from certified seed production gradually. This activity has been passed on to the State Seeds Corporations.

2.12 Certified Seed production directly by the NSC is, however, being taken up by the NSC to fill up the gaps left in the state seed productions programme and to build up exports and buffer stock. NSC organises Certified seed production through State Seed Corporation, SFCI and contract growers to meet the demand of certified seed.

Processing

2.13 Seed, after harvest, is seldom fit for planting straightway. In order to improve the physical quality of large quantities of seeds produced by NSC as well as other agencies/organisations in the country, NSC has established and also assisted in setting up seed processing plants using the latest and the best technical know-how for seed draying, cleaning grading and packing. These processing plants are functioning at various places in the country for processing of seeds.

2.14 Under the National Seeds Programme, NSC is providing consultancy services to the State Seeds Corporations in setting up their own seed processing plants.

Quality Control

2.15 Seed Certification is an important component of the seeds production programme. To ensure that the true characteristics of varieties are maintained through the various stages of seed multiplication upto the stage the seed reaches the farmers, the NSC discharged the function of seed certification agency over large areas in the country as an interim measure till the state seed certification agencies were established as per the provisions of the Indian Seed Act, 1966.

2.16 NSC operates its internal quality control measures of field inspection and seed testing for seeds produced by NSC.

2.17 The NSC also undertakes to organise grow-out trials to verify the quality of seeds produced or sold by it.

Seed Testing

2.18 NSC set up its seed testing Laboratory in 1968 independently with the indigenous know-how and equipment. Annually, the laboratory analyses between 12,000 to 20,000 samples of a wide range of crop-varieties from various seed production zones in the country.

2.19 This laboratory is one of the three in the country to have the privilege of holding membership of the International Seed Testing Association. The techniques used in the laboratory conform to international standards.

2.20 Recognising the importance of seed health in productivity, NSC has also set up its own seed Health Testing Laboratory for analysing seed samples for freedom from diseases.

Information, Communication, Public Relations, Sales Promotion and Advertising

2.23 The NSC has been primarily instrumental in the transfer of modern farm technology. Effective information communication and public relations systems were developed in collaboration with the international organisations for popularising the certified seeds. As a help to the extension and sales promotion efforts, informative handbooks on all aspects of quality seed production and supply, improved crop varieties, agronomic practices, seed crop handling, seed processing, seed testing and quality control, have been published by the NSC. NSC has also produced films highlighting the usefulness of certified seeds and assisted the Films Division and Television in producing films on the certified seeds and high yielding variety programme. NSC has also provided basic material to the Government of India field publicity agencies for highlighting importance of certified seeds. Information communication activity of the National Seeds Corporation made comprehensive study of the rural market and designed and launched media like press publicity, radio, film, field demonstrations and so on. The NSC

provided the necessary help to mass communication agencies like Radio and Television in organising useful programmes for the benefit of the rural masses. Important of these programmes, are the introduction of Krishi Darshan at Television, Farmer's School on the of All-India Radio.

Training

2.24 Recognising the need for building up a cadre of trained personnel to manage the seed programme, NSC began imparting training through short courses since 1965. NSC has so far organised 43 Seed Improvement Training Courses, 12 Vegetable Seed Improvement Training Courses, 4 Integrated Seed Improvement Training Courses, 1 Seed Health Training Courses, and 15 courses of other kinds in which 1540 individuals from NSC, departments of agriculture, agricultural universities, state seed corporations, certification agencies, private sector including foreign institutions have received training. The regular courses are usually of 40-45 working days duration and briefly deal with plant breeding, variety evolution, recent trends and developments in variety improvement and in reasonable detail on seed biology, seed production, processing, certification, marketing, testing, law enforcement and storage.

Project Formulation and Project Management

2.25 By virtue of its sound professional experience in various spheres of quality seed production and supply the NSC has been largely instrumental in formulating the Rs.90 crore National Seeds Programme launched in

India with the World Bank assistance. Under the National Seeds Programme (NSP) the NSC has assumed the role of a leader to develop the seed industry on sound lines. Specifically, the National Seeds Corporation is contributing towards the State Seed Corporation's share capital, coordinate certified seed production programme of several State Seed Corporations, assess seed demand and be responsible for interstate marketing of certified seed, conduct surveys of seed demand, plan and organise the production of foundation seed, plan the production of breeder seed in consultation with ICAR, provide technical assistance services to State Seed Corporations and private sector agencies, co-ordinate market research and sales promotion efforts, provide training facilities for staff participating in seed industry development, operate the reserve stock scheme, provide certification services for states not having established independent seed certification agencies, and produce vegetable seed for local and export market. NSC is also helping State Seed Corporations in producing materials for establishing seed processing facilities under the NSP.

Exports

2.26 Agricultural seeds from India especially of the high yielding improved varieties are finding favour with a number of countries especially the developing countries. The NSC is arranging exports of seeds of such varieties mostly against advance indents received. In this manner NSC meets the needs of the export market after taking the domestic needs in account.

CHAPTER III

SEED DEVELOPMENT IN M.P.

3.1 The seed industry in Madhya Pradesh has a chequered history. Until the beginning of the eighties, there was no seed industry worth the name and there was not a single seed processing plant anywhere in the state. The state seed corporation (SSC) was launched in 1981.

3.2 The SSC was intended to function as the guardian angel of the state seed industry to provide leadership at the state level for the establishment and growth of a healthy seed industry by means of promotional, educational, technical and coordinating roles and to act as a foundation seed organisation. The SSC undertook direct production of certified seeds right from the beginning on the departmental farms handed over to the corporation.

