

We may therefore present as our broad conclusions (1) that statistical evidence proves the vitality and slow expansion of other forms of cultivation than what we call distinctly big, and in particular of small cultivating ownership; (2) that the province of small-scale farming is permanently assured and capable of expansion; and (3) that this expansion is directly stimulated by the trend of international agriculture. Combining these results with those of previous chapters, in which we have shown the supreme importance of Co-operation to the small farmer in particular, we may submit that Co-operation is not only *a* but *the* corner—stone in the development of modern agriculture.”

*Mutatis mutandis*, this conclusion seems to me to be true also of the continent of India and of the ryotwari Province, which is ours, in particular. If so, do you do well, I ask, to fight shy of us? It is doubtless your immediate care to make two blades of grass grow where there was but one, and put two grains into the ryot's store when he has to be content with one now. But surely this bettering of production is one of many links in the chain of modern Economics, and he who would really better agricultural production, has to look about him and find how this bettered state of things, he has in view, fits in with the course of Industrialism as a whole. If it does not fit in well then, depend on it, the very efficiency which you labour hard to bring about, may become your bane. Accordingly, I believe I have made out a case for the study, by the agricultural expert, of the element of Economics and of Co-operation in particular.

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**Easy method of preparing lime manures  
required for Tanjore paddy soils,  
through Co-operation.\***

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The Research Institute attached to the Agricultural College, Coimbatore has analysed samples of soils in the Tanjore Delta taken at

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\*Note read by Rai Sahib Mr. A. Sethurama Iyer, Diplomaed in Agriculture, before the College Day and Conference on 12th July 1915.

five miles apart. It has been found out that *phosphates* are wanting in almost all the samples of soils analysed.

“A soil containing about 700 lbs. of available phosphates per acre within the first 9 inches would probably show about 3000 lbs. of total phosphoric acid both available and unavailable to the plants. Of the 700 lbs. of available phosphates, a crop of 1000 lbs. of rice per acre removes from the soil only 3 lbs. to the husk, 4 lbs. to the rice and 3 lbs. to the straw. The gain of phosphoric acid by silt deposition is a good deal more than the outgoings and it is only where no silt deposit takes place that the question of recoument of phosphoric acid would be considered.”

In the Cauvery there are many dams and regulators in the way. The silts are deposited then and there where there is an obstruction. The irrigation water reaches the fields in a clean condition. Owing to the continuous cropping of paddy and the absence of silt in irrigation water, Tanjore soils are losing their phosphates. So, it is necessary that ryots should make good this loss by applying phosphatic manures to the soils, such as bones and superphosphates.

Bones may be used in various sizes, such as  $\frac{1}{2}$  inch bones  $\frac{1}{4}$  inch bones, bone dust etc.

In the Tanjore district about a lac of cattle either die or are slaughtered every year. The bones of each animal (cattle) will weigh about 40 lbs. That means about 4,000,000 lbs. or 1800 tons or about a lac of rupees worth of bones are exported to Ceylon. This export can be stopped a little by co-operation. The bones can be collected by a co-operative society specially organised for that purpose, crushed by means of a disintegrator and the dust used as manure to the fields. A co-operative Society consisting of not less than 10 members should take shares for about Rs. 2000. With this amount they should purchase a five horse power oil engine for about Rs. 1000. A disintegrator for about Rs. 340 etc., The whole machinery for milling bones would cost about Rs. 1500, and construction of shed etc. would come to about another Rs. 500. This society should borrow as a

joint loan from the District Bank about Rs. 5000 in a year for working expenses. A ton of bones costs about Rs. 50 in the Bombay Presidency. In the Tanjore District, bones can be procured at a very favourable rate at Rs. 40 a ton. For 100 tons about Rs. 4000 may be required. A 5 horse power oil engine would give one ton of bone dust ( $3/16''$ ) costing about Rs. 80 a ton in a working day of  $8\frac{1}{2}$  hours. So there is a sheer profit of Rs. 30 per ton in making bone dust. Deducting expenses for crude oil, cylinder oil, shafting oil, driver's pay, boy's pay, wear and tear and interest on the outlay, we can get a net profit of Rs. 20 per ton of bone dust produced.

The Department of Industries would help as regards installations. Further there are now about 129 oil engine installations in the Tanjore District of which only 9 are pumping plants and the rest in industries (milling paddy). These installations will be without work during rainy season and owing to competition many are without any proper work. These can be utilised for crushing bones into bone dust. Only disintegrators costing about Rs. 300 should be attached to the oil engines. The oil-engine owners may derive profit if they determine to work in this new line. Not only will they be profited, but they will also benefit the ryots by supplying bone dust manure to the Tanjore wet lands which are now almost deficient in phosphates; 1 to 2 cwts may be necessary for an acre.

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The friends of Mr. K. Chinnaswami Pillai, Dip. Agric., will be glad to read the following account of him which we have taken from the Report of the Ceylon Agricultural society for 1914-15:—

“Mr. K. Chinnaswami Pillai who was seconded for duty as Foreman of the Dry Zone Experiment Station, Anuradhapura, reverted to his substantive post as Agricultural Instructor, Batticaloa, on 1st February 1915. Mr. Chinnaswami Pillai's training and experience in South India enabled him to put in some