Partnership on Sustainable Low Carbon Transport

Rural Transport and Agriculture Fact Sheet


Photo by: Subir Ghosh


Photo by: IFAD


Photo by: SSTAP

Importance of Rural Transport for Agriculture and Rural Development

Increased agricultural production is critically important to achieving the Sustainable Development Goals (SDGs), particularly for ending poverty (SDG1), achieving food security (SDG2) and ensuring healthy lives (SDG3). Global food production must increase 60% from 2005-2007 levels by 2050 to meet projected demand. Roughly 2.5 billion people derive their livelihoods from agriculture, and in many developing countries the agricultural sector accounts for over 30% of gross domestic product (GDP).[1]

An efficient rural transport system is crucial to developing agriculture and reducing rural poverty. Reducing rural transport costs can raise farm-gate prices, increase farmers' incomes and help reduce the price of food in urban areas. It can also facilitate timely distribution of farm inputs (e.g. fertiliser, insecticide), increase agricultural yields and extend cultivated areas, and reduce post-harvest losses. Yet at present, rural transport systems in most developing countries, particularly in Africa, are still far from optimal.


Photo by: World Bank

Fast Facts on Rural Transport and Agriculture

- 90% of Africa's food production is by smallholders, who mostly have limited access to transport infrastructure.
- Increasing road quality has increased the use of fertiliser and other agricultural inputs by around 30%, and has increased agricultural production by 27% in Ethiopia.[2,3]
- In India, fruit and vegetable post-harvest losses amount to 40% of total production due in part to a lack of reliable rural transport options.[4]

Strategies for Improving Rural Transport and Agriculture

- Tackle 'first-mile' constraints of moving agricultural produce from the farm
- Reduce loss in value of agricultural produce during transport
- Address inefficiencies and monopolistic practises of rural transport operators
- Improve efficiency of overall post-harvest storage and marketing operations
- Improve load consolidation practises to reduce costs and increase bargaining power for farmers
- Develop modern agricultural supply chains, particularly for high-value export crops and to meet demand of proliferating supermarkets
- Increase resilience to climate impacts, including through rural road improvements
- Establish farmer's associations or cooperatives to lower the price of transport by arranging and purchasing farm inputs (such as fertiliser) in bulk


Photo by: Paul Starkey

Low Volume Rural Roads (LVRR)

Most rural communities depend on agriculture (e.g. crops, livestock, fisheries, forestry) for income generation; thus, improving agricultural production can provide economic justification for constructing and maintaining low-volume rural roads (LVRRs). A study in Madagascar suggested that a new rural road can increase incomes of the remotest households by about 50%. A study in Peru showed that although rehabilitating LVRRs was associated with greater incomes, rural residents tended to invest extra income in livestock, likely due to the assumption that the roads would again fall into dis-repair.[13]

Food Loss during Transport

During the wet season, many unpaved roads become impassable, creating delays as vehicles get bogged down or have to take circuitous routes. In hot weather, such delays can have adverse effects on the quality of produce, as commodities such as vegetables, fish, tea and milk can deteriorate easily once collected, and can suffer serious losses if delayed in getting to the market or processing facility.

Many fruit crops (e.g. mangoes, tomatoes) can also be damaged by bruising when travelling on rough roads. Where possible, special vehicles and packaging may be employed to minimise effects of poor roads, though this can be more expensive. Poor roads and low transport reliability also make it difficult to market fresh livestock products, and the humane transport of live animals is problematic.

'First-Mile' Agriculture Transport Issues

The initial 'first-mile' stages of crop movement, from farm collection to secondary roads, are the most expensive and pose the greatest obstacles to the development of agriculture in rural areas. The costs of first-mile transport may account for over a fifth of total transport costs in the transport chain. First-mile movements usually involve transporting crops by humans (e.g. headload or backload) or IMTs (e.g. non-motorised or animal transport), before being transferred to multi-purpose light goods vehicles. Many crops lose value through handling and transport over rough paths and tracks. For most farmers with limited harvests, load consolidation at markets, buying posts or truck stops is crucial to achieve economies of scale through lower transport costs.

A study in Nyeri County, Kenya found that the costs of transporting onions over the first two kilometres accounts for around 10% to 20% of the net income that farmers would derive from sale and production. Due to difficulties of using trucks on low-quality tracks close to farms, produce had to be transported by humans, motorcycles, and animal carts. The study found that these forms of transport cost 16 to 30 times more on a per tonne-km basis than truck transport.[5]

Photo by: USAID

Intermediate Means of Transport (IMTs)

Intermediate means of transport (IMTs) are small motorised or non-motorised transport modes that fill the gap between human walking and carrying and large-scale transport. IMTs include bicycles, motorcycles, pack animals and carts. IMTs provide a useful form of transport for agricultural products when load volumes are small and access pathways are poor. However, IMT costs per tonne-km tend to be significantly higher than by motor vehicle.

