Policy Brief

Evaluation of the cost-beneficial improvement of first mile access on small-scale farming and agricultural marketing

Key policy recommendations

- The research project on First Mile access demonstrated that there are discernible benefits to farmer's livelihoods by **extending all-season road networks closer to farms,** thus reducing the need for more expensive and slower modes of transport. For instance, a cost benefit analysis found the benefits of pineapple production in Tanzania to be 2.65 times the costs, which is very positive for a rural road. Governments should invest in **First Mile** roads as a pro-active way to support agriculture development for small-scale farmers across Sub-Saharan Africa.
- **Coordinated efforts of funding and investment** in these rural road networks has the potential to **reduce transport costs and increase farm incomes.** For the more remote farms surveyed in the research area in Tanzania, bringing collection points 0.5 km closer to the farm was calculated to reduce the burden of head and backloading by 35%, and reduce overall transport costs by 2.2%. An overall fall in transport charges of 1.7% combined with an elasticity of -2.5% would bring an estimated rise in net farm incomes of 4.25%.
- **Road infrastructure should be planned to enable appropriate means of transport** to allow farmers to access collection points in a cost effective way that minimises spoilage. Planners should take into account the needs of farmers and local communities at the planning stage of local infrastructure, so that produce can be transported efficiently.
- **Community participation in road maintenance and rehabilitation** should be supported by putting in place appropriate frameworks within which communities could work, and supporting technical training of local groups. Communities can play a significant role in local road provision and maintenance if they are engaged appropriately.
- **Local government should be encouraged to become involved in First Mile road rehabilitation and maintenance**, in participation with communities. Local government technicians should be more accessible to communities, to provide advice and facilitate training. This is aimed at maximising the efficiency of local road rehabilitation and maintenance, whilst maintaining a technical link with the appropriate authority.
- **Farmers' cooperatives and associations should be encouraged** and supported as a focal point for improving First Mile transport. Associations can act as pressure groups for improving road access, as well as negotiating prices for transport and produce. This is in addition to the general support they provide to farmers and communities.
- **Women should have more involvement in decision making and be encouraged to assume more important roles** in all aspects of farm life. Better access to credit and more funding options would also enable women to increase agricultural productivity and benefit from improved access as a result of First Mile interventions. Better engagement in community driven development would also benefit other disadvantaged groups, such as youths and physically impaired people.
- **Farmers would benefit from commercial advice** to show how they could add value at the farm, thus reducing transport costs as a proportion of their outlay. Processing at the farm can reduce transport costs and add value to a product. Governments could liaise with donors and the private sector to develop a support programme in this area.

Figure 1: Poor condition rural road in Kenya

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Brief Problem Summary

The issue of First Mile research has previously been explored by IFRTD in two pilot studies covering the transport and marketing of onions in Kenya in 2014, and tomatoes in Tanzania in 2015. The First Mile refers to the initial segment of transport from farm to the first market or a collection point.

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The First Mile project funded by UKAid and part of the Research for Community Access Partnership (ReCAP) has recently investigated this subject further and produced the basis for these policy recommendations. The project is concerned with the cost-beneficial improvement of First Mile access and the transport services associated with transferring harvest produce on the initial stages of movement from the farm to established road access.

First Mile roads are essential for farmers, but many are often poorly designed and constructed and as a result can be in poor condition, especially during the wet season, as seen in Figure 1.

This is arguably a largely under-researched area of work as far as the potential exploitable benefits of smallholder farming productivity is concerned, and the impact that improved access to rural markets can have for local small-scale economies in Kenya, Tanzania and across Sub-Saharan Africa (SSA). This research was designed to extend the evidence base for the benefits associated with access improvements to small-scale farmers, and the potential impact that those benefits have on food security and poverty reduction on a much wider scale.

The efficiency of rural transport is important for improving financial and time costs in the delivery of produce and for reducing post-harvest losses. Many crops lose value as they are transported over rough roads and suffer time delays in getting to the market. The pattern of transport varies between seasons with many roads becoming impassable, which results in slower transport and increased costs. There is growing recognition that rural infrastructure needs to be planned together with transport services to minimise transport costs, reduce crop wastage and gain the maximum advantage for farmers.

Agriculture is an important sector for enhancement of rural incomes, employment and poverty reduction in SSA where the rural economies remain strongly based on agriculture relative to other regions. According to the Food and Agriculture Organisation (FAO), agricultural growth involving smallholders, especially women, is most effective in generating employment for the poor and reducing extreme poverty and hunger.

Rural transport plays a central role in agricultural development. Poor rural transport systems increase the costs of marketing to and from farm areas, inhibit product flows, limit the spread of information, and increase risks to farmers. The rural road system, which is the most important for market development in terms of distribution of inputs and outputs to and from farms, is the most serious infrastructure bottleneck facing agricultural development and inhibiting growth in the smallholder value chain sector.

The key challenge for this project was to explore and better understand the transport dynamics along the First Mile. The pattern of transport may vary greatly between periods when the roads are dry or wet. During the wet season many tracks and roads become impassable to conventional motor vehicles creating additional problems, which result in extending the initial transport time and increasing costs. The aim of the project was to provide guidance on the cost-beneficial improvement of all-season access at a range of levels from policy makers down to villages and small farmers.

Summary of Project/Background

The First Mile research project conducted fieldwork in Tanzania and Kenya to explore transport service and engineering solutions for the provision of improved access to markets for small scale farmers.

In Kenya the study was conducted in Meru and Machakos where French beans are grown for export (Figure 2), and in Tanzania the study was carried out in Matola and Madeke where potatoes and pineapples are the main crops. Data was collected using semi-structured interviews with farmers, transporters, and focus groups.

