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AD838809

TRANSLATION NO. 1486

~~DATA 12~~

DATE: 1951

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Mechanization  
of  
Colonial  
Agriculture  
7(302): 2345-47, 1951

Mechanization of the rice culture in South Vietnam

by Leon ROBERT  
Engineer of Public Works  
Ex-chief of the Navigation Service at Saigon

**Mechanization of the rice culture  
in South Vietnam**

The problem of the alimentation of autonomous populations is one of the essential problems of the French Union. The mechanization of agriculture overseas must help to resolve it.

It is certain that a massive production of rice, not only in Vietnam, but in Madagascar, in black Africa and even in North Africa would bring an effective solution to many of the political and social problems.

Interesting experiences are undertaken in several territories to extend the mechanized culture. It seemed useful to us to study them under our title "Mechanization of colonial agriculture". We are beginning today by a study by Mr. Leon Robert, on "The mechanization of the rice culture in South Vietnam." In our next title, September 29, will appear a study by Mr. Monclin, director of agricultural domains of the General Company of Madagascar, on the rice culture at Lake Alaotra, in Madagascar.

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Mr. Leon Robert, engineer of Public Works in Indochina, exploited, before the war, in the West of South Vietnam, a vast rice growing-region.

To give value to it, he was led to define and next to put into work procedures opposed to the traditional procedures of rice growing. These procedures rest on two practices: the use, in all of the successive operations of rice growing exploitation, of agricultural machines moved by a tractor and the simultaneous culture of two varieties of rice, one expedited, harvested in September, the other tardy, harvested in February.

Certain reservations were made by the other technicians to the expose by Mr. Leon Robert, that we publish under his responsibility.

It is evident that, thanks to the use of tractors and of agricultural machines, the cultivators have the responsibility and possibility of effecting at the most opportune moments the different agricultural methods. Moreover, in the conditions of South Vietnam, a beneficent washing of the soils by the first rains will result from it. But it is perhaps daring to discount an augmentation in harvest in the double size, except in certain conditions particular to the milieu, that Mr. Robert met on his domain.

The economy of manual labor that stems from integral mechanization is great, but will manifest itself slowly.

Other reservations must be made on the importance of impenses. Foresee only one tractor for a domain of 300 ha in culture appeared insufficient. Admitted that it will be able to serve twenty years is still longer. The tractor would have, each year, nearly 1000 hours of work; now tractors capable of working 20,000 hours are rare.

The integral use of mechanical material in very varied rice growing conditions of South Vietnam, at least as long a time as a complete management of the hydraulic system of the Mekong delta will not have been realized must equally be studied closely. To the extent that the rice grower will not be the absolute master in watering his rice field, the harvest will always be risky and will not be able to pay important expenses.

The procedure of culture by seedling of two associated varieties finally raises objections on the part of numerous agronomist engineers. Possible in certain localities, it seems impossible in the regions where the height of the water would be too high at the moment of the first harvest in September, in the floating and semi-floating rice zones. This procedure is known elsewhere and practiced in North Vietnam, in Formosa, in the south of China, however it is little by little being abandoned.

Be that as it may, the hardy ideas of Mr. Robert merit to be known and discussed: Colonial Markets of the World would be very happy that its readers interested by the question send in their remarks and their suggestions to the editorial staff. A debate could usefully open on this subject.

Cochin China is, by excellence, an agricultural country, thanks to its climat and its deltaic soils. She annually produces 3 millions of tons of rice, of which half of it often can be exported, thus making of this region, before the last war, the third exporter country of rice.

Actually, consequence of events, numerous rice fields stay uncultivated. When it will again be possible to cultivate them, by which methods should one envisage their return to value? By the traditional methods or by new methods utilizing on the one hand modern agricultural machines, on the other hand a new procedure: the simultaneous culture of two varieties of rice, the one hasty and the other tardy.

