

The Araku Valley Scheme

By

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Introduction: Araku Valley is a narrow strip of land about seven miles in length, two miles in width and is situated on the Visakhapatnam—Jeypore road at a distance of about 71 miles from Visakhapatnam. It has an altitude ranging from 2,500 to 5,000 feet. A stream called Pathalagedda which is a tributary of the Machkhund river, runs in the middle of the valley and the land slopes gently towards the stream from either side. The valley is 5,705 acres in extent, and is very thinly populated by hillmen. The annual rainfall is about 52 inches distributed as follows:—

Hot weather period (January to May)	9.76 inches (average of four years)	
South-West Monsoon (June to September)	31.54	do.
North-West Monsoon (October to December)	11.15	do.
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	52.45	

There will be hailstorms in April—May, strong gales in May and October and frost in winter. The minimum and maximum temperatures range from about 36° F in winter to about 100° F in summer. The soils are poor, (sandy loam) with poor retentive power, and the holdings are scattered. ragi, samai, paddy (dry and wet) and niger are the principal crops grown in the valley.

2. **Work done (1944 to 1949)** In 1944, a scheme was sanctioned with the immediate object of growing potatoes, and exotic and indigenous vegetables for supply to the army at Visakhapatnam. The ultimate object was the development of the Agency tract. The Military supply scheme continued till the end of March 1946.

During 1946—1947, another scheme for the increased production of food crops under the *share cultivation system* was tried and the following were the details of the scheme. An area of 551 acres held by the Department was thrown open to the ryots for cultivating under the guidance and supervision of the department under share system i. e. the ryots were advanced free seed, manure and work cattle and in return half their gross produce were recovered by the Government. Food crops like ragi, wet and dry paddy, and samai were cultivated in these lands by 232 ryots jointly with individual responsibility over their holdings in 19 blocks of about 30 acres each in each village. A sum of Rs. 16,845/- was

spent towards the supply of manures, seeds and cattle and in return a sum of Rs. 8,752/- was recovered by the Department in the shape of half the gross yield. The crops did not give normal yields due to the failure of monsoons. The following are the details of cropping and yields obtained.

Name of crop	Area cultivated	Yield obtained in lb.	Half-share realised
Ragi	... 161.56 acres	1,01,742	50,871
Wet Paddy	... 14.00 "	19,176	9,588
Dry Paddy	... 54.38 "	34,332	17,166
Samai	... 222.86 "	82,700	41,350
Niger	... *109.51 "	5,054	2,527

*Party double-cropped after samai.

During the years 1945 to 1947, another scheme for the uplift of hillmen was run, and the details are furnished below :—

Hillmen Uplift Scheme: A scheme for the uplift of hillmen was sanctioned, its main objects being (1) Free distribution of improved seeds of food crops; (2) Free distribution of manures and fertilisers; (3) Free lending of work cattle and implements.

The scheme was actually put into operation from July 1945, and during this year 800 lb. of improved strains of ragi seed, and 4,000 lb. of improved strains of paddy seed were distributed to about 140 hillmen to cover an area of 82 acres. Distribution of manures was also arranged, and during this year a total quantity of 500 bags of groundnut cake (each bag weighing 160 lb.) and 250 maunds of ammonium sulphate were distributed to 226 hillmen in 20 villages and were applied to 500 acres of paddy and ragi. It was found that both wet and drylands responded well to manuring. The following figures will illustrate the fact.

	Yield per acre (grain in lb.)	
	Unmanured	Manured
Dry Paddy	... 600	1,000
Dry Ragi	... 800	1,000
Wet Paddy	... 1,000	1,800

The scheme continued during the subsequent two years also, i. e. 1946 and 1947. Besides the free distribution of seeds and manures, 30 pairs of work cattle and also implements e. g., ploughs, hoes etc. were lent free to hillmen to take up the cultivation of their lands. The following statement shows the quantities of seeds and manures distributed.

Year	Paddy seed	Ragi Seed	Potato ,	Ground-nut seed	Ammonium Sulphate	Ground-nut cake	Ammonium Phosphate
	lb.	lb.	lb.	lb.	lb.	lb.	lb.
1945—1946	4,000	800			6,250	8,000	
1946—1947	4,100	1,640	2,240	2,116	336	1,18,400	33,000
				Ordinary		Potassium	
				Super	672	Nitrate	326
1947—1948	4,566	1,640		1,000	782	782	

The total cost of the scheme during the three years was Rs. 1,01,498/-.

This free distribution enabled the hillmen to realise the advantages of better types of cattle and implements and regular cultivation instead of shifting cultivation (termed "Podu") and also helped them to realise the advantages of using better seed and intensive manuring. As a result of free lending of work cattle, an additional area of 192 acres was brought under cultivation. Formerly transplanting and manuring in wetlands were not being practised, but as a result of Departmental propaganda and demonstrations, transplanting was adopted and the yields were nearly doubled, as can be judged from the following figures:—

Yield per acre (grain in lb.)