3.3 The SSC would provide the necessary facilities for seed production, processing, storage and marketing within the State. It would also act as the catelyst for intensive development of the area and provision of necessary facilities, inputs and credit etc. by other agencies. It would arrange for the distribution of the seeds imported through the National Seed Corporation from other states.

3.4 The scope and functions of the Madhya Pradesh Rajya Beej Evam Farm Vikas Nigam as notified by the Madhya Pradesh, Agricultural Department, Bhopal's notification dated 17th Nov.1980, are as follows :-

1. To procure and produce breeder's and foundation seeds and planting material of different crops, stocks from monitored sources and to multiply them for production of 'certified seeds' of different crops and varieties.

2. To produce quality seeds and planting material of different crops as "truthfully lebelled seed" whenever production of certified seed is not technically possible.

3. To arrange sale of seeds to the farmers through the Department of Agriculture, cooperative societies and private dealers.

4. To install processing plants and maintain them for processing of seeds produced. It may also be utilised for processing of seeds of other agencies on customer service basis.

5. To operate and develop departmental farms handed over by the Agricultural Department to the Corporation for production of seeds and conducting adaptive trials of seed etc.

6. To enter into contract with National Seed Corporation and other seed Corporations of other States for procuring, processing of seeds for them.

7. To provide assistance to the farmers, Seed Growers Societies for production of quality seed and planting material.

3.5 The chief objective is of production of the certified seeds of notified varieties of different crops for supplying to the farmers. When it is not possible to produce certified seed due to technical reasons, the corporation would produce "truthfully lebelled seeds" maintaining high standard of specification. The production of seed and other planting material will be taken up on corporation and Agricultural Department farms and on the field of the Seed Growers Societies and Individual farmers. The seeds

produced will be processed and packed in suitable acre packing for distribution to the farmers.

3.6 The corporation handles the programme of production and distribution of certified seeds to the extent necessary to cover the targeted area, Nucleus seeds of improved varieties are produced on agricultural research stations and are multiplied on seed multiplication farms of the S.S.C. which are known as foundation seeds. The Corporation have to look after seed activities in three stages as follows:-

1.	Foundation Seed :	Production and Coordination of various agencies for the production of foundation seeds and breeders' seed.
2.	Certification :	Selection of Seed producer; inspection of seed production plots, processing and certification of seeds.
3.	Commercial :	Marketing of Certified seed.

3.7 The foundation seeds are also given to Registered seed Growers for multiplication under direct supervision of the officials of the Nigam. The seeds thus produced are distributed either by the Corporation through the cooperatives or by the Registered Seed Growers.

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CHAPTER -IV

AGRICULTURAL ECONOMY OF MADHYA PRADESH AND SELECTED DISTRICTS

4.1 A brief outline of the broad features of the agricultural economy of Madhya Pradesh and the districts selected for the study is presented in this chapter. The object is to provide, by way of background information, some relevent particulars regarding the land use pattern, soil type, irrigation and crop pattern, size of holdings, infrastructure facilities etc.

MADYPA PRADESH

4.2 The state of Madhya Pradesh is centrally situated between latitudes 17° to 26°N and longitudes 74° W 84°E and is the largest state in India, occupying 4.43 lakh square kilometres. According to 1981 census the population was 52.1 million. Eighty per cent people live in villages and are dependent on agriculture. The average size of holdings is 3.53 ha. with 64 per cent of the holdings having lower size than the average. Net cropped area is 19.2 million ha. (43.0 per cent of the land area) of which only 14.4 per cent is irrigated, the chief sources being canals, tanks and wells. The gross cropped area is 22.6 million ha. with a cropping intensity of 118 per cent. Forest occupy 31.7 per cent of the land area of the state. The share of agriculture and allied sectors is 56 per cent of the domestic product of the state.

4.3 Madhya Pradesh state has six distinct physical regions which are : Northern low lying plains, Malwa and Vindhya Plateau, Narmada Valley, Satpura stretch, Chattisgarh plains and Bastar plateau. The State has varying soil type ranging from alluvial, deep, medium and shallow black; mixed red and black; mixed red and yellow and skeletal soils.

4.4 The annual rainfall is the highest (1626 mm) in the eastern districts which gradually decreases to less than 476mm. in the western part of the state. Though most of the precipitation is received during June to September, with a peak in August, there is an unpredictable variation in the distribution of rains during the season and to some extent during winter. Cultivation being mainly dependent an irregularly distributed mansoon rains, agricultural production is by and large not commensurate with potential that exists. The major crops of the state are paddy, wheat, jowar, lesser millets, arhar, lathyrus, gram, urid, moong, lentil, peas, linseed, groundnut, sesamum, rape/mustard and niger. Under commercial crops, sugarcane and cotton are mainly grown. The cropping pattern varies from region to region according to topography, soils and climatic conditions. The major crop-zones are : (i) Cotton-Sorghum Zone, (ii) Sarghum Wheat Zone (iii) heat zone (iv) Rice-Wheat zone and (v) Rice zone.

4.5 Madhya Pradesh is generally self sufficient in food grain production. The production fluctuates considerally from year to year due to uncertain mansoon rains. Tribal cultivators, representing about 21 per cent of the total population, are engaged mainly in a primitive type of agriculture.

4.6 The State, however, due to its size is one of the major foodgrains producers. Its share to the countries total goodgrains production has been around 10 per cent. Percentage contribution of the state to the total production of different crops in the country is : rice 9%, sorghum 16%, maize 14% and wheat 9%. Pulses play an important role in the state, predominantly in rainfed

agriculture, with a contribution of about 21% of the total pulse production of the country. Although the state's overall contribution to the agricultural output is impressive, its performance with regard to agricultural productivity level is rather low. The situation is mainly due to large area under cultivation being rainfed, with considerable variations in mansoon rains from year to year.