#### ANCESTRAL CULTURE AND MECHANICAL CULTURE

With the methods of ancestral culture or traditional, all of the successive operations are effectuated solely by hand; the agricultural tools, plows, harrows, wheels, almost entirely of wood, are pulled by cattle or by buffalo. The cultivators, be they proprietors or, most often,

sharecroppers, only obtain meager results; they feed themselves and their families, and only very rarely have the possibility of ameliorating their condition of life. These methods, in addition, necessitating a considerable manual labor for a small, weak profit, are the cause of an extraordinary waste of this last mentioned, from which a very feeble individual productivity.

It is easy to prove that the traditional culture methods, put in parallel with those of the mechanical culture demonstrate the flagrant inferiority of the first one. Compare phase after phase, the different works that succeed each other in the course of a rice growing country side.

**LABOR.** \_\_\_ Like the rice growers of India or of China, the Vietnamese plow their rice fields. He uses a rudimentary wooden plow, whose only metallic piece is the plowshare, as soon as the soil of the rice fields is sufficiently soaked by the rains, or, more rarely, by irrigation water so that this work not be too hard on his cattle or his buffalos. In Cochin China, each grower thus puts about ten hectares in rice. He must consecrate thirty days to the work with the help of a guardian, who leads the beasts to graze during the rest hours. This labor thus demands sixty work days. Whereas with a 30 CV tractor pulling a stubble plowing plow, a mechanic and his aide would be susceptible of working the same surface in a day.

At the same time the grower must prepare his nursery that will furnish the plants to transplant. Such a job is avoided in mechanical culture, which permits direct seeding of the rice field.

**HARROWING and ROLLING.** \_\_\_ After the labor, the rice grower must harrow his ground and roll it to reduce the surface bed in a mass of fluid mud, in which, at the time of transplanting, he will be able to place the roots of the young plants taken from the nursery. The harrow is of wood, even the teeth. The cultivator can harrow about a demi-hectare per day, be it twenty days of work for the 10 ha, that he wants in rice fields. The rolling carried out with a fluted roller, also of wood, will cost him the same number of work days. In counting the days of the guardian of buffa, eighty work days are necessary for ten hectares to harrow and roll. With a tractor pulling the roller, only two work days are necessary; the harrow work can be eliminated.

**TRANSPLANTING.** \_\_\_ In ancestral agriculture, the work of transplanting comprises the following operations: a) taking the young plants from the nursery; b) their transport in packages and the distribution of these last mentioned in the rice field to be planted; c) the actual transplanting itself.

To carry out the ensemble of these operations, it is always necessary for ten hectares of rice fields: one hundred twenty days of work.

With mechanical material, in order to directly seed these ten hectares, only five days of work is necessary.

**HARVEST.** — The harvest includes the four following successive operations: a) the actual harvest; b) transport of the sheafs to the threshing place; c) threshing; d) placement of grain in the granary.

Always for ten hectares, the first of these operations necessitates one hundred work days with the traditional methods, two days of work if one operates with a corn reaper; the economy would be greater still if one operated with a threshing corn reaper, which would considerably reduce the duration of the operations following.

The second job necessitates forty work days, those of the cattle guardians there included, against seventeen if the transport were effectuated with a tow pulled by the tractor.

The threshing will necessitate thirty days following the ancestral methods against seventeen with the aid of a thresher.

The last operation would necessitate twenty workers in the case first mentioned but only twelve in the other.

