

A critical approach for intensive cultivation of groundnut in Madras State *

by

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Synopsis: In this paper, intensive cultivation measures for raising the production of groundnut are discussed.

Introduction: An increased production of groundnut is possible by extensive and intensive cultivation practices. Extensive cultivation has limited scope in this State since all the available cultivable lands have already been brought under cultivation and the possibility of any more addition to the cultivated area is remote. Further, diversion from other crops to groundnut is also not desirable since at present all the major agricultural commodities are either self-sufficient or in short supply. So by such diversions to groundnut, the production of other agricultural commodities will be affected which will again create new problems. So, the only possibility of increasing production is by intensive cultivation and thereby increasing the acre yield.

While reviewing the progress of work under the Oilseeds Development Schemes for the year 1961-'62 on an all India basis, it was found that practically no impact of intensive cultivation practices was seen by way of increased acre yield. As a matter of fact, the acre yields in several States were falling down. One of the important reasons for such reduction in acre yields is mostly due to the ryots generally taking up to one or two of the improvements at the most and not all the recommended practices together. Added to this, the frequent failures of monsoon further reduced the impact of intensive cultivation practices. In a crop like groundnut where over 90 per cent of the area is rainfed, the usual failures of monsoon in one part of the State or other compensates the increased production likely to be obtained in other parts resulting in no overall increase in production and at times may result in reduction in production. Seeing the above adverse conditions facing groundnut production in India, the Indian Central Oilseeds Committee launched a package programme for groundnut in seven major groundnut growing States in India during 1962-'63 of which Madras was one of the States selected.

Intensive Cultivation Practices: Use of improved seeds, application of fertilisers, improved agronomic practices and plant protection measures are the important practices recommended. The yard sticks for each of the improvements are improved seed 3/40 of a ton, fertiliser application 1/20 (rainfed) and 1/10 (Irrigated) of a ton, agronomic practices and plant protection measures 1/20 of

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a ton per acre. If all the above improvements are adopted, an aggregate increased production of 300 to 400 lb. will be achieved in a short time with little additional cost. The above proposition looks very sound, but the application of the above improved practices on a large scale is beset with several difficulties.

Improved Seeds: Tindivanam Research Station has evolved improved strains TMV. 1, TMV. 2, TMV. 3, TMV. 4, which give increased yields ranging from 15 to 25 per cent and in case of TMV. 4, the increased yield goes upto 30 to 40 per cent under irrigation. The above increased production is obtained without any additional cost. There are suitable strains in groundnut for every district in this State.

Strains for rainfed crops: TMV.1, a spreading variety, is partially drought resistant and yields better than the local spreading variety. It is observed that in years of poor and ill-distributed rainfall, an average yield of 3 to 4 maunds per acre are obtained where as the local practically may not give even the seeds sown. It is well suited for the scarcity areas where rainfall is poor and erratic, like Namakkal and Tiruchengode taluks in Salem district, Avanashi, Gobichettipalayam and Erode taluks in Coimbatore district, Ramnad and Tirunelveli districts. TMV. 3, a spreading variety is recommended for areas receiving higher rainfall of 30" to 40" with better and more uniform distribution and recommended for Chingleput, South Arcot, portions of Madurai, Tiruchirappalli and Thanjavur districts where generally spreading variety is grown. For Pollachi and Coimbatore taluks in Coimbatore district, Salem district other than Tiruchengode and Namakkal taluks, whole of North Arcot and portions of Madurai districts where already bunch variety is grown, TMV. 2 is replacing the local. In Cumbum area in Madurai district comprising the blocks of Uthama-palayam, Bodi and Cumbum where spreading variety with 3 seeded pods is popular, TMV. 4 is recommended.

Strains for irrigated crops: TMV. 2 is ideally suited for irrigated crop in all the districts except in South Arcot and Tiruchirappalli where spreading variety dominates for which area TMV. 4 is recommended.