Africa has traditionally had much lower access to IMTs than Asia, although this difference is becoming less pronouncing as more IMTs are introduced through the market. Over the last 20 years, governments and donors have tried to introduce IMTs to Africa through various demonstration and credit schemes, though not all have been successful. Nevertheless, during this time period there has been a large increase in motorcycles in Africa and Asia.

Photo by: Paul Starkey

Reducing Costs of Rural Transport and Agriculture

Well functioning agricultural markets are essential for rural growth and poverty reduction. Most rural households are connected with markets, as sellers of produce and/or buyers of food, and access to reliable produce markets enables farming households to commercialise their production systems and increase their farm incomes.[6]

Smallholder food production is undermined by high transaction costs, low market power and limited access to finance services and infrastructure.[7] Multiple transactions between different wholesalers and retailers can increase the price difference between farmer and retailer with little real value added, as shown in the following illustration of the Ghanaian maize market.
One way of increasing incomes is to engage in direct contract-farming with supermarkets or food processing factories. Selling directly to these organisations cuts out intermediaries and gives farmers greater certainty over returns, and can also help to reduce transport costs and help increase farm gate prices. Additional services such as cleaning, processing and packaging can also increase value of agricultural products.

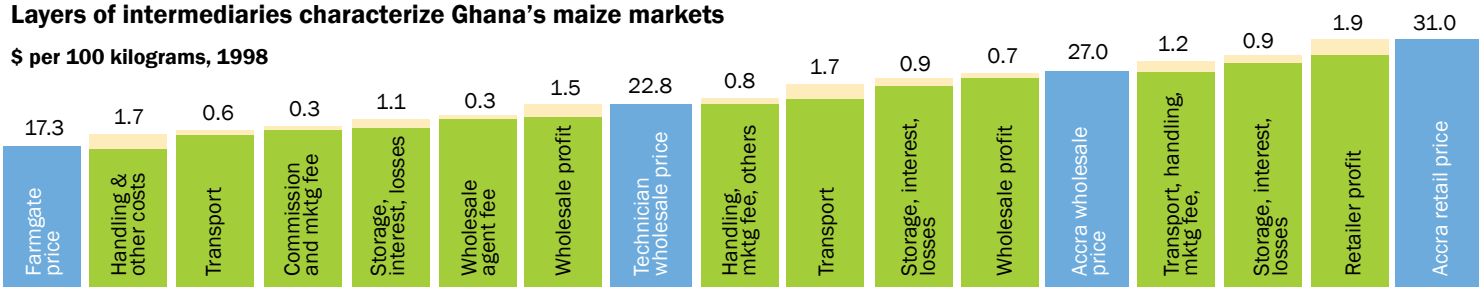
In most developing countries, demand for agricultural products is increasing rapidly, driven largely by increasing incomes of urban consumers. The rapid emergence of supermarkets has spurred the establishment of modern value chains, particularly for high-value food products. Restructured markets can offer new opportunities for smallholders, but also pose higher entry costs and risks of marginalisation.[8]

Transport and Marketing Associations and Cartels

Cartels limit competition by controlling the production and distribution agricultural products, thus creating a gap between costs and prices. Operators in cartel-dominated markets are able to achieve high profits despite low utilisation of their vehicle fleets, though operators find it hard to break into these markets. In East Africa, where the trucking environment is competitive, cartels have a limited presence, and major corridors in Southern Africa are even more efficient, mainly due to a deregulated transport market.[12]

Layers of intermediaries characterize Ghana's maize markets

$ per 100 kilograms, 1998



Reference: World Bank World Development Report 2008, Agriculture for Development

Case Study: High-Value Food Crops in Thailand

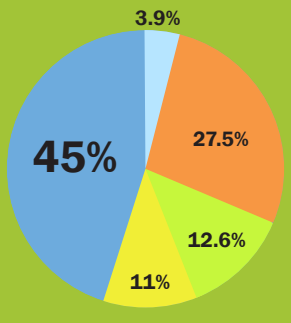
Swift Co., Ltd. is a Thai company and one of Southeast Asia's leading exporters of quality vegetables and fruits, such as mangosteen, galangal, and lemon grass. The company exports more than 200 tons of fresh produce each month to global retail markets.

Swift's contract-farming model provides a guaranteed market for growers and cuts out inefficient logistics and profit-taking along a multi-tiered production chain. Collection stations are set up near every growing area to cut transport costs and minimise damage to produce, and daily harvests are combined into lots for delivery to packing houses via temperature-controlled trucks.[6]

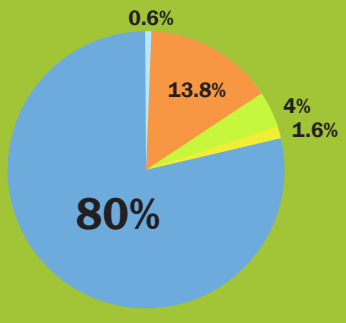
Agricultural Transport Costs in Africa and Asia

Several major comparative studies indicate that freight transport tariffs have been up to six times higher in Africa than in Asia, for comparable journeys. Although many of these studies relate to long-distance travel, the same patterns of inefficiency were also found for short-distance rural transport movements.[9] Earlier studies emphasised high input costs and low utilisation in Africa, and a recent study emphasises high transport profits in Africa due to cartels, operator associations and freight queuing systems.[10,11]