	Ryots method (broadcasting, no weeding, no manuring)	Improved method (transplanting weeding, and manuring)
Ragi	800	1,650
Paddy	1,000	2,500

Colonisation scheme: In the year 1947, a comprehensive colonisation scheme on the lines of the Wynad colonisation scheme were as below :

The total area of the Araku Valley is 5,705 acres of which about 3,472 acres are under cultivation leaving about one-third fallow. There are about 500 land-holding ryot families and about 100 landless families of hillmen employed as farm labourers. Hence all the 600 hillmen families are cultivating an area of 3472 acres. Still there is room for an additional population of atleast 100 families from the plains to settle as colonists. Thus it was proposed to develop the entire Araku Valley, and besides accepting all the hillmen in the valley as colonists i. e. 600 families, provision was made to select from plains 100 families with agricultural bias. Ex-servicemen were proposed to be selected to make up these 100 families. Thus 700 families were proposed to be settled on the land, and the proportion of the colonists was fixed as follows:—

Existing land-holding hillmen	...	72%
Existing landless hillmen	...	14%
Plainsmen and ex-servicemen	...	14%

It was proposed to allot to each hillmen colonist 6 acres of land (5 acres dryland and one acre of wetland) and to each colonist family from the plains 7 acres (five acres of dryland and 2 acres of wetland). The total area of the valley was purchased and an amount of Rs. 2,14,840—14—0 due to hillmen towards compensation was deposited in the Co-operative Central Bank, Vizianagaram. But when parcelling of lands into 5 acres dryland and one acre wetland was taken up by the Survey Department, practical difficulties arose on account of the uneven nature of the soil and the existing plots with well marked out contours had to be disturbed. Hence this item of work was given up. The colonisation scheme itself was finally dropped, and no colonist from the plains has been settled here.

Details of work on Departmental Farms: during the years 1944 to 1947, besides the cultivation of potatoes, exotic vegetables, other crops like paddy, ragi, samai, groundnut, plantains etc. were also tried getting improved strains of these crops from the plains. Regular cropping trials and experiments were started in the year 1947-48. A short resume of the work done so far is given below:—

3. RESEARCH

Cereals: Work on Paddy (Wet): Thirty-three varieties of paddy obtained from Agricultural Research Station, Anakapalle were tried, of which the following six i.e. Mtu. 1, S. S. 5, G. E. B. 24, B. G. 1 and Bellamonji, which gave acre yields of above 3,000 lb. were compared in yield trials with local Tellasannam as control. Of these B. G. 1 and S. S. 5 have fared well and are already under distribution. S. R. 26 B paddy variety, was tried and found suitable for saline areas and is now spreading. Transplanting of paddy, manuring and weeding which were being done on the farm were copied by the ryots as a result of which their yields have almost doubled. Mass selection in the main local varieties was taken up and the seed was distributed.

The present programme consists of the growing of promising strains for seed multiplication and continuance of mass selection work in the local varieties.

Dry Paddy: Thirty varieties of paddy received from Agricultural Research Station, Anakapalle were tried along with ten varieties, among which the local variety Bhattadhan was the best. Hence mass selection in this local variety Bhattadhan was taken up, and the mass selected seed is under distribution to hillmen.

Ragi: Ragi is an important crop of this valley. Five strains of ragi got from the Agricultural Research Station, Anakapalli were compared with the local variety *Jagaralamandya* as control. The local proved better and mass selection work in this and in another popular local variety, *Muddaimuskal*, was taken up. AKP. 7 Ragi was however

found to yield well and it is now under distribution. The application of 10 cart-loads of cattle manure and two bags of groundnut cake per acre to ragi was found to give almost double the average yield.

The programme of work consists of mass-selection in the local varieties i.e. *Jagaralamandya* and *Muddaimuskal*, and growing the mass-selected crops on the farms and distribution of the seed.

Jonna: Among the three strains of Jonna tried, AKP. 1 and AKP. 2 were found to fare well and are being grown and multiplied on the farm.

Wheat: The glumed variety from Siruguppa seems to come up well and it is programmed to continue its trial.

Oilseeds: Niger and castor are grown in the locality, of which Niger occupies a very large area and is the principal money crop of the hillmen. Mass-selection work in this crop was taken up, and is being continued. Improved castor varieties from Tindivanam are introduced and they are spreading in the valley. Other oilseed crops like groundnut and gingelly which are new to the valley were also tried, of which groundnut came up very successfully while gingelly was a failure. The cultivation of groundnut has been taken up by the hillmen and it is spreading.