Difficulties in Stepping up Seed production: The seed rate used in groundnut is very high i. e. about 160 lb. of pods per acre. It is about 10 to 12 times that of millets and paddy. Hence, very large quantities of seeds have to be handled if large areas are to be covered with improved seeds. Secondly, the rate of multiplication is also low, i. e. one acre covers at the most only 4 to 5 acres and so there is necessity to handle large areas under seed farms.

Seed Saturation Scheme: According to the seed saturation scheme, 4000 maunds of foundation seed to cover 2000 acres of primary seed farms, 16,000 maunds of primary seed to cover 8000 acres of secondary seed farms and 80,000 maunds of secondary seed to cover 40,000 acres of tertiary seed farms have to be procured. In addition 4,00,000 maunds have to be procured and distributed from

40,000 acres of tertiary seed farm to cover 2,00,000 acres i. e. 10 per cent of the area taking 20,00,000 acres as the average acreage. It was proposed to handle departmentally foundation, primary and secondary seeds to the extent of 1,00,000 maunds. Regarding tertiary seed production and distribution, co-operatives are encouraged to take up the same. The detailed working programme is stated below:

(a) *Breeder's Seeds*: production of Nucleus seed is done at the Tindivanam Agricultural Research Station.

(b) *Foundation Seed*: This is produced in what are called Zonal Farms of 50 acres each unit. Each farm is staffed with an Oilseeds Development Assistant and a Fieldman with godown facilities. After harvest, the produce is well dried, cleaned and picked and seeds advanced are taken back and the excess seeds produced in the farm is purchased by paying a premium of 20 per cent over the local market rate.

To produce 4000 maunds of primary seed, there must be atleast 550 acres under Zonal Farm, taking the rate of seed production per acre as 7 to 8 maunds, according to the seasonal conditions. The crop is raised only under rainfed condition. To cover 550 acres of Zonal Farm, 1100 maunds of breeder's seed is required. The normal quantity of nucleus seeds, available from Research Station is above 200 maunds. Hence foundation stage is split into foundation A and foundation B. The nucleus seed received from Tindivanam Research Station is multiplied in an intermediary stage under foundation A in 100 acres and the seeds produced under foundation A covers 500 to 550 acres of foundation B stage Zonal Farm. The foundation A Zonal Farms are in leased lands directly under the departmental supervision so as to keep up to high standard of seed quality. These foundation B Zonal Farms of 550 acres produce nearly 4000 maunds of seeds to cover 2000 acres of primary seed. On the whole, 14 Nucleus and Zonal Farms, with one such unit of 50 acres attached to Tindivanam Research Station to produce nucleus seeds, 2 units (100 acres) for the production of foundation 'A' seeds and 11 units (550) for the production of foundation 'B' seeds are set up and function at present. Of the above 14 farms, five are in leased land and 11 in ryots' holdings.

(c) *Production of Primary Seeds*: Multiplication of primary seed is generally done in ryots' holdings. Wherever areas are available in State Seed Farm, such areas are utilised for primary seed production. But the area available is roughly about 200 acres in all the 200 State Seed Farms and so major area for multiplication is in ryots' holdings. Under the saturation scheme, special staff of 26 Oilseeds Development Assistants and 60 Demonstration maistries are sanctioned exclusively for Zonal Farms and quality seed production of primary and secondary stage. The primary seed production is entrusted to Oilseeds Development Assistants incharge of Zonal Farms who have been provided with 2 additional Demonstration maistries over and above the normal staff of one Fieldman. Each of the Assistants has to organise 200 acres of primary seed farm in addition to Zonal Farm work.

These primary seed farms are located round about the Zonal Farms to facilitate the Oilseeds Development Assistants to supervise the work easily, quickly and efficiently. Seeds are purchased from seed-farms by paying 20 per cent premium over the local market rate.