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In conclusion, one can affirm that all of the jobs, without excepting a single one, interesting to the rice growers, can be undertaken with the aid of machines, contrarily to the preconceived ideas that exist on this question, and which have even been expressed in technical relations:

\* As for mechanical jobs in the rice fields, they are impossible. All of the tractors, that were tested out there, be it on wheels, or caterpillars, and whatever their weight and power, are always sinking in the sand there. They were never able to attain a sufficient adherence to the soil for plow traction and have, in sum, given the worst results. Only the agricultural machines serving for mowing and threshing are utilized in the rice field; these machines are still being used but rarely and are most often pulled or driven by beasts.\*

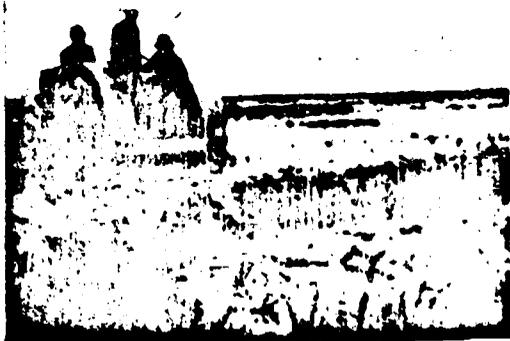
Since the beginning, we experienced the same problems. But one can avoid them in carrying out the work either in dry season, free of breaking the clumps of earth by rolling, as here below exposed, or as soon as there is 10 or 20 cm of water in the rice field. In the second case, the water constantly washes the wheel rims of the tractors just as the clumps that are there affixed, the clay is diluted in measure of the advancement of the tractor and thus the choking is eliminated. We were thus able to realize all of our rice growing labors with the aid of machines.



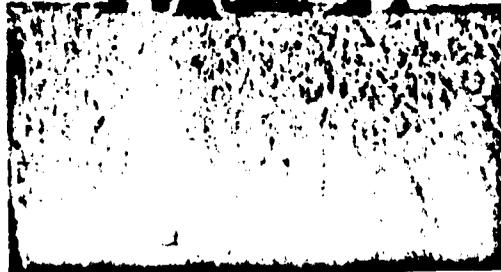
Harrowing



Travail de repiquage  
Seeding



Mechanical rolling



Reaper binder harvesting at work in the Transbassac

*Advantages of the use of machines in the Transbassac*  
ADVANTAGES OBTAINED THANKS TO AGRICULTURAL MACHINES

We thus obtain, thanks to machines, the following advantages:  
a) economy on manual labor; b) economy on the money not spent by the use of machines; c) amelioration of the soil; d) possibility to have two harvests per year, advantage on which we will insist more particularly.

a) Economy of manual labor realizable in a domain of 300 ha (number of days of workers):

|                         | Ancestral Method | Mechanical Culture |
|-------------------------|------------------|--------------------|
| Labor.....              | 1800             | 60                 |
| Harrowing.....          | 1200             | 60                 |
| Rolling.....            | 1200             | 60                 |
| Seeding.....            | 3600             | 150 (seed beds)    |
| Harvest.....            | 3000             | 60                 |
| Transport of the sheafs | 1200             | 510                |
| Threshing.....          | 900              | 510                |
| Transport of grains,    | 600              | 360                |
| <b>Total.</b>           | <b>13500</b>     | <b>1710</b>        |

The economy of manual labor is thus seven-eighths. With a thresher

corn reaper, it would be still more important.

In order not to reduce to unemployment the manual labor that would become unemployed, the proprietor will be interested in keeping a family of sharecroppers per 10 ha, in profiting from the augmentation of the same yield, that will pass from 1500 kg to 3000 kg per hectare. He will even be able to augment the part that returns to the sharecropper: this last mentioned person will have a less laborious job and his existence conditions will be ameliorated.

b) Economy realized thanks to the use of machines. We are going to compare the money saved in dead and living livestock (in Indoch. piastres):

| Ancestral method               |         | Mechanical culture      |         |
|--------------------------------|---------|-------------------------|---------|
| Forty pairs of buffalos at 300 | 120 000 | One tractor of 30 CV... | 80 000  |
| Forty plows at 50.....         | 2 000   | One stubble plow.....   | 25 000  |
| Forty harrows at 50.....       | 2 000   | One roller.....         | 5 000   |
| Forty rollers at 100.....      | 4 000   | One thresher.....       | 80 000  |
| Forty threshers at 100.....    | 4 000   | One tow.....            | 5 000   |
| Total.....                     | 132 000 | Total.....              | 195 000 |