At the two sites selected in Kenya and Tanzania farmers, local transporters and local infrastructure

Figure 2: Sorting French beans at the collection point

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specialists were consulted. The condition of farm access roads was also measured, so the effect of the road condition on the transport of produce and subsequent damage could be estimated.

The condition of local access roads was also assessed using various methods. Many of the study roads were in poor condition, with access possible only during the dry season. Some were so badly damaged that they were no longer motorable by four wheeled vehicles. This situation was found in Meru, Kenya where the roads were constructed on a steep hillside with little

engineering and poor drainage, and as a consequence had washed out (see Figure 3).

This research has added value to the body of evidence on First Mile access through investigation of a large sample of the small-scale farming population, taking account of the differences in transport costs and access

Figure 3: Washed out road in Meru

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constraints for well-connected and remote rural farmers located in the same market catchment, growing the same crops. It has also assessed the potential for low-cost engineering measures to be used in the primary transport segment as part of community driven development projects going forward.

The project recommendations have potential for unlocking growth in the smallholder value chain sector. The outcomes of this research have the potential to sensitise stakeholders to the importance of First Mile access to farmers, as well as to the economy. The implications on policy and resources that could be committed to improving First Mile roads have potentially significant implications for farmers, transporters and rural communities across Africa and Asia.

ReCAP commissioned TRL and IFRTD to carry out this research on the evaluation of First Mile access on small-scale farming and agricultural marketing.

Key findings and observations

Overall the different analyses suggest that initial transport costs and crop losses account for reductions of between 30% and 40% of net incomes of potatoes and pineapples in Tanzania, and 10% to 15% for French beans in Kenya. The opportunities to substantially reduce transport charges by changing modes (through better transport links and load consolidation) for short distance trips, may be more limited than previously thought. The most effective method of reducing transport costs would be by picking up farm produce at the farm and transporting directly to market, avoiding double handling at the collection point altogether. Figure 4 shows an example of a collection point. This finding adds weight to the argument that all-season motorable roads should be extended closer to farms, in order to cut down on the most expensive modes of transport, and maximise the use of trucks as the cheapest mode.

Figure 4: Loading produce at collection point

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From the interviews with local communities it was found that there is interest from local people and farmers to take on a more active role in the provision and preservation of rural roads, especially the First Mile roads that connect farms to collection points.

It is clear from the research that where the farmers have formed associations, they receive a better price for their crops and are more easily able to consolidate loads and negotiate cheaper transport. Although there are many other factors that influence this, it does seem that farmers' associations are significant in empowering farmers to have more influence over buyers and transporters.

In total, 35% of farmers interviewed in both countries were female. In three of the four locations, the areas farmed by men were significantly larger than those farmed by women, and for Machakos in Kenya the crop areas were the same. Yields per acre were lower for women in three locations, but for Madeke pineapple farming in Tanzania, women achieved 58% higher yields. Women's net incomes were found to be substantially less than for men, and women paid more for transport and were significantly less likely to own a means of transport, indicating that they are substantially disadvantaged.

For the cost benefit analysis the predicted changes in transport costs and a cautiously adjusted value of the elasticity were used to calculate changes in net incomes as a response to the proposed road improvements. An IRR of 47% and a discounted cost benefit ratio of 2.65 for the interventions were calculated, which indicates that improvement of First Mile roads to an all-season standard is economically feasible.

Most Relevant Evidence

Evidence was primarily collected through surveys and focus group discussions (see Figure 5). The reduction in net incomes as a result of initial transport allows a greater understanding of the dynamics surrounding transport and incomes and will inform policy makers and planners of the most effective infrastructure and transport services solutions for farm to collection point.

Figure 5: A focus group meeting in Kenya

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Although the gender findings are not particularly surprising, they do provide evidence as to the detailed areas where women, youths and vulnerable groups are disadvantaged. This data can be used to plan for more equitable and inclusive engagement of women in smallholder farming, as well as in local transport from the farm to collection point, and beyond.

The cost benefit analysis was undertaken in the organic pineapple producing area of Madeke. Analysis of the farm survey data suggested that 27% of farms in this area have to transport their produce by more than half a kilometre to a collection point. These farms suffer from much lower revenues and net incomes compared to the majority of the farms that are located less than 0.5 km to a collection point. The reason for the longer distances to collection points is due to poor access and road condition, where roads are not open all year round to traffic. In order to address this, a programme of road interventions has been suggested that would enable the collection points to be located closer to the farms.

The difference in transport cost by mode can be seen in Table 1, which demonstrates that trucks are the cheapest mode of mechanical transport, when considered per kg / km. Headloading and animal cart transport are even more expensive than motorcycles. This reinforces the potential savings by improving the First Mile to facilitate reliable truck access.

Table 1: Comparison of transport cost by mode

Transport Data	Potatoes	Pineapples		
	Truck	Truck	Pickup	M'cycle
Load, kg	10,512	3,505	813	103
Distance, km	582	195	108	32
Charge, US$	518	177	67	10
US$ cents/kg	4.9	5.1	8.2	9.5
US$ cents/kg-km	0.009	0.026	0.076	0.300

The analysis undertaken was only conducted in one area, and as such is not representative of the whole of Kenya and Tanzania. However, in this instance it provided positive results for the improvement of farm roads in the pineapple growing area of Madeke, and suggests that there is value in planning roads that enable vehicles to access farms more easily and reduce the 'First Mile' distance, at a lower cost to the farmer.

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