(d) *Secondary Seed Production*: In all 8000 maunds of secondary seeds have to be produced every year. Secondary seed-farms are spread over in all the districts except Tirunelvely, Kanyakumari and Ooty. To run the secondary seed farms, in addition to 20 Oilseeds Development Assistants and 40 Demonstration Maistries sanctioned under Saturation Scheme, 16 Oilseeds Development Assistants with 48 Demonstration Maistries under Integrated Oilseeds Development Scheme, 2 Oilseeds Development Assistants with 4 Fieldmen under Castor Development Scheme and 7 Oilseeds Development Assistants with 20 Demonstration Maistries under Gingelly Development Scheme are also utilised partially. Though staff for different Schemes have been sanctioned, all are pooled together with definite jurisdictions fixed with in which they should run 200 to 300 acres of secondary seed farms and also attend to intensive development of oilseed crops including Castor and Gingelly. Seeds are procured by paying 20 per cent premium over the local market rate and stocked in agricultural depots. Additional godowns are provided if there is need.

(e) *Tertiary Seed Farm*: Under tertiary seed farms 40,000 acres have to be organised and 4,00,000 maunds of seeds have to be procured and distributed every year to cover 2,00,000 acres i. e. 10 per cent of the area. The above huge handling of stock is not possible by the departmental staff and hence seed multiplication through co-operative societies have been initiated. Under this scheme, sound working Co-operative Marketing Societies are selected and each society should run 1000 acres of tertiary seed farms in their members' holdings and procure and distribute 10,000 maunds of seeds to cover 5,000 acres. At present, 6 societies are functioning from the last 2 years, one each at Dindigul in Madurai district, Tindivanam in South Arcot district, Bhavani in Coimbatore district and Pochampalli, Tiruchengode and Salem in Salem district. Ultimately it is proposed to have 40 Co-operative Marketing Societies to cover 40,000 acres of tertiary seed farms in the course of the next 2 years enabling to procure and distribute 4,00,000 maunds of seeds. The societies will be suitably located at the rate of one for every 50,000 acres for groundnut and strains recommended for the area of operation of each society only will be multiplied. Each society is provided with a Special Agricultural Demonstrator and one Demonstration maistry to organise and inspect seed farms and also to examine the quality of seed before purchase. The registrar of Co-operative Societies has also instructed Central Banks to give credit at Rs. 100/- per acre to such of those ryots taking up to the seed multiplication scheme to meet the cost of seeds and fertilisers. The purchase price at which seeds are to be purchased from seed farm ryots and also the rate at which seeds procured are to be distributed, are fixed by a committee consisting of the District Agricultural Officer, Deputy Registrar of Co-operative Societies, President of the concerned society, one seed farm grower and one non-seed farm ryot. The

purchase price is fixed based on the market price with a premium of Rs. 1 to 2 per maund to cover loss incurred in dryage and cleaning. While fixing the sale price, cost of seeds, handling charges, godown charges, interest on capital, reasonable margin of profit etc. are added and the sale price arrived at. If, due to fluctuation in market prices, the selling price so fixed is higher than the market price, the price fixation committee can reduce the sale price by a maximum of Rs. 3/- per maund to bring the sale price to market level and this subsidy of Rs. 3/- per maund is reimbursed by the Agricultural Department. By the above working arrangements, the societies are assured of reasonable margin of profit and also cover risks due to fluctuations in market price and the scheme works satisfactorily.

Organising Seed Farms: To obtain quality seeds, seed farms must be organised properly.

(a) *Selection of ryots:* There are several ryots who are willing to become seed farm ryots on the conditions stipulated by the department in view of premium of 20 per cent paid over the market price to compensate the loss incurred in proper drying and cleaning of seeds. The co-operation of such desirable ryots are availed of.

(b) *Selection of area:* There are certain pockets in each district getting good distribution of rainfall. Such areas are generally located near the hills or in valleys surrounded by hills. A thorough study of such conditions are made before selecting villages for seed farms. By doing so, minimum required quantities of seeds year after year are assured.