Pulses: Among the pulse crops, green gram, black gram, red gram and bengal gram were tried. Of these red gram was found to come up well in this locality though it was sometimes susceptible to frost attack during December–January.

Root Crops: Potato: The cultivation of potato has received special attention in this valley. About a dozen varieties from Mysore and Ooty were tried, and finally 'Mysore Rickets' or 'Maddigedda' was chosen as suitable to this tract. Potato was found to come up well as a rainfed crop (from June to September) and as an irrigated crop from November to February. The Summer crop i. e. from March to June was not very successful due to drought conditions during the period. The summer crop is stunted in growth and gave very low yields (just equalling the seed material put in). Gradual enriching of the soil with green manure and lime was found to increase the yields. Four manure mixtures suggested by the Agricultural Chemist of which one is Nanjanad mixture, are being tried on potato. The planting of whole tubers was found better than cut pieces. The crop yield at present is about three tons of good-sized tubers in both the seasons. But the limiting factors for extension of the potato area are: (1) Seed preservation during the summer months from March to May; (2) Market; (3) Availability of fertilisers and; (4) Availability of irrigation water for the winter crop. On account of the above limitations its cultivation has not spread in the valley.

The present programme consists of the following items of work

- (1) Growing the crop on a bulk scale in the monsoon and winter months.
- (2) Trial of manure mixtures.
- (3) Storage and preservation trial for seed material from the crop grown here.

Among the other root crops tried like sweet potato, ginger, turmeric, onions, tapioca, arrow root and colocasia, sweet potato was found to come up well in this locality and has given yields ranging from 10 to 15 thousand pounds per acre. Its cultivation has spread in the valley, but the limiting factor is again marketing. Seven Almora varieties are under trial and some of these are giving very big tubers about 8 to 10 lb. each with a high carotene content. Sweet potato is being grown on a bulk scale and the trial of Almora varieties is being continued.

Fibre crops: Seven types of perennial cottons received from the Cotton Specialist are under trial of which Barbados Type I and II are found promising and are under multiplication. Other fibre crops tried are gogu, sunnhemp and jute varieties.

Vegetables: Exotic: In the early years exotic vegetables like cabbage, cauliflower and knolkhol were successfully grown and supplied to the Military. The yields ranged from 10 to 15 thousand pounds per acre. The cultivation of these is now being taken up by hillmen.

Indigenous: Almost all indigenous vegetables were successfully grown on the farm, notable acre yields being, Brinjals: 21,685 lb. Tomato: 9,300 lb. Gourds: 11,080, Bendai: 4,675 lb. and Clusterbeans: 5,150 lb.

At present both exotic and indigenous vegetables are being grown on the farm periodically on an area of about 200 acres, and the produce supplied to the residents of the colony.

Bananas: Bananas are not cultivated in this valley on a field scale. Among the dozen varieties tried, Amruthapani and Sirumalai were found well suited for this tract, and they are being grown successfully under rainfed conditions. The suckers are being distributed to hillmen.

Sugarcane: Sugarcane Co. 419 has been introduced for the first time during 1948—'49. Ryots have taken to it, being used for chewing purposes. Co. 419 and Co. 527 are being grown on the farm for trying jaggery making.

Fodder and green manure crops: Fodder crops like fodder jonna, maize, Thin Napier grass, and lucerne and green manure crops like sunnhemp, indigo and wild indigo were tried, which gave respectively 20,000 lb., 21,000 lb., 25,000 lb., 4,000 lb. of fodder per acre, and 5,000 lb, 3,000 lb. and 1,500 lb. of green leaf per acre. At present Thin Napier grass and sunnhemp are being successfully grown on the farm.

Work on fruits: About 60 varieties of fruit trees of both hill and plains varieties and a few spices are being grown in an area of 18 acres since 1947. Among those, citrus, Annonas, Guavas, Sapota, Banana, Pomegranate, Pineapples, Papaya, Plums, Peaches, Pears, Apples, Tree-Tomato, Passion fruit, Cape-Goose-berry and Strawberry are coming up well. Among the lemons, Lucknow Seedless and Nepali Oblong and guava (Lucknow No 49) have started bearing profusely and their layers are being distributed to hillmen. Pineapple suckers are being distributed free every year. Seedlings of Strawberry and Cape-Goose-berry, Tree-Tomato and Passion fruit are also under distribution. Sweet Oranges, Plums, Peaches and Apples have just started bearing.

4. WORK IN PROGRESS

(a) **Demonstration:** (i) *Growing of potatoes and exotic vegetables:* Ever since the inception of the scheme, potatoes and exotic vegetables were grown both on the farm and on ryots' holdings and were demonstrated to hillmen. If seed material, fertilisers, irrigation and marketing facilities are given, potato cultivation can also spread in the valley.