4.7 The area, production and productivity of crops of the state are given in Table 4.1

Table 4.1

Area, production and productivity of major crops in Madhya Pradesh - (1983-84)

Crops	Area ('000 ha.)	Production ('000 T)	Productivity kg/ha
Paddy	4946	4799	1027
Sorghum	2128	1983	934
Maize	831	1156	1403
Arhar	508	510	1009
Moong Moth	232	75	354
Urid	790	231	312
Soybean	614	462	752
Groundnut	312	232	745
Wheat	3780	4374	1207
Gram	2106	1425	677
Linseed	585	164	281
Rape & Mustard	312	232	749
Cotton	544	210 (Lint) (in '000 bales)	215

DISTRICT DHAR

4.8 The district is situated on the western corner of Madhya Pradesh and lies between 22.0' to 23.10' north latitude and 74.28' to 75,42' east longitude. The area of the district according to surveyer General of India is 8,153 sq.kms. The district comprises seven tehsils having 13 blocks of which 12 are tribal development blocks and one (Badnawar) is a community development block with mini tribal project. According to 1981 census, the total population of the district is 10.56 lakhs of which 9.23 lakhs (87%) account for rural population. The district is predominantly a tribal one and tribals constitute 52.18 per cent of the total population. The population density is 130 persons per sq.kms. There are 1,19,428 farm families in 1,570 villages in the district.

4.9 So far as rainfall is concerned, Dhar district falls under sub-humid classification, with an average annual rainfall of 833 mm. Scanty and improper distribution of rainfall has been the problem of the district.

4.10 The soil is generally medium deep to shallow black cotton soil. In hilly tracts, the soil is light and sandy loam.

4.11 In 1983-84 out of the total area of 8,19,550 hectares in the district, 74,850 hectares i.e. 9.12 per cent was covered with forests. The low proportion of forest area indicates the unfavourable ecological balance and the immediate need to increase the forest area. Similarly, the percentage of pasture area to total area was 7.09 only in 1983-84. Since pasture area provide effective vegetative cover to the soil and help in conservation of soil and provide fodder for animals, the increase in the pasture areas should also be taken up on priority basis.

4.12 Agriculture is the mainstay of the economy. Nearly 75 per cent of the rural population is engaged in agriculture. Main foodcrops of the district are wheat, jowar and maize. Among the cash crops cotton is grown in a larger part of Nimar tract followed by groundnut. In most of the blocks of the district, the yield of the crop is below the state and all India averages.

4.13 The position of area irrigated in the district is none too happy. In 1983-84 area under irrigation was 73,450 hectares, which was 12.22 per cent of the gross cropped area. Since irrigation potential is less, agriculture is mainly dependent on the rainfall. The proportion of area under kharif and rabi was 2:1 in 1983-84, which clearly indicates that scanty and erratic rainfall can bring about scarcity and drought condition in the district. It is, therefore, essential to increase the irrigation potential, by way of construction of tanks.

4.14 The area, production and productivity of crops in Dhar district are given in Table 4.2.

Table 4.2

Area, production and productivity of major crops in Dhar district (1983-84)

Crops	Area ('000 ha)	Production ('000 T)	Productivity (kg/ha)
Sorghum	75.8	57.3	495
Maize	69.4	92.3	1,331
Arhar	8.4	6.1	725
Moong Moth	19.2	5.5	284
Urid	45.9	13.6	296
Soybean	37.8	32.6	861
Groundnut	27.2	17.1	628
Wheat	84.4	115.8	1428
Gram	67.6	31.9	475
Linseed	17.1	5.1	300
Cotton	53.9	27.8 ('000 bales)	269

DISTRICT RAIPUR

4.15 Raipur district is situated in the south eastern part of M.P. between 81°-25' and 83°-38'E longitude, 19°-50' N to 21°-53'N latitude, occupying an area of 21,274 sq.kilometers i.e. 4.8 per cent area of the state. The district is chiefly divided into two parts Eastern part and Western part by Mahanadi river flowing south-north in the initial stage and turning east ward at the latter stage. The main tributaries of Mahanadi river in the district are Sheonath, Piary, Kharun, Udanti and Tel rivers. The general slope of the rivers is from south to north. The southern and south-eastern part of the district is hilly having Sihawa range with it fringes spread out towards north-eastern portion of the district. In general the area can be described as plain with mild slope.

4.16 The district had a population of 30,79,476 persons who resided in 3,842 villages and 8 towns (1981). The density of population per sq.Km. is 145. The population included 18.56 per cent scheduled tribes and 13.77 per cent scheduled castes. The district population had larger proportion of females numbering 15,44,122 as against 15,33,606 males which means 1,007 females per 1,000 males. The district population included 14,06,143 workers covering 45.66 per cent of the total population. Among the workers 6,98,602 were cultivators or 49.68 per cent, 4,22,714 agricultural labourers or 30.06 per cent and the remaining 2,84,827 workers or 20.26 per cent were engaged in other trades.

4.17 So far as climate and rainfall are concerned the climate of Raipur district is, in general, warm and humid. Maximum and minimum temperatures recorded were 41.7° (May) and the 12.8°C

(December). The district falls in the heavy rainfall region with and average annual rainfall of 1375mm. Maximum rains fall during rainy season between May-June to mid- September and it may have some rains during winter in December and January.

4.18 According to the broad classification of Indian soils, the soils of the district can be placed under the category of red and yellow soils with variations like grey, dark-grey, brown, yellowish and reddish brown. From the agricultural point of view the soils can further be classified as clayey (50-60%), clayey loam (43-56%), sandy loam (35-40% clay) and sandy. The soils are locally classified as Kanhar, Dorsa, Matasi and Bhata.