In the ancestral method, dead livestock, in wood, and living livestock must be replaced every three years; mechanical equipment must be able to serve twenty years. From which its superiority.

c) Amelioration of the soil. Mechanical labor permits to realize in time all of the work. If the labor is effectuated dry, the soil is washed from the first rains and the growth of rice plants is more rapid. The rice plants, dense from the first rains, are sufficiently developed upon the arrival of the flood and fear less the inondation. Rice straw in decomposing reconstitutes the humus bed; if, on the contrary, one burns it it enriches the soil in fertilizing mineral principles.

#### POSSIBILITY OF OBTAINING TWO CROPS PER YEAR

To obtain two crops per year has always been a goal of rice growers of South Vietnam. But, as, outside of a few privileged regions situated in the provinces of Choien, of Tanen, of Mytho, and in certain islands found in the mouths of the Mekong, they do not possess mastery of the water plan, all of the attempts undertaken in this sense, gave only mediocre results.

To effectuate two crops per year, it is necessary to sow varieties of hasty rice as well as varieties-behind season. The culture of the first ones presents no risk, they are harvested in August, the rice field having a water bed of 40 to 60 cm; but at this moment it is impossible to sow the young rice plants of behind season variety, for fear of drying up

partially the rice field by pumping, operation which would not be profitable, in the actual course of the paddy. It is thus necessary to avoid the transplanting and operate by direct seeding.

An observation permitted us to put to the point this procedure of simultaneous seeding of two varieties of rice and to discover from it the advantages. A plant of rapid growth is spontaneous in our rice fields. In the plots, where this herb develops itself, the rice plants instead of growing densely, as that which is produced by direct seeding, develops to the contrary by clumps, as if the rice field had been transplanted. This herb grows at the same time as the rice seeded at random, but around September, it dies, decomposes and thus constitutes a manure deposit in favor of rice plants in full growth; elsewhere, the occupied locations being liberated, the rice plants from this area profit, the tillering is rendered possible; the rice grows in clumps exactly as if it had been transplanted. The episperms produced by these clumps are much more beautiful and far more regular than those originating from transplanted rice. We tried to propagate this plant everywhere but it granulates weakly. We thus had the idea of replacing this plant by a hasty rice.

We thus mixed the seeds of hasty rice with the seeds of seasonal rice, that which is habitually cultivated. We thought that the hasty rice would be only a palliative permitting us to have a good harvest of seasonal rice. The results exceeded our hopes: the hasty rice harvested in September, four months after the seeding, had a yield of 2 t per hectare, and the seasonal rice gave 3 t per hectare. The year's yield is thus elevated to that of the hasty rice, 5 t, that of the best rice fields in Japan. The first crop, the hasty rice, must be effectuated at an unfavorable epoch: in full rainy season and commencement of the inundation, it must be carried out by hand and the sheafs transported on canoes.

These attempts were carried out in 1943 and in 1944, each year, with satisfying results. After the first harvest, the seasonal rices are still unripe, it would be wise to pass a roller lightly over them to bed the rootstocks of these last mentioned under water.

One can thus affirm that the problem of two crops is resolved.

Such a procedure could be applied just as it is in all of the provinces of South Vietnam, where direct seeding is practiced: Langhuyen, Chaudoc, Sadec, Tanan, be it around 600 000 ha. The first harvest would be sufficient to assure the alimentation of the population, leaving the second dispensable for exportation.

We have exposed in broad outline the methods to apply in order to arrive at producing two crops. For the detailed questions residing in the choice of seeds and the proportions to respect in the mixture of these

seeds before the sowing, we will be at the disposition of those that this method could interest. It would suffice for them to make the request for information either to the French government, or to the Vietnamese government.

C. I. E. F. A.  
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