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How to translate the Results of Research to General Farming Practices with Particular Reference to Sugarcane

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The Magnitude of the Problem: Sugarcane is an important money crop of this province and the area under this crop increased from 1,25,000 acres in 1935-36 to 2,73,000 acres in 1947-48. The total investment on sugarcane is roughly Rs. 25·25 crores, on land and Rs. 1·15 crores on factories. Nearly fifteen lakhs of unskilled labourers are dependent on this crop, not to mention of thousands of middle men, merchants and labourers employed by them. Being a money crop that fetches the maximum profit per acre as compared to other crops, this crop plays an important role in the economic structure of the poor cultivator, saving him from indebtedness. Though, during the present period of food crisis, it is considered less important, any attempt to completely displace this crop, will result in the cultivator's economic ruin. Dr. Burns in his report on Technological Possibilities in India pointed out that Madras is capable of producing over 50 tons of cane per acre, due to its particular adaptability in respect of climate and soil to this crop. But our present average production is only 20 tons of cane i. e. 50% of the potentiality. It is known to every one that the starting of the Samalkot Research Station saved the sugarcane crop of the Godavari Delta from extinction by red-rot, and the starting of the Coimbatore Breeding Station developed the Sugar Industry of the country. If to-day the industry is faced with a crisis by foreign competition, by import of cheap sugar, it is because practically nothing has been done to investigate the possibilities of lowering the costs of production, the research on which, being the only way to save the industry from its total and second extinction. A few of the items in which quick improvements are possible are indicated in the following table to bring home the total value of such improvements when adopted in the entire Sugarcane area of the province.

Name of improvement	Quantum of improvement	Total value of improvement	Remarks
1. Variety ...	Introduction of Co. 419 in the province in a normal area 1,44,000 acres taking average increase of yield as ten tons per acre for one year over the displaced variety.	Rs. 36/- Millions.	Taking the average price of cane in (the last decade as round about Rs. 25/- per ton)

	Name of improvement	Quantum of improvement	Total value of improvement	Remark
2.	Jaggery preparation ...	Improved methods of jaggery preparation and preservation.	Rs. 59,40,000	Taking 75% of the cane is utilised in the jaggery production and average yield as 2½ tons of jaggery and premium for good jaggery Rs. 0—4—0 per maund.
3.	Recovery percent in factories ...	Average recovery for province 8·66 per cent possible level to be raised 10·5 per cent.	Rs. 80,00,000	Taking the value of sugar as Rs. 735/- per ton exclusive of excise duty and 53,000 tons as normal production of province.
4.	Other cultural improvements ...	Ten tons of cane increased production per acre.	36 millions.	Present average 25 tons By varietal improvements 10 tons By cultural methods 10 tons 45 tons

It is therefore computed that a net increased income of over 90 millon rupees is possible if these improvements in Sugarcane cultivation are carried out.

The cultivation of crop in this province may be grouped into ten zones namely (1) Vizag District, (2) Godavari Delta, (3) Kistna, (4) Central Districts comprising N. Arcot, Chinglepet, Salem and Chittoor, (5) Hospet, (6) South Arcot, (7) Coimbatore, (8) Madura, (9) Trichy and Tanjore and (10) West coast. Each one of these ten zones has its own characteristic type of soil, irrigation facilities, climate, cultural practices, and farm economics. If research is to meet the needs of as many cultivators as possible it should be equally extensive. Any advice given based on few fundamental experiments carried out in one or two central Reserch Stations for the whole province will lack in details in its application to individual field practices of the different zones. There were only five Research stations to work on Sugarcane (Anakapalle, Samalkot, Gudiyattam, Palur and Coimbatore) with only nine men as technical personnel spending only about Rs. 72,000/- per annum. It is thus seen, that the research on this crop, is not extensive to go into the fringes of the problems of the different tracts, not to speak of the problems of the individual tracts. This inadequate staff and finance for the immensity of the problem, may be compared with the money spent on sugarcane Research by the other sugar producing countries, as given below :

Hawalii	...	1,082,404	Dollars	(Rs. 4,329,616)
Puerto Rico	...	685,600	,,	(Rs. 27,42,400)
Florida	...	590,161	,,	(Rs. 23,63,844)

For a single problem of plant survey in Russia, before World War II, 168 milliom roubles were spent employing 2000 research workers in 1233 research stations. Britain spends annually 74 million pounds, on original research and 10 million dollars to propagate scientific knowledge in countries even outside Britain. Therefore, it is not wrong to say, that research is not adequate enough to appeal and to solve the problems of the different tracts in detail.

Research to be extensive should be in two forms (i) Fundamental to the crop and (ii) its application to field practice. At present, researches on applied aspect of the crop are confined only to the departments of agriculture, universities playing no role in this country as in others. This aspect of the problem was mentioned by Ramaiah who says that inspite of various handicaps, the agricultural officers have contributed valuable knowledge in the field of science while the universities played no role in this. In other countries, universities and other private research institutions engage qualified men to take up research on fundamentals, while the government or subsidised institutions take up the applied field of research. The examples of Rothamstead, Savalof and Hawaiian Planters' Association may be mentioned where research prospered without initiative from the State, while in this country, it is the reverse. State can invest only limited funds for research on the multifarious problems of the cultivator, thus restricting the field of utility. Taking the sugarcane factories of this province, it is not impossible to gather up a capital of one or two lakhs of rupees for research on problems of reduction of sugar price from Rs. 28—8—0 to Rs. 16—12—0 in order to face the present foreign competition. Therefore since research is as productive as any other commercial undertaking greater investments on the same can only spread science to the millions of cultivators in this province.