(c) *Compact blocks for seed farms:* Seed farms must be arranged in large compact blocks. Ryots with large holdings are selected to reduce the number of ryots. Generally ryots with over 5 acres are selected. The seed farms are arranged in a few villages, the lesser the number of villages the better. Seed farms are as far as possible the head-quarters of Assistants to facilitate frequent inspections of seed farms and thorough examination of seeds before purchase.

(d) *Other requisites:* Ryots selected should have proper threshing floor, godown facilities etc. The soils must be fertile so as to enable proper development of pods and kernels. Ryots should not grow any variety other than what is given for running the seed farms to prevent local seed getting mixed in the threshing floor or godowns.

Quality Seeds: It is observed that if quality seeds are produced, ryots do not hesitate to purchase by even paying 1 or 2 rupees per maund over the market prices. The crop must be harvested after full maturity which is judged by the darkening of the inside of the shell. It must be dried well and moisture content should not be more than 5 to 7 per cent. Chaff must be removed completely by proper winnowing. Single pods, discoloured and shrunken pods must be separated. Above all, the ryots judge the quality of seeds by the shelling percentage and

also by finding the proportion of undeveloped kernels. If the shelling percentage is low and less than 70 to 72 per cent and if the percentage of undeveloped to developed seeds, is more than 3 to 5 per cent the ryots remark that such seeds are not good for seed purposes. Generally pods may develop well but kernels inside might not have developed well and such a stock is not good for seed purposes. Ill development of kernels is mostly due to drought, poor fertility etc. That is why, it is recommended to select fertile areas, getting good rainfall for seed farms which factors will reduce the percentage between good and bad seeds and thereby increase the shelling percentage.

Fertiliser Application : Groundnut is a very heavy feeder of potash and lime. Being a leguminous crop, sufficient quantities of phosphate also must be made available to raise a good crop of groundnut. An acre of groundnut removes from the soil 100 lb. N, 24 lb. P_2O_5 , 30 lb. K_2O and 50 lb. of calcium oxide as reported by Collin Morris which indicates that groundnut depletes soil fertility unless the crop preceding it or the crop itself is directly manured. The results of the manurial trials conducted on groundnut in Madras State have been reviewed recently by Mariakulandai & Morachan (1965).

Experiments conducted at Tindivanam Agricultural Research Station reveal that the crop responds to low nitrogen, medium phosphoric acid and high potash over a basal dressing of 5 tons of farm yard manure or compost. One cwt. of super phosphate (20 lb. P_2O_5) and $\frac{1}{2}$ cwt. of muriate of potash (30 lb. of K_2O) for rainfed crop and $\frac{1}{2}$ cwt. of ammonium sulphate (10 lb. N) in addition to $1\frac{1}{2}$ cwts. of super phosphate (30 lb. P_2O_5) and $\frac{3}{4}$ cwt. of potash (45 lb. K_2O) for an acre of rainfed and irrigated crop respectively, are recommended as a result of manurial trials conducted.

The Agronomy section attached to Agricultural College and Research Institute, Coimbatore conducted co-ordinated simple fertiliser trials for irrigated groundnut in farmers' holdings in the districts of Trichy, Coimbatore, Chinglepu tand South Arcot during the years 1959—'60 to 1962—'63 in *Rabi* season with the various combinations of N. P. K. The results obtained revealed that there was uniformly good response for N. P. K. at 15-30-30 level while there was no economic increase in yield when the levels of N. P. K. are increased. The increased yield ranged from 400 to 700 lb. per acre. Working out the economics of manuring at the above rate, against Rs. 40/- spent towards cost of manure, the gross increased return comes to Rs. 80/- leaving a margin of Rs. 40/- as net profit.

Co-ordinated manurial trials on groundnut was sponsored by State and Indian Central Oilseeds Committee to find out the proper dose of fertilisers for irrigated and rainfed groundnut. The experiments were conducted in ryots' holdings for a period of 3 years and the following are the observations.

