

Rotavation and Rice Cultivation

By

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Introduction : It is a known fact that the low yields of irrigated paddy are in a large measure traceable to late sowings and the same may also be said in the case of this State where predominantly rice growing areas exist and the vagaries of the monsoon do not allow the fields being got prepared for the timely sowings. The indigenous methods adopted also are very tardy in this respect and it is in regard to the gain in time and efficiency, mechanisation of agriculture plays one of its important roles.

The timely preparation of a seed bed for our crops is enabled now a days by the use of light weight tractors especially of the wheel types and this timely cultivation of the fields helps to increase soil fertility through improved nitrification and better incorporation of green manure and absorption of humus into the soil from the rural rubbish and compost added. Again, the timely sowing of the seed ensures a good start to the crops, saves them from diseases caused by unfavourable climatic factors.

Maximum yields can only be obtained if the seeding and planting of the crops are done at the proper depth and the seeds are distributed uniformly in the required quantities to suit the moisture and soil conditions. This can best be achieved by the employment of modern agricultural implements and machinery which otherwise is termed as mechanisation of agriculture.

Recent advances in mechanisation of agriculture : With regard to agricultural mechanisation, progress has been rapid in the U. S. A. and U. K. necessitated by conditions created by the recent world war. The most significant changes in modern rice growing in the western countries and Australia during recent years has been the rapid mechanisation under widely varying conditions and increased yields resulting therefrom.

In U. S. A. most of the operations in rice culture - seeding, manure spreading and plant pathological measures are mechanised. The combine is also rapidly displacing even the harvests. In Australia attempts have been successfully made to mechanise rice cultivation completely. In Malaya also attempts at mechanised rice growing on a large scale are afoot. In British Guinea again, rice cultivation is being largely mechanised. There seems to be ample ground to expect with confidence mechanisation of rice cultivation in India as well with

resultant efficiency of operation, timeliness and quick turnover. In a few years time rapid changes in this direction may be expected. For example, the cost trials of rice cultivation carried out by Nayanakkara (West Indies) at the Imperial College of Tropical Agriculture in 1950 showed that the typical rice farmer and his wife (growing perhaps $\frac{1}{2}$ to 5 acres of paddy) used 236 man hours per acre to till the soil for their crop. With the help of the rice land Rotary Hoe, the labour requirement was reduced to 50.3 man hours. For larger farmers or contractors, the wheeled tractor and Rotavator reduced the labour requirements to less than 10 man hours.

It is gratifying to mention that the preliminary investigations on puddling with tractor in the Madras State in 1949, 1950, and 1951, showed that puddling with tractors is a definitely feasible item and the triple objects of efficiency, timeliness with turnover and low costs can be secured by mechanisation of this vital operation in rice cultivation.

Rotary tillage and rotavation: In the field of agricultural implements and machinery the Disc plough which is otherwise known as Rotary ploughing is adopted in large wheat fields. This machinery is replacing the mould board ploughs of the West. These are also being used in the Madras State with very good advantage. Rotary ploughing gives more output and at a lesser cost as compared to mould board ploughing. The roto-tiller or Rotavator or a kind of rotary cultivation are being increasingly used now for vegetable and garden crops in preference to other methods of tillage.

Rotary tillage is the method of cultivation that is now commonly called "Rotavation" and the principles on which it is based can be summarised as below:—

According to Shawl (1946) the rotary plough was invented about 90 years ago. The rotary plough has been used in Europe, for many years but the American farmer has only recently become interested in this type of plough. They are divided into three types viz.

- (i) The pull auxiliary engine - where the rotary plough is pulled forward by a tractor but has the cutting knives driven by an auxiliary engine mounted on the frame of the plough.
- (ii) The pull power-take-off driven - where the Rotary plough is not only pulled forward by the tractor but has the cutting knives also driven by the tractor. The cutting knives or lines are generally mounted on a horizontal power driven shaft which operates at about 300 r. p. m.
- (iii) The self propelled garden type rotary ploughs have one drive wheel, while others have two. Some garden type rotary ploughs can also be used for cultivating vegetable crops.

These rotary cultivators have proved to be extremely valuable in horticultural work and for the incorporation of organic matter in the top few inches of soil and for cultivation among crops and in plantations.

According to "World Crops", Rotavation, the modern means of cultivating rice, is a time and man power saving technique, which is fast superceding the slow and laborious traditional use of manual and animal drawn implements. Greater areas are worked in a fraction of the time with these. The recent efforts in Ceylon, Thailand, Malaya and Philipines in mechanising rice cultivation are of considerable value in this connection and all countries have been using more and more rotavation.