4.19 The geographical area of the district is 2,127.3 thousand hectares. Agriculturally Raipur is said to be basement of the rice bowl area. It is one of the districts selected for the intensive cultivation of paddy. It is mainly a paddy growing district. Area under agricultural uses was 1000.7 thousand hectares and it covered 47.04 per cent of the total geographical area of the district. It included 74.8 thousand hectares or 43.52 per cent used for raising the crops. Double cropped area accounted for 311.5 thousand hectares or 25.17 per cent of the net sown area. The gross cropped area was 1,237.4 thousand hectares of which 1,172.2 thousand hectares or 94.73 per cent was sown under food crops. The non-food crops were sown on a meagre area and covered only 65.2 thousand hectares.

4.20 The district had better resources of irrigation. However its agriculture mainly depended on the behaviour of rains. Area irrigated in the district was 296.9 thousand hactares which mean- nearly one-third of the net area sown was irrigated. Irrigation

sources in the district included 55 canals, 12,737 tanks, 22 reservoirs, 314 tubewells and 53,412 irrigation wells. Canals were more important and irrigated 253.4 thousand hectares or 89.35 per cent of the total irrigated area.

4.21 Like other districts of the state the kharif crops form the backbone of agriculture in Raipur district. These crops were sown on 898.8 thousand hectares and covered nearly three forths of the gross cropped area. The rabi crops were grown on 338.6 thousand hectares or 27.36per cent area.

4.22 Cropping pattern of the district mainly included paddy which was sown on 799.6 thousand hectares and covered 64.62 per cent of the gross cropped area. Lakh (Teora) was next to be so on 206.0 thousand hectares. Kodo - kutki, linseed, urid, wheat, groundnut and gram were also sown on a considerable area.

4.23 The area, production and productivity of crops in Raipur district are given in Table 4.3

Table 4.3

Area, production and productivity of major crops in Raipur District (1983-84)

S. No.	Crops	Area ('000ha)	Production ('000 T.)	Productivity (kg/Hect.)
1.	Paddy	809.2	995.0	1297
2.	Jowar	0.6	0.5	845
3.	Maize	1.5	1.5	1023
4.	Kodo-Kutki	54.3	8.1	150
5.	Sanwan	1.1	0.4	275
6.	Groundnut	6.6	4.5	681
7.	Arhar	3.1	2.8	928
8.	Wheat	17.6	11.7	688
9.	Linseed	51.0	5.8	114
10.	Teora	188.9	65.6	347
11.	Lentils	3.3	1.1	337
12.	Gram	5.3	3.0	572
13.	Moong Moth	10.2	1.9	390
14.	Urid	45.4	8.1	393
15.	Kulthi	5.2	1.7	661
16.	Sugarcane	0.6	1.4	3571

DISTRICT CHHINDWARA

4.24 Chhindwara district is situated on southern boundary of Madhya Pradesh and lies between 21°28' and 22°49' north latitudes and 78°10' and 79°24' east longitudes. The entire district lies in the 'Satpura Range' of mountain at a height of about 370 to 1000 metres above M.S.L. The whole district is intersected by rivulets and streams. The district has an area of 4,565 square miles according to the surveyor General of India and 1,885 thousand hectares according to the village papers.

4.25 According to 1981 census the population of the district was 12.3 lakhs. The density of population in the district comes to 104 per square kilometer.

4.26 The average rainfall of the district is 1,205 mm. It is least in the plains of Sausar and increases with the rising elevation towards north. About 88 per cent of the annual rainfall is received during the mansoon month i.e. mid June to September. The temperature starts increasing rapidly from about March till May, which is the hottest month. The maximum temperature ranges from 23.9° to 39.01°C in the months of January and May respectively. The winter commences from November and extends upto February. There is a considerable variation in temperature and rainfall. The climate is suitable for cultivation throughout the year.

4.27 According to the broad classification of Indian soils the soils of the district can be placed under the category of

(i) Gravelly and sandy loam, light black cotton soil in patches,

(ii) Shallow black cotton soil and (iii) Shallow and medium black

4.28 Agriculturally the district may be divided in three distinct cropping zones, namely-(i) Niger-Kondon-Kutki (ii) Jowar-wheat and (iii) Jowar- cotton-groundnut.

4.29 There is an agricultural maize research and demonstration farm situated at Chandangaon about 1.5 kms.from Chhindwara town sponsored by J.N. Agricultural University, Jabalpur. This farm serves the purpose of demonstrations of improved agricultural practics laying out adopted research trials and multiplication of recently developed variaties seeds mainly of maize and other crops.

4.30 The most significant feature of land use in the district is the high percentage of forest area. It is 38 per cent of the total geographical area. Net area sown in the district comprised 40.59 percent and fallow, 5.31 per cent. Nearly 8 per cent of total area was not available for cultivation and another 8 per cent was cultivable waste. The main sources of irrigation in the district are wells which irrigate 96 percent of the total irrigated area.

4.31 The district of Chhindwara falls in jowar-wheat zone of the state and these two crops occupy 26 per cent of total cropped area of the district. Kodon-kutki which is generally grown in inferior soils, is other crop of importance occupying 11 per cent of the total cropped area. The important non-food crops include niger and groundnut among oilseeds and cotton as fibre. Fruits and vegetables occupy only 1.50 per cent of the total cropped area.

4.32 Most significant feature of the cropping pattern in the district is that the bulk of the cropped area is devoted to kharif crops (nearly 75 per cent). The cultivation of kharif crops depends on mansoon which is erratic and uncertain and at

times fails the crops owing to long dry-spell.