(a) *Irrigated Groundnut:* The experiments were laid out in Lower Bhavani Project area in Coimbatore district, South Arcot district and Cauvery Mettur

Project in Thanjavur district. The findings are N. P. K. at 15-30-45 level increases the yield with economic returns as stated below :

Centre	Yield from control plot per acre	Yield from treated plot per acre	Extra yield due to treatment	Value of additional produce obtained		Cost of treatment		Net Profit	
	Kg.	Kg.	Kg.	Rs.	P.	Rs.	P.	Rs.	P.
South Arcot	650	766	116	87	00	48	77	38	23
Cauvery Mettur Project area	482	568	86	64	50	48	77	15	73
Lower Bhavani Project area	695	816	122	91	50	48	77	42	73

It is reported that in the Cauvery Mettur area, the crop was heavily affected with pests and diseases and hence low return was recorded.

(b) *Rainfed Groundnut*: The experiments were conducted in scattered block trials in Salem district representing central inland zone, South Arcot district representing central zone, Pollachi in Coimbatore district representing special zone and Ramnad district representing southern zone. Fertiliser combinations of 10 N, 20 P₂O₅ and 30 K₂O were tried. Suitable combinations for economic returns are detailed below :

Name of the centre where experiments were laid	Economic combination	Yield from control per acre	Yield from treated plot per acre	Extra yield due to treatment per acre	Value of additional produce obtained		Cost of treatment		Net profit	
		Kg.	Kg.	Kg.	Rs.	P.	Rs.	P.	Rs.	P.
Salem	NP	449	528	72	54	00	20	79	31	21
South Arcot	NK	297	332	35	26	25	20	57	8	75
Ramnad	NK	167	285	118	88	50	20	57	67	93
Pollachi	PK	277	373	96	72	00	24	78	47	22

Suitable Standard Mixture for Groundnut: In the above different sets of experiments conducted, phosphoric acid had been given in the form of super phosphate. The results indicate that both high and medium potash with equal doses of phosphoric acid have given economic return. Since different levels of NPK are not used in the co-ordinated manurial trials, it is not possible to conclude whether a lower dose of potash gives equally the same yield as is obtained in the

simple fertiliser trials where a lower dose of potash had been used when compared to high dose used under co-ordinated trials. Making use of the above results, attempts are made to fix up a suitable standard mixture for groundnut. Demonstrations were laid during 1963-'64 with the following standard mixtures applied at 75 kg. and 150 kg. for rainfed and irrigated crops respectively. The analysis of the mixtures used are as follows:—

Name of the Mixture	Analysis		
	N	P	K
(a) Standard Mixture No. 3	6	6	12
(b) do. No. 4	6	12	6
(c) Special Mixture Groundnut	4	8	12

In mixture No. 3, 4 and special mixture, the soluble phosphates are only 3, 6 and 8 respectively and given in the form of super phosphate. The results obtained are given in Annexure No. 1. The observations from the results obtained show that standard mixture No. 3, with low soluble phosphate and high potash has given less additional yield than that obtained by the application of standard mixture No. 4 and groundnut mixture. In between the two mixtures, standard mixture No. 4 and special mixture, the variation in increased yield is very narrow. The water soluble contents of phosphoric acid is practically same in the above two mixtures with a few kilograms difference on acre basis. Hence it is possible that with a lesser dose of potash in special groundnut mixture it is likely to give as much yield as obtained with mixture No. 4 and special mixture. So, further trials with a new mixture with lesser potash and with the same level of phosphoric acid in comparison with groundnut special mixture is worth the trial. Accordingly demonstrations with a new mixture analysing NPK to 5 : 10 : 10 in comparison with special mixture are laid out, the results of which are yet to be received.

Agronomic Practices: Seed treatment with agrosan, line sowing, optimum seed rate, proper interculture etc. are some of the agronomic practices recommended. But the results obtained in population studies and optimum irrigation in project areas are the two important agronomic practices worth maintaining.

