

PRACTICAL ROAD MAINTENANCE IN RURAL AREAS OF DEVELOPING COUNTRIES

Through using only locally available material and manual labor, rural roads can be maintained by villagers who use the roads daily. This is one of the important factors to solve the problem of rural roads in Africa, or developing countries. This can be viewed as a giant step to reduce poverty in the world.

On rural roads, sometimes you do not see cars passing for half a day; or you might see trucks of buyers collecting crops passing in a row. The first thing to do for the maintenance of such roads is to improve the trafficability at spots which become impassable whenever it rains. Due to poor drainage, run-off water is stagnant on the carriageway of rural roads and so road surfaces become muddy. Soil with high water content is easily disturbed by traffic, leading to the formation of deep ruts. Generally, the lengths of sections that become impassable range from 20 to 200 m.

First of all, the drainage system is improved, and then the muddy part is replaced with "Do-nou". Figure 7. shows the standard cross-sections of a maintained road with two-layer "Do-nou". Where a rural road has a deeper rut or overly soft ground, the required number of "Do-nou" layers is varied accordingly, sometimes exceeding two layers.

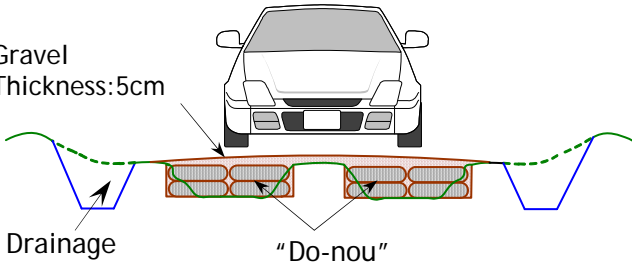


Figure 7. The standard cross-section of a road maintained using "Do-nou"

One of the main challenges is to train farmers who usually dig up the ground to implement road maintenance by themselves properly to realize the full potential of "Do-nou". A 20 liters container of cooking oil, is utilized to measure the proper volume of soil put into bags (Figure 8). After putting the soil in the bags, their open end is tied with a string at a position just over the fist to be leaving a certain space inside the bags (Figure 9). These standardized

procedures enable the size of “Do-nou” to be uniform. As a result, it becomes possible to place “Do-nou” evenly and minimize the space between them (Figure 10).



Figure 8. Soil measured with a container is being put inside a bag (Kenya)



Figure 9. The open end of a bag is being tied using string over a fist. The child is curious about his mother's work (Kenya)



Figure 10. “Do-nou” are positioned at a site where the mud has been removed. The space between “Do-nou” is necessary to allow them to expand due to compaction (Kenya)

For compaction, a wooden mallet, which weighs about 10 kg, is utilized. The compactor is hand-made by villagers and requires only locally available material such as wood and nails. At least ten strokes per “Do-nou” are required for compaction (Figure 11). The space still remaining after the compaction is filled with stones and soil; the next layer of “Do-nou” is then applied. In order to avoid the bags being torn due to exposure to sunlight and friction from the car tires passing, the top layer of “Do-nou” is covered with gravel to a thickness of 5 cm after compaction (Figure 12).



Figure 11. A villager is compacting “Do-nou” using a wooden mallet (Kenya)



Figure 12. Gravel is distributed over the final layer of “Do-nou” to build the layer of the road surface (Kenya)