4.33 Main crops grown in rabi are wheat and wheat mixed with gram, potato, lentil, gram early and linseed under existing condition. Because of total dependability on rains, the cultivators hesitate to adopt a sophisticated technology in farming to maximise the productivity of their crops and therefore the traditional method of cultivation is still, give very poor yields.

The area, production and productivity of crops in Chhindwara district are given in Table 4.4

Table 4.4

Area, production and productivity of major crops in Chhindwara district- 1983-84.

S.No.	Crops	Area ('000 ha)	Production ('000 T)	Productivity kg/hect
1.	Jowar	87.6	77.9	889
2.	Kodo Kutki	73.9	22.9	309
3.	Paddy	26.8	28.0	1100
4.	Maize	33.6	58.5	1740
5.	Arhar	31.9	47.4	1491
6.	Urid	38.1	16.1	582
7.	Moong Moth	13.9	5.3	717
8.	Soybean	37.6	36.5	579
9.	Groundnut	22.4	29.5	1317
10.	Niger	31.6	9.3	292
11.	Til	4.2	0.9	216
12.	Cotton	10.0	7.6	425
13.	Sugarcane	8.0	22.8	5638
14.	Wheat	80.9	128.5	1654
15.	Gram	28.9	17.6	608
16.	Potato	2.3	29.2	12799
17.	Peas	2.7	0.8	307

DISTRICT KHANDWA

4.34 Khandwa District occupies the south-western position of Madhya Pradesh and is located between 21°05' North latitude and 75°57' and 77°13' east longitude. Major part of the district lies on the uplands between the valley of Narmada and Tapti flowing parellel to each other, east to west. The district is situated at an average height of 304.8 metres above the mean sea level. The district stretches over an area of 10,779 sq.kms., which in turn is only 2.43 per cent of the total area of the state.

4.35 According to 1981 census the population of the district is 11,54,830 i.e. 2.21 per cent of the total population of Madhya Pradesh. The density of population in the district is 107 people per sq.km. Of the total population of the district the urban population is 3,09,094 or 26.77 per cent, the rural population being 8,45,736 or 73.23 per cent. Total working population is 4,59,023 of which 40.23 per cent are cultivators and 34.19 per cent are agriculture labourers.

4.36 So far as climate and rainfall are concerned Khandwa district falls under the hottest belt in India. The maximum average temperature reaches to 117°F. during the month of May. The temperature, however, ranges between 110°F to 115°F during the entire summer season. The minimum average temperature in the month of December reaches 67.90°F. The rains usually start in the month of June and continue upto mid September. The average rainfall is 800 mm.

Relatively high temperature, small range of diurnal changes, longer days make the climate of the district drier and suitable for all the crops typically of tropics. The economy of the district predominently being dependent on the agriculture is governed by the intensity and distribution of rainfall.

4.37 The soil of the district comprises of Dark-Black, Medium Black and Laterite (Bhakarla), which is most suitable for Jowar, Cotton and groundnut.

4.38 The most significant feature of land use in the district is high percentage of forest area. About 43.5% of the district's total area is under forests, which according to the Gazetteer of the district are of four main types (a) Mixed Teak forest (b) Mixed teak and Anjan forest, (c) Pure Anjan forest and (d) Salai forest. Salai forests constitute nearly half the forest area of the district growing on flat hill tops and upper slopes all over the district. Total area under forest is 5,05,380 hectares of which 4,33,125 hectares are under reserved forests, 39,390 hectares under protected forests and 32,865 hectares is under classified forests. The main forest produce are timber, bamboo, tendu leaves, gran and gum. The important timber available are teak, salai and anjan.

4.39 East Nimar is predominantly a kharif crop area and cotton and Jowar are the main crops. Wells are the main sources of irrigation. Of the total irrigated area of 49,068 hectares 45,390 hectares area is irrigated by wells.

4.40 There are four agricultural farms in this district. Two farms: one at Khandwa and another at Burhanpur are run by the State Agriculture department and seed production and multiplication work is being undertaken. One farm at Khandwa is run by Agricultural University, Jabalpur where research on various varieties of seed is being conducted. One farm at Harsud is established for conducting seed multiplication work by M.P. State Seed Corporation.

4.41 Agriculture department is responsible for supplying seeds to the cultivators through block agency in time, whereas fertilizers and pesticides are being sold through cooperative societies situated in 5 the villages. There are as many as 562 credit and other societies functioning in the district. Seeds and pesticides are also available at the various Krishi Sewa Kendras located in the district.

4.42 The area, production and productivity of crops in Khandwa district is given in table 4.5

Table 4.5 Area, Production and Productivity of Major crops in Khandwa District (1983-84).

S.No.	Crops	Area ('000 ha)	Production ('000T.)	Productivity (kg./Hect)
1.	Cotton	135.8	38.9	146
2.	Jowar	122.5	125.0	1020
3.	Groundnut	19.5	10.1	522
4.	Paddy	29.3	31.1	1118
5.	Urid	50.9	11.8	444
6.	Moong & Moth	8.9	1.8	470
7.	Tur	15.9	20.8	1313
8.	Wheat	25.6	38.8	1577
9.	Gram	8.0	5.8	726
10.	Banana	9.5	195.3	39,443
11.	Sugarcane	1.5	3.2	4,102

CHAPTER V

USE OF CERTIFIED SEED BY SAMPLE FARMERS

Present enquiry into use of certified seed

A study of demand, supply and impact of certified seeds can not be complete without an analysis and evaluation of their impact on the use of certified seed by sample farmers. Investigation into this aspect was an important part of the present study. Data were collected from the sample farmers about their use of certified seed of wheat, paddy, jowar and cotton crops. The data have been analysed comprehensively since these crops were found to be most important in the district selected for study. It should be noted that the findings are representative, within certain margins of error, only of the districts selected for investigation.