(a) *Population Studies:* Dr. Evans who toured the important groundnut growing areas in India, at the instance of the Government of India, to suggest ways and means to increase the production of groundnut, pointed out in his report that low population is one of the reasons for low yields of groundnut. The low populations may be due to low seed rate, bad seeds with poor germination or soil insects or fungi which prevent germination of certain percentage of seeds or seeds germinated dying out due to the attack by soil insects or fungi or seeds germinated from bad seed cannot sustain full plant growth due to bad seed etc. The seed rate used by the ryots is really low. Against 100 to 110 lb. of kernels (bunch) or 80 to 90 lb. of kernels (spreading) recommended per acre, the ryots generally use 80 to 90 lb. or 70 to 80 lb. of kernels of bunch or spreading variety respectively per acre. Seed treatment to control soil insects and fungi and quality seeds are not used by most of our ryots.

Fifty acre demonstrations in 3 centres in Gingee in South Arcot district were organised during 1964-'65. The Vanaspathi Manufacturers' Association were kind enough to finance for the free issue of fertilisers and pesticides for the above demonstrations. Ryots were asked to purchase quality seed from the department and adopt all the package of practices including prophylactic plant protection measures twice. Seed treatment with agrosan was also effected. When the crop was one month old, population counts were taken in one cent plots at random and also in the control plots in the nearby fields. One cent plots were also harvested along with the control plots. The following are the results obtained

Average population per acre :				Average yield per acre in kg. (wet wt.)			
No. of 1 cent plot wherein counts were taken in each of treated & control plots	No. of plants in treated field.	No. of plants in the control field.	Increase in population in treated plot over control.	No. of 1 cent plots harvested in each of the treated and control plots.	Yield in treated plot.	Yield in control.	Increased yield
12	91,000	73,000	18,000	25	1,611	1,244	367

The above results go to show that apart from the increased yield due to package of practices, the increase in the population is also equally responsible for the increased yield. The increased population is attributed mostly to good seed, optimum seed rate and seed treatment. So optimum population is directly related to increased production.

(b) *Optimum Irrigation* : This is generally adopted where well irrigation is given. But in project areas, flooding the fields and thereby over irrigating the crop are common. As a matter of fact, irrigated groundnut after having been given one irrigation after sowing, requires drought for a period of 20 to 25 days. Once the plants start flowering, light irrigations, at frequent intervals are necessary for getting a good crop. It has been observed in project areas like Lower Bhavani and Sathanur where flood irrigations are given, there is excessive vegetative growth with poor pod setting. In the package area in Sathanur Project ayacut, 10 demonstrations were laid during 1963-'64 with controlled irrigation on the lines stated above. Actually, the fields were thrown into beds and channels and water was let into beds as done in the case of garden lands to give optimum irrigation. The results show that an average increased yield of 2 to 3 maunds per acre was obtained over the control plots where fields were flooded.

Plant Protection : In spite of adoption of all practices, if plant protection measures, especially prophylactic measures for irrigated crop are omitted there will be little or no increased yield. To quote an example in Tiruvannamalai Block in North Arcot district, in 1962-'63, ryots applied fertilisers under Intensive Manuring Scheme loans. It was surprising to note that the ryots reported that

there is no increased yield as a result of fertiliser application. It was a shock to the extension wing of this department to hear such a report which cuts at the very root of the idea of fertiliser application for groundnut. On investigation, it was observed, that the crop was heavily damaged with *surul poochi* and red hairy caterpillar which pulled down the yield. In the succeeding years, under the package programme, prophylactic measures were taken up by dusting with BHC. 10% and DDT. 5% which gave remarkable results with 5 to 10 maunds of increased yield per acre.