(ii) *Cattle manure preservation, and farm wastes compost making:* The soils of this tract are inherently poor and the cattle manure that can be got is quite insufficient. Hence special attention was paid in demonstrating better methods of preservation of cattle manure. Compost making is gaining popularity and almost every village is having nearly 20 pits.

(iii) *Prevention of soil erosion:* Due to the sloping nature of the land and heavy rainfall there is much of soil erosion. To check this, demonstrations of contour bunding, by putting up earthen and stone embankments, gully-plugging and ploughing along the contours were done.

(iv) *Green manuring of fields:* Demonstrations are being conducted regarding growing of green manure crops like sunnhemp in wetlands and drylands and application of green leaf to wetlands to increase the fertility of soils.

(v) Tractor ploughing of lands was also demonstrated to hillmen, as a result of which 502.87 acres of land of hillmen was ploughed so far. The lending of tractors to hillmen for hire at half rates is being continued.

(b) **Propaganda:** Twenty villages of the valley are tackled for propaganda purposes, and the following are the main items of work tackled.

(1) Introduction of improved strains like B. G. 1, AKP. 7 paddy, T. M. V. 2 and 3 groundnut, Co. 419 sugarcane etc. and explaining the advantages of growing them.

(2) Improved cultural and manurial practices like transplanting, weeding, green manuring paddy and tractor ploughing.

(3) Improving soil fertility by the application of compost, checking soil erosion and growing green manure crops.

(4) Mass selection in important local crops like ragi, paddy, samai and niger every year.

(5) Cultivation of exotic vegetables like cabbages and growing fruit plants like guavas, lemons, plantains, pine-apples etc.

(6) Control of pests and diseases.

(7) Exchange of white Leghorn cockerels with the *desi* ones, to grade up the local stock.

Subsidiary Industries: (i) *Dairy:* A dairy unit with 19 she-buffaloes and one buffalo breeding bull was maintained and the milk sold to residents of the colony. The strength of the dairy herd is now increased to 25 she-buffaloes.

(ii) *Poultry:* A poultry unit with white Leghorn birds was started and the cockerels both hatched here and from the Agricultural Research Station, Anakapalle were exchanged with the local ones to grade up the local stock. As the supply of cockerels from Anakapalle is now stopped, eggs of Leghorn birds are being exchanged with the local ones.

(iii) *Sericulture:* The rearing of mulberry silk worms was first taken up by this Department in 1947. The worms were successfully reared and 17½ tolas of silk yarn was produced. This work was subsequently handed over to the Industries Department.

(iv) *Pisciculture:* Fingerlings of 'Mirror carp' variety of fish were first introduced in 1946 into one of the departmental ponds for rearing. To growth and development of the fish are very satisfactory, but the fish did not breed and multiply. Hundred and eighteen fingerlings were again introduced during this year.

(v) *Sheep breeding*: During 1949, 19 ewes and 2 rams of the Mandya breed sheep (woolly type) were got from Hosur. They are thriving well here and are multiplying; their strength is 2 rams, 15 ewes, and 24 lambs. One shearing was taken during 1949, and a total quantity of 25 lb. of wool was received. It is proposed to build up the stock to about 50 or 70 adults, and distribute them to the local hillmen.

(vi) *Cattle improvement*: A Murrah buffalo breeding bull was maintained on the farm for free service and grading the local scrub cattle.

Miscellaneous trials: (a) *Pyrethrum*: Pyrethrum which was tried here was not found to grow satisfactorily and its flowering was also poor.

(b) *Cinchona*: Cinchona is being tried at two places (Ananthagiri and Sunkarametta) in two acres at each place. The seedlings were planted in 1946—'47 and they have now come to flowering. But their growth is however not encouraging.

(c) Eucalyptus, Camphor, and Silver Oak plants are being grown as avenue plants in the colony.

Fasciated Pedicels in a Variety of *Capsicum annuum*, L.

By

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The genus *Capsicum* comprises a wide range of forms varying in shape and pungency. Different degrees of importance have been attached to the morphological characters for taxonomical classification. The Index Kewensis recognises fiftyfour species, Roxburgh (1832) mentions six species, but modern systematists consider that there are only a few real species in the genus. Hooker (1885) recognises three species, namely *Capsicum minimum*, Roxb., *C. grossum*, Willd., and *C. frutescens*, L., and Irish (1898) has made it into two species namely *C. annuum*, L.; and *C. frutescens*, L. Shaw and Rahman (1928) agree with Irish and maintain the two species in their monograph. Bailey (1923) and Erwin (1931) have further reduced it to a solitary species, namely *C. frutescens*, L. The shape of the fruit and the nature of the calyx are reliable characters but the