Agencies for Seed Distribution

5.1 The present arrangement for distribution of certified seed may be broadly classified into three groups. First there is, the Agricultural Department for distributing certified seeds to the ultimate growers under the general supervision of the Block administration and the Rural Agricultural Extension officers. The second pattern of distribution is organized neighbour farmers, which are engaged in producing seed and distributing it. The third system may be said to be direct sale by the private dealers in the market.

5.2 The information collected in the course of the enquiry on the agencies for the distribution of certified seed, indicates that more than one agency is generally responsible for this work in the district.

Certified Seeds Requirement in Different Size Groups

Wheat:

5.3 The total requirement of sample farmers in the district for certified seeds of wheat was 75 quintals. Wheat seeds to the extent of 37.70 quintals were distributed to them. The quantity distributed was thus 50 per cent of the demand of sample farmers (Table 5.1). Secondly in no size group of the sample farmers was the quantity distributed sufficient and 9 individual farmers out of 25 selected sample farmers had been in deficit in obtaining the certified seed of wheat.

The net requirements of certified seeds of wheat worked out by the sample farmers are given in table 5.1

Table 5.1

Demand and supply of certified seed of wheat to the sample farmers in Dhar district- 1985-86

(Quantity in quintals)

Farm Size group	Seed requirement (Qtls)	%to total	Total quantity of seed obtained from: Agriculture Department	Neighbour Farmer	Private dealer in market	Total	Deficit
Small	16.50 (100.00)	22.00	7.60 (46.06)	3.40 (20.60)	-	11.00 (66.67)	5.50 (33.33)
Medium	18.90 (100.00)	25.20	0.70 (3.70)	8.20 (43.39)	-	8.90 (47.09)	10.00 (52.91)
Large	39.60 (100.00)	52.80	7.60 (19.19)	8.60 (21.72)	1.60 (4.04)	17.80 (44.95)	21.80 (55.05)
Total:	75.00 (100.00)	100.00	15.90 (21.20)	20.20 (26.94)	1.60 (2.13)	37.70 (50.27)	37.30 (49.73)

Note : Figures in parenthesis are percentage to the requirement.

According to this requirement of certified seed of wheat of sample farmers was 75 quintals. It showed that certified seed requirement activities was largely concentrated (53 per cent) with farmers who had large holdings. The sample further indicated that even the small and medium holdings were not an impending factors to adoption of the innovation. The requirement showed that 22 per cent and 25 per cent were from small and medium farmers respectively.

Paddy:

5.4 The total requirement of sample farmers in the district for certified seeds of paddy was 19.60 quintals. Total paddy seed to the extent of 17.40 quintals (89 per cent) was actually procured by the sample farmers of which 71 per cent was from the Agricultural Department. This shows that there had been progress in the distribution of paddy seeds comparing with other crops in the selected district, but the achievement as proportion of demand of sample farmers shows a steady decline by 11 per cent. It may be observed that the supply of certified seed of paddy in the case of small farmers was adequate. However, in the case of medium and large farmer the deficit was reported of 12 per cent and 18 per cent respectively (Table 5.2)

5.5 Secondly, nine farmers out of 25 selected sample farmers had been in deficit in obtaining the certified seeds of paddy.

The net requirement of certified seeds of paddy worked out by the sample farmers are given in table 5.2.

Table 5.2

Demand and Supply of certified seed of paddy to the sample farmers in Raipur district-1985-86

(Quantity in quintals)

Farm size group	Seed requirement (Qtls)	% to total	Total quantity of seed obtained from Agriculture Department	Neighbour Farmer	Total	Deficit
Small	4.55 (100.00)	23.21	3.80 (83.52)	0.75 (16.48)	4.55 (100.00)	- -
Medium	8.10 (100.00)	41.33	6.40 (79.01)	0.75 (9.26)	7.15 (88.27)	0.95 (11.73)
Large	6.95 (100.00)	35.46	3.70 (53.24)	2.00 (27.77)	5.70 (82.01)	1.25 (17.99)
Total	19.60 (100.00)	100.00	13.90 (70.92)	3.50 (17.85)	17.40 (88.77)	2.20 (11.23)

Note :- Figure in parenthesis are percentage to the requirement

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According to this the requirement of certified seeds of paddy of sample farmers was 19.60 quintals. It shows that certified seed requirement activity in paddy crop was largely concentrated (41 per cent) with medium farmers. The requirement of small and large sample farmers were 23 per cent and 36 per cent respectively.

Jowar :

5.6 The total requirement of certified seed of jowar of sample farmers in the district was 159.0 Kgs. Though the supply of certified seed was very close to the demand of sample cultivators (157.5 Kgs against 159 kgs. i.e. 99 per cent) there was a deficit of 1.5 kgs. i.e. 3 per cent among the larger sample farmers. The prospects of availability of supply and the quantity

distributed was sufficient as the Agricultural Department has covered a significant proportion of supply (72 per cent) and the another agency i.e. private dealer in market has supplied about one fourth of the quantity of certified seeds to the sample farmers. It appeared from the position of the sample farmers, as outlined above, that the supply of certified seed was more satisfactory as less than 1 per cent of the demand was in deficit (Table 5.3)

5.7 In terms of percentage of procurement to requirement of certified seed of jowar there was not much differences between the individual sample farmers.

The net requirement of certified seeds of jowar worked out by the sample farmers are given in Table 5.3.