Red-hairy Caterpillar Campaign: This pest is a severe menace for groundnut crop in this State. It is estimated that annually about 4,00,000 to 5,00,000 of acres are damaged by it. It appears in endemic forms year after year in all the districts. The incidence is light in Thanjavur, Ramnad, Tirunelveli, Kanyakumari, Chingleput and Salem districts and in the remaining districts, it appears in a virulent form. Once this pest appears, it eats away all the green matter leaving no trace of the crop in the fields. The caterpillars will be seen marching from field to field in large numbers. During the period of severe out-break, the caterpillars enter the houses, cattle shed, get into wells and become a source of nuisance. The pest is controlled by dusting with BHC. 10% or spraying with folidol or Endrin, provided plant protection measures are taken before the caterpillars develop hairs. It was during 1961 a special scheme was formulated and got sanctioned for Madurai, Ramnad, Tirunelveli and Kanyakumari district under red-hairy caterpillar campaign.

Results of the Campaign: The special campaign organised has given excellent results and so is extended throughout the State now, except in the Nilgiris. The area treated and the value of insecticides distributed increased by leaps and bounds as detailed below :

Year	Area treated in acres.	Value of insecticides distributed in Rs.
1961-'62	1,47,000	2,70,000
1962-'63	4,24,000	7,58,000
1963-'64	5,00,000	10,73,000

The achievements of the campaign in Madurai Division has been brought out by Mukundan (1964).

Package Programme for Groundnut: At present 1,00,000 acres of groundnut are under the package programme. The above acreage is split into 5 working units each of 20,000 acres and are located in Cuddalore and Villupuram in South Arcot district, Tiruvannamalai in North Arcot district, Anamalai in Coimbatore district, and Cumbum in Madurai district. The unit at Cuddalore started functioning from 1962-'63, at Tiruvannamalai and Anamalai from 1963-'64 and the units at Cumbum and Villupuram from 1964-'65. Both irrigated and rainfed crops come under the package programme. Compact blocks of 20,000 acres

in favourable areas with good distribution of rainfall or with assured irrigation are generally selected for package work. The units at Cumbum and Anamalai are mostly for rainfed crop and in the other 3 units both irrigated and rainfed crops come under the scheme. It is proposed to cover each unit in a phased programme in 4 years. Each unit is targetted to produce 6000 tons of increased production at the end of the fourth year. The credit facilities required are provided through village credit societies. Credit is given at Rs. 100 and Rs. 150 for dry and irrigated crops respectively with the following break up.

			<i>Irrigated</i>	<i>Dry.</i>
Cost of seeds	...	...	Rs. 55/-	Rs. 55/-
Manure	...	...	Rs. 60/-	Rs. 30/-
Pesticides	...	...	Rs. 5/-	Rs. 5/-
Cash	...	...	Rs. 30/-	Rs. 10/-
			<u>Rs. 150/-</u>	<u>Rs. 100/-</u>

The staffing pattern for each unit is one Special District Agricultural Officer, 2 Oilseeds Development Assistants and 10 fieldmen with necessary clerical staff. The scheme is worked directly under the administrative and technical control of Oilseeds Development Officer. The Block depots make the necessary supplies of insecticides, fungicides, seeds etc. The seeds are supplied from Saturation Scheme and the package staff also organise seed-farms to procure atleast 6,000 mds. per year.

The Oilseeds Development Assistants and Fieldmen are given intensive training on the aspects of package of practices. Details, regarding the preparation of Farm Production Plans and rules and regulations governing the issue of co-operative loans are also explained in detail.

Preparation of Farm Production Plan: Four copies of Farm Production Plans are prepared for each holding at one copy each to the concerned ryot, Fieldman, Oilseeds Development Assistant and Credit Society. Ryots meetings in each village are convened with the representative of credit societies and the idea of the package programme explained in detail. Concessions given are highlighted. After convincing the ryots only, preparation of the Farm Production Plans are taken up. On completing the Farm Production Plans, the Oilseeds Development Assistant checks up all the Farm Production Plans and Special District Agricultural Officer checks up 25 per cent of the numbers. After giving a copy to the ryot concerned, another copy is handed over to the co-operative society for the preparation of loan application.