Why the Cultivator is not Responsive: It is fallacious to argue that the Indian ryot is conservative and slow to know what is good for him. The probable cause for the existing gap between science and the cultivator, are to be sought elsewhere. Taking sugarcane as an example, it may be pointed out that the average holding of a cultivator under this crop is not more than one acre, though in some factory areas it is much more because lands are taken on lease and cultivated. The land tenure system in this province is such that the land is always starved and kept under minimum production level. Maintenance of land at high fertility level, requires investment on manures, soil conservation implements, change of cropping system, which all require long range policy.

In the social structure, most of the sugarcane cultivators take to this crop, to realise some cash and not as an investment of surplus money into productive avocations. In many cases, he borrows money to meet

part of his cultivation expenses and these money lenders not only charge him high rates of interest but also compel him to dispose off the produce at harvest time when there is a glut in the market. A specific instance of such a case namely Chodavaram Taluq of Vizagapatam district may be mentioned. Over 12,000 acres of cane are grown every year in this taluq, and almost every ryot is indebted to the money lender and he is compelled to sell his jaggery straight from the pan at the harvest season. In the 1949 season, nearly 24,000 tons of jaggery were prepared in this taluq, and all of them sold out to middle men at the lowest price of round about Rs. 2—12—0 a maund. The prevailing price in June was Rs. 4/- per maund, and thus the producer of the taluq, lost his legitimate share in the increased market value of about Rs. 15 lakhs. This is the sad story of a jaggery manufacturer in a single taluq.

Taking a ryot in the factory areas, and taking for example, a factory of 800 ton capacity, which produces about 7,900 tons sugar annually, the ryot is in the same plight. It is very well known, that the factory aims at maximum production of sugar, with the minimum of cane with no concern to sugar. Therefore, a factory of the above type compels the ryot to cultivate a poor yielding type such as Co. 527, in preference to a heavy yielder like Co. 419. To produce the 7,900 tons of sugar the factory has to crush about 85,000 tons of Co. 527 cane of 9·26% recovery whereas it has to crush 89,000 tons of Co. 419 of of 8·82% recovery. On the former basis, the factory saves about Rs. 2 lakhs over payment of cane and also by short period of working where as the ryot has to put additional 550 acres under cane and incur an additional 3·3 lakhs of rupees, as cultivation charges while losing nearly Rs. 9 lakhs by low yield of cane. For every increase of 0·1% in the recovery, the Sugar factory makes an increased profit of Rs. 60,000 under the present prevailing prices. The recovery of 8·82% of Co. 419 in a figure for cultivation under almost neglected conditions and if scientific technique of field management is adopted, it is not difficult to raise the recovery percent much more. Still, a factory prefers not to spend any thing on research but would like to take the profits by enforcing a poor yielding cane on the ryot. Therefore a ryot in the factory area also has no share in the benefits of improvements.

A lack of system for the proper distribution of benefits of the scientific improvements, between the various interests, is at the back ground for the apathy or even antipathy of the cultivator to improved method of cultivation. A parity between the different groups of vested interests involved in sugarcane cultivation is necessary.

The state has only limited resources of finance and as such its expenditure on research can be only small. Financing of research entirely from the State Exchequer is also not desirable as it cuts off the cultivators from direct interest. If extensive research, as suggested here, is to be

undertaken it should be by financial aid from the industrialists or private institutions. Just as cess is collected for roads, education and irrigation projects, a cess for research is suggested so that every cultivator may realise his contribution for his improvement and naturally he will take keener interest. Though at present, some of the commodity committees are formed this way, the number of research institutions and research workers are too few to meet the actual need. As a deviation, the Sugarcane Development Scheme of Madras roped in the sugar factories to pay for research into their problems of increased recovery. A similar system for all the other crops is to be devised wherein the cultivatior or the industrialist will have direct concern in research. Organisations for research must be on a much wider scale so that every individual can approach it for easy as well as cheap and quick solution of his problem.

Sugarcane cultivation in Hawaii reached high level of perfection because sugarcane planters themselves organised research institutions and established extensive field laboratories and the problems of the individual plantations were solved to be immediately adopted into field practice.

The Potential value of the press for greater publicity has to be realised in a greater measure. The people are to be widely informed of the efforts that are being made by scientists to enable them to become more appreciative of science. With a more energetic system of publicity, the results will spread through the land more easily and rapidly.

Publication of a larger number of books and other literature in the local languages dealing with the local problems must be encouraged. The State should take direct interest in protecting the interests of the authors and encourage them to publish more and more.

The Intermediate Seasonal Cropping in Godavari Delta

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The total area under paddy in the Godavari delta is 12,49,000 acres. In the double crop areas the first crop "Sarwa" is grown between June to November and the second crop "Dalwa" between February to May. The area alloted to the Dalwa crop is about 30 per cent of the first crop area of which the western delta alone contributes 1,30,000 acres. The water supply in the second crop season (Dalwa) is limited and in years of low rainfall it may run short before the maturity of the crop.