Table- 5.3

Demand and Supply of certified seed of Jowar to the sample farmers in Chhindwara District (1985-86)

(Unit in kg.)

Farm size group	Seed requirement		Total quantity of seed obtained from				Deficit
	Quantity	% to total	Agriculture Department	Neighbour farmer	Private dealer in market	Total	
Small	38.0 (100.00)	23.9	32.0 (84.2)	6.0 (15.8)	-	38.0 (100.00)	-
Medium	64.5 (100.00)	40.6	51.0 (79.1)	-	13.5 (20.9)	64.5 (100.00)	-
Large	56.5 (100.00)	35.5	31.0 (54.9)	-	24.0 (42.5)	55.0 (97.4)	1.5 (2.6)
Total	159.0 (100.0)	100.00	114.0 (71.7)	6.0 (3.8)	37.5 (23.6)	157.5 (99.1)	1.5 (0.9)

Note : Figures in parenthesis are percentage to the requirement

According to this the requirement of certified seeds of jowar of sample farmers was 159 kgs. It shows that certified seed requirement activity in jowar crop was largely concentrated (41 per cent) with medium farmers. The requirement of small and large farmers were 24 per cent and 35 per cent respectively.

Cotton :

5.8 Certified seed of cotton was procured from two sources i.e. Agricultural Department and private dealer in the market by the sample farmers (Table 5.4)

5.9 The total requirement of certified seed of cotton of the sample farmers was 55.5 kgs against this 41.5 kgs.(75 per cent) was procured. Significantly nearly one fourth of the requirement of sample farmer was in deficit.

The net requirements of certified seeds of cotton worked out by the sample farmers are given in table 5.4.

Table 5.4

Demand and supply of certified seed of cotton to the sample farmers in khandwa district (1985-86)

Units in kg.

Farm size group	Seed requirement		Total quantity of seed obtained from				Deficit
	Quantity in kg.	% to total	Agri-culture Depart-ment	Neigh-bour farmer	Private dealer in market	Total	
Small	25.0 (100.00)	45.1	13.0 (52.0)	-	6.0 (24.0)	19.0 (76.0)	6.0 (24.0)
Medium	14.0 (100.00)	25.2	10.0 (71.4)	-	-	10.0 (71.4)	4.0 (28.6)
Large	16.5 (100.00)	29.7	7.5 (45.5)	-	5.0 (30.3)	12.5 (75.8)	4.0 (24.2)
Total	55.5 (100.00)	100.00	30.5 (55.0)	-	11.0 (19.8)	41.5 (74.8)	14.0 (25.2)

Note : Figures in parenthesis are percentage to the requirement.

According to this the requirement of certified seeds of cotton of sample farmers was 55.5 kgs. It shows that certified seed requirement activity in cotton crop was largely concentrated (45 per cent) with farmers who had small holdings. The requirement showed that 25 per cent and 30 per cent were from medium and large farmers.

Distribution of Certified Seeds to Cultivators

5.10 Wheat- Information was sought from the sample farmers for the different sources of supply or ways of obtaining certified seeds (Table 5.5). If we see the source of purchase of certified seeds by the sample farmers it would be seen that 56 per cent of the sample farmers of wheat had purchased certified seeds from the neighbour farmers and 40 per cent had purchased from the Department of Agriculture and only 4 per cent had purchased from private dealer in market.

Table 5.5

Source of purchasing certified seed of wheat by sample farmers in Dhar district-1985-86.

S.No.	Particulars	Small	Medium	Large	Total
1.	Agricultural Department	6 (24.00)	1 (4.00)	3 (12.00)	10 (40.00)
2.	Neighbour farmers	5 (20.00)	4 (16.00)	5 (20.00)	14 (56.00)
3.	Private dealer in market	-	-	1 (4.00)	1 (4.00)
	Total :	11 (44.00)	5 (20.00)	9 (36.00)	25 (100.00)

Note : Figures in parenthesis are percentage to total.

5.11 Paddy:- Information was sought from the sample farmers for the different sources of supply or ways of obtaining certified seeds (Table 5.6). If we see the source of purchase of certified seeds by the sample farmers it would be seen that 84 per cent of the sample farmers of paddy had purchased certified seed from the Department of Agriculture and only 16 per cent had purchased from the neighbour farmers. The department of agriculture had routed most of the retail sales of certified seeds through the Block headquarter/Rural Agricultural Extension officers. The certified seeds were procured by the block agencies from the District Agriculture Department and distributed to the farmers.

Table 5.6

Source of purchasing certified seed of paddy by sample farmers in Raipur district - 1985-86

S.No.	Particulars	Small	Medium	Large	Total
1.	Agricultural Department	7 (28.00)	10 (40.00)	4 (16.00)	21 (84.00)
2.	Neighbour farmers	2 (8.00)	1 (4.00)	1 (4.00)	4 (16.00)
3.	Private dealer in market	-	-	-	-
	Total	9 (36.00)	11 (44.00)	5 (20.00)	25 (100.00)

Note:- Figures in parenthesis are percentage to total

5.12 Jowar:- Information was sought from the sample farmers for the different source of supply or ways of obtaining certified seeds (Table 5.7). If we see the source of purchase of certified seeds by the sample farmers it would be seen that 80 per cent of the sample farmers of jowar had purchased certified seeds from the Department of Agriculture and only 20 per cent had purchased from the private dealer in market. The department of agriculture had routed most of the retail sales of certified seeds through the Block headquarter/Rural Agricultural Extension Officers. The certified seeds were procured by the block agencies from the District Agricultural Department and distributed to the farmers.