Sanctioning of loans: The Supervisors attached to the Central Bank prepare the loan applications subject to the eligibility and limited to what is recommended in the Farm Production Plans. The loan applications are sent to Central Bank through the concerned union and the loans are sanctioned.

Disbursement: Loan sanctions are intimated to the Special District Agricultural Officer and the concerned credit societies but the value of the kind portion is held in the Central Bank. Only cash portion is given to credit societies. The District Agricultural Officer arranges to supply requisites from marketing societies regarding fertilisers and seeds and pesticides from the agricultural depots and distribute the same and takes acquittances. When acquittances from the ryots on kind portion are received by Central Bank, payments to marketing societies and agricultural depots for the supplies made are paid by cheques by the Central Bank.

Evaluations: The Director of Statistics evaluates the increased production by conducting special crop cutting experiments. In case of Cuddalore unit, for the year 1963—'64, the Director of Statistics has evaluated the increased production at 35.1 per cent over non-package area. The average yield in irrigated crop increased from 1242 lb. in non-package area to 1678 lb. of pods in package area per acre. Likewise, in the rainfed crop, an average of 1070 lb. was obtained in package area against the normal yield of 700 to 800 lb. per acre. The net monetary return in case of irrigated crop ranged from Rs. 120/- to Rs. 150/- and in the case of rainfed crop Rs. 75/- to Rs. 100/- per acre which are very remunerative.

What next: With the experiences gained in the working of the Development Scheme for groundnut during the Second and Third Five Year Plan periods, a comprehensive programme for Fourth Five Year Plan is also suggested. The salient features are discussed below :

New package units: To extend the package programme to 15 more units covering 3,00,000 acres. Ten of the above units to be located in areas receiving good rainfall or having protected irrigation facilities. The remaining five units which are otherwise known as Package Programme for dry farming practices to be located in scarcity areas in Salem, Ramnad and Tirunelveli Districts which will be taken as a pilot project and with the experience gained in the above novel project, the scheme is to be extended to other areas. The salient features of the above new type of package units are that dry farming practices like use of drought resistant strains, contour cultivation, throwing the fields into beds after sowing for holding rain water, use of improved implements like seed drill, inter-cultivators, bund-formers etc., planting of Ipomoea on the outskirts, wastelands, to increase the output of organic manure at least to get 2 tons per acre per year, green manuring with horsegram where sufficient rains are received after harvest of groundnut in places like Pollachi, Cumbum etc., to be adopted in addition to fertiliser application and plant protection measures.

Development Outside Package Unit: As usual, the use of improved seeds, fertilisers, agronomic practices and plant protection measures to be recommended singly or in combination with other improvements. It is also anticipated to increase the area under groundnut by 2,00,000 acres.

Seed Programme: Saturation Scheme to cover 10 per cent of the area under groundnut to be continued.

Additional Production Anticipated: 3,00,000 tons of additional production of groundnut increasing the level of production to 16.06 lakhs of tons is expected at the end of the Fourth Five Year plan. Of the above increased production, 1,00,000 tons each is expected from Package Programme, extensive cultivation and intensive cultivation outside the package area.

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ANNEXURE - I.

Centres of trials and Treatments	RAINFED CROP			IRRIGATED CROP		
	No. of plots in each treatment	Yield kg.	Additional yield kg.	No. of plots in each treatment	Yield kg.	Additional yield kg.
Tiruvannamalai:						
Control	12	570	...	5	954	...
Mixture-III	12	657	90	5	1,142	188
Mixture-IV	12	781	210	5	1,242	288
Special Mixture	12	714	153	5	1,222	268
Cuddalore:						
Control	18	538	...	13	787	...
Mixture-III	18	680	142	13	855	68
Mixture-IV	18	681	143	13	1,120	333
Special Mixture	18	702	166	13	1,111	324
Anamalai:						
Control	22	726	...	...	...	...
Mixture-III	22	805	79	...	...	...
Mixture-IV	22	814	88	...	...	...
Special Mixture	22	815	89	...	...	...