It is said that in 1951 alone five times as many power bladed Rotary hoes went into Indian farms as in 1950. The demand found in some 67 other countries particularly in those which till recently have relied on age old technique and are now striving for rapid mechanisation of their agriculture, to meet the growing food needs of their people.

The rotavator represents a new and revolutionary science of cultivation which has proved itself by demonstration, field test and practical farm work to be particularly suited to the needs of countries faced with the problems of this kind.

The working and advantage of rotavator : The rotavator produces not only the right sort of cultivation but also better tilth by being thorough and quicker and is thus so much more economical. It also adds benefits of increased fertility. Rotavators are available in various sizes. The important aspect about the Rotavator is that it is a tool which puts the maximum amount of tractor power direct to the work of tilling the soil, the basic principle of the machine. The specially bladed rotavator which can now be power coupled direct to most leading makes of tractors provides a forward thrust which assists the tractor in its work and vigorous tests over years have proved that the wheel slip experienced with other cultivators is eliminated. The forward thrust of the hoes aid less soil compaction under the wheels. The cultivating job is done by the hoe shaped blades. They cut clearly through the weeds, green crops, trash, sugarcane stools, lifting the earth, breaking it up and putting it back with finer particles underneath. During this process the earth is shaken loose and thoroughly aerated.

In preparing seed bed, the chopping up and turning in action of the rotavator blades put trash and any green manure crops evenly through the soil, thus ensuring its rapid decomposition into rich humus contact. However, the basic soil crumb structure is preserved intact.

Since the Rotavator will cultivate even more quickly than the tractor powered plough and disc harrow, time is available for the planting

of such crops which can be turned in for soil improvement. It gives quick and thorough tillage where surface cultivation is the rule and can handle the entire cultivating processes efficiently. This is also true of the hand controlled models which is a blessing to small farmers. The rotavator has now become a valuable and much sought after implements for all kinds of cultivation.

Role of rotavation in rice fields: It is calculated that more than 60% of world's total rice production is by the wet paddy method. Faced with the rapidly rising population, the traditional crude indigenous cultivation methods gradually have begun to give place to mechanisation. As mechanisation remains a major step towards economy of labour and efficiency of tillage and the cultivation of much wider area, the need for a special wet paddy Rotavator resulted in small hand controlled 6 H. P. "Gem" which rapidly won favour on the small peasant holdings in Trinidad, Malaya and Spain. More recently tractor powered rotavators with a standard cut of 50" and a cultivating depth of 9" have been successfully employed in the various parts of India.

At Mankhand, in Bombay State, the Rotavator covered on an average $\frac{2}{3}$ of an acre per hour. The quality of the job done was excellent resulting in perfect mixture of soil. The soil was worked to a depth of 7" burying all weeds and the consistency of the puddle was uniform throughout.

In France in the Camargue, the largest number and sizes of rotavators are used in conjunction with 60 and 70 H. P. French tractors.

In South Africa, swamp and marshes have been reclaimed by Rotavators under the Rice Expert of the Colonial Development Corporation, Mr. Gaspar Snokolay.

The rotavator tractor attachment also has entered the wet paddy fields of Madras State. Equipped with the special swept back rice blades it was successfully demonstrated in 1951 in Madras where it did the work of puddling, green manuring and levelling without any of the wheel slip experienced with other types of cultivators.

Other Use: The rotavator is now playing an important role in the growing of sugarcane. Here again there is immense saving of time and labour. Two operations with the rotavator are said to do the whole job of harrowing down the ridges, ploughing in trash equally distributed which otherwise would have been wastefully burnt requiring further discing and ridging. The increase in soil fertility by mixing the chopped up trash through the soil to form valuable humus is an important factor contributed directly by Rotavation.

They can also be worked in tea gardens, preparing seed beds and hoeing between young tea. These are eminently suited for vegetable and orchard cultivation and for the inter-row cultivation of such crops as cotton, tobacco, maize and millet.

In dry farming also they can do the complete cultivating. They are of robust build.

Conclusion: It is admitted on all hands that there can be no maximisation of food production without mechanisation of farming. Besides producing more food, more cheaply from our present cultivated lands with the aid of agricultural machinery, the best method by which our vast uncultivated land could be brought into production expeditiously and economically is by the use of mechanical equipment.

It is clearly established now that tractor power can produce wider and better cultivation only if it is applied to the proper implements. And many will admit that the pride of place among these implements for its speed, economy and thoroughness of tillage, goes to the "ROTAVATOR".

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