Table 5.7

Source of purchasing certified seed of Jowar by sample farmers in Chhindwara district - 1985-86

S.No.	Particulars	Small	Medium	Large	Total
1.	Agricultural Department	7 (28.00)	7 (28.00)	6 (24.00)	20 (80.00)
2.	Neighbour farmer farmers	-	-	-	-
3.	Private Dealer in market	1 (4.00)	3 (12.00)	1 (4.00)	5 (20.00)
	Total :	8 (32.00)	10 (40.00)	7 (28.00)	25 (100.00)

Note :- Figure in Parenthesis are percentage to total.

5.13 Cotton:- Information was sought from the sample farmers for the different source of supply or ways of obtaining certified seeds (Table 5.8). If we see the source of purchase of certified seeds by the sample farmers it would be seen that 68 per cent cultivators of cotton had purchased certified seed from the Department of Agriculture and 24 per cent had purchased from the private dealer in market and only 8 per cent from the neighbour farmers. The department of agriculture had routed most of the retail sales of certified seeds through the Block headquarter/Rural Agricultural Extension Officers. The certified seeds were procured by the block agencies from the District Agriculture Department and distributed to the farmers.

Table 5.8

Source of purchasing certified seeds of cotton by sample farmers in Khandwa district 1985-86.

S.No.	Particulars	Small	Medium	Large	Total
1.	Agricultural Department	8 (32.00)	6 (24.00)	3 (12.00)	17 (68.00)
2.	Neighbour Farmers	1 (4.00)	-	1 (4.00)	2 (8.00)
3.	Private dealer in market	4 (16.00)	-	2 (8.00)	6 (24.00)
	Total :	13 (52.00)	6 (24.00)	6 (24.00)	25 (100.00)

Note :- Figures in Parenthesis are percentage to total

Channel of Communication

5.14 Wheat:- A large majority of the sample farmers (76 per cent) became aware of certified seeds of wheat through the extension agencies of State Department of Agriculture and 8 per cent through non-official channels of communication viz., fellow cultivators. In creating awareness of certified seed in wheat demonstration and printed literature played a minor role (Table 5.9).

Table 5.9

Source of information of sample farmers regarding certified seed of wheat in Dhar district- 1985-86

Farm size group	Extension officials of state Agril. Department	Fellow cultivators	Village panchyat and meetings	Demonstration	Literature	Total
Small	9 (36.00)	1 (4.00)	-	1 (4.00)	-	11 (44.00)
Medium	4 (16.00)	-	-	-	1 (4.00)	5 (20.00)
Large	6 (24.00)	1 (4.00)	-	1 (4.00)	1 (4.00)	9 (36.00)
All Farms	19 (76.00)	2 (8.00)	-	2 (8.00)	2 (8.00)	25 (100.00)

Figures in parenthesis are percentage to total.

5.15 Paddy:- A large majority of sample farmers (80 per cent) became aware of certified seeds of paddy through the extension agencies of State Department of Agriculture and 16 per cent through non-official channels of communication viz., fellow cultivators. In creating awareness literature played hardly any role (Table 5.10).

Table 5.10

Source of information of sample farmers regarding certified seed of paddy in Raipur district - 1985-86

Farm size group	Extension officials of state Agril. Department	Fellow cultivators	Village panchayat and meetings	Demonstration	Literature	Total
Small	8 (32.00)	2 (8.00)	-	-	1 (4.00)	11 (44.00)
Medium	7 (28.00)	2 (8.00)	-	-	-	9 (36.00)
Large	5 (20.00)	-	-	-	-	5 (20.00)
All Farms	20 (80.00)	4 (16.00)	-	-	1 (4.00)	25 (100.00)

Note : Figures in parenthesis are percentage to total

5.16 Jowar :- A large majority of the sample farmers (72 per cent) became aware of certified seeds of jowar through the extension agencies of the State Department of Agriculture and 16 per cent through non-official channels of communication viz., fellow cultivators. In creating awareness of certified seeds in jowar, demonstration and literature played minor role (Table 5.11)

Table 5.11

Source of information of sample farmers regarding Certified Seed of Jowar in Chhindwara district 1985-86

Farm size group	Extension officials of state Agril. Department	Fellow cultivator	Village panchayat and meetings	Demonstration	Literature	Total
Small	5 (20.00)	2 (8.00)	-	1 (4.00)	-	8 (32.00)
Medium	7 (28.00)	1 (4.00)	-	1 (4.00)	1 (4.00)	10 (40.00)
Large	6 (24.00)	1 (4.00)	-	-	-	7 (28.00)
All Farms	18 (72.00)	4 (16.00)	-	2 (8.00)	1 (4.00)	25 (100.00)

Note : Figures in parenthesis are percentage to total

5.17 Cotton:- A large majority of the sample cultivators (68 per cent) became aware of certified seeds of cotton through the extension agencies of the State Department of Agriculture and 8 per cent through non-official channels of communication viz,, fellow cultivators. In creating awareness, nearly one-fourth of the 25 sample farmers were aware of certified seeds of cotton through demonstration and literature. (Table 5.12)

Table 5.12

Source of information of sample farmers regarding certified seed of Cotton in Khandwa District- 1985-86

Farm size group	Extension officials of state agril. Department	Fellow cultivators	Village Panchayat and meetings	Demonstration	Literature	Total
Small	9 (36.00)	1 (4.00)	-	2 (8.00)	1 (4.00)	13 (52.00)
Medium	5 (20.00)	-	-	1 (4.00)	-	6 (24.00)
Large	3 (12.00)	1 (4.00)	-	1 (4.00)	1 (4.00)	6 (24.00)
All Farms	17 (68.00)	2 (8.00)	-	4 (16.00)	2 (8.00)	25 (100.00)

Note : Figures in parenthesis are percentage to total