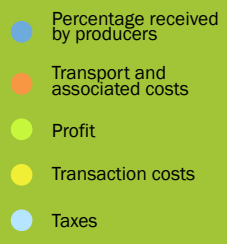
High transport costs and inefficient marketing directly influence farmer and retail prices. A comparative study found that average food grain producer prices as a percentage of final market prices ranged from 75 to 90% in Asia, and only from 30 to 60% in Africa. Transport costs accounted for 27.5% of average market prices in Kenya and Malawi compared with 13.8% in Bangladesh and Indonesia.[12]



Components of Final Market Price, Kenya/ Malawi



Components of Final Market Price, Bangladesh/ Indonesia



Minimize Climatic Impacts to Rural Transport and Agriculture

Agricultural production is highly sensitive to variations in weather and climatic events, and the need to ensure basic vehicle access throughout the year is essential. Building climate resilience into road designs involves balancing performance, cost, and volume.

There is a wide variety of rural road designs including seasonal tracks, earth or gravel roads, and bituminous-surfaced roads. Ensuring 'basic motor vehicle access' throughout the year usually involves an earth road with water crossing structures (e.g. culverts, simple bridges). Since gravel is increasingly scarce in many parts of the world, engineers have developed solutions to improve the performance of earth roads and bituminous-surfaced roads using low-cost paved road designs suitable for lower traffic volumes.

Countries such as Nepal that are subject to frequent landslides now pre-position road construction equipment before the monsoon season to more quickly resolve disruptions to the road network.

Photo by:Adam and Lora Wilard

Mixed Passenger-Freight Rural Transport Services

People travelling on rural transport services often need to carry bulky freight, including farmers carrying produce to market. While such loads may be large for passenger vehicles, it is often unrealistic to consolidate such loads into freight vehicles. As a result, 'mixed' rural transport services commingle passengers and freight in light trucks, minibuses or buses. Many authorities have tried to discourage mixed transport services; however, these services are extremely important for smallholders who lack access to the freight vehicles used by more affluent producers with more substantial loads.

Photo by: Rosemary Sheel

ICTs in Agricultural Value Chains

Information and communication technologies (ICTs) have the potential to improve efficiency by reducing the cost of doing business along the agricultural value chain. ICTs can also facilitate vertical integration by small-scale farmers and entrepreneurs in value chains. Additionally, ICTs offer employment opportunities in the agricultural sector that are both in demand and attractive to young people, such as mobile money transfer.

In Kirinyaga District, Kenya, farmers who do not have their own transport means use mobile phones to contact ox cart owners, who provide transport services and are able to coordinate services by alerting farmers on pick-up times. Thus, farmers are able to pool produce and utilise available space in the carts, thereby reducing overall costs.

Further reading

- *Hine, J. (2014) Good Policies and Practices on Rural Transport in Africa: Planning Infrastructure & Services, Working Paper No. 100, SSATP, World Bank, Washington DC*
- *IFAD Rural Poverty Report (2011). New realities, new challenges: new opportunities for tomorrow's generation. IFAD Rome*
- *KENDAT, IFRTD, TCP International GmBH. (2013). A Planning Framework for Improving the Efficiency of Transport Services in the High Value Agricultural Sub-sector, Replicable in Other Values Chains. Project AFCAP/GEN/060.*
- *Sieber, N. (2009) Freight Transport for Development Toolkit: Rural Freight. Leapfrogging from Rural Hubs to New Markets, Transport Research Support, World Bank, Washington DC*
- *World Bank, World Development Report (2008), Agriculture for Development, Washington. DC.*

This fact sheet was developed by:

ReCAP Research for Community Access Partnership
Safe and sustainable transport for rural communities

UKaid from the British people

Research for Community Access Partnership (ReCAP)
ReCAP is a research programme, funded by UK Aid, with the aim of promoting safe and sustainable transport for rural communities in Africa and Asia. ReCAP comprises the Africa Community Access Partnership (AfCAP) and the Asia Community Access Partnership (AsCAP). These partnerships support knowledge sharing between participating countries in order to enhance the uptake of low cost, proven solutions for rural access that maximise the use of local resources.

Partnership on Sustainable Low Carbon Transport

The Partnership on Sustainable, Low Carbon Transport promotes, through a multi-stakeholder membership, the integration of sustainable, low carbon transport in global policies on sustainable development and climate change

[1] FAO Statistical Yearbook, 2013, Rome.
[2] Dercon, S. and J. Hoddinott (2005), Livelihoods, Growth, and Links to Market Towns in15 Ethiopian Villages, FCND Discussion Paper 194, International Food Policy Research Institute, Washington DC.
[3] Wondemu, K.A., (2010), "Road Infrastructure and Rural Poverty in Ethiopia", Thesis, Development and Economic Studies Department, University of Bedford and Ahmed, R., and M. Hossain., ibid.
[4] World Bank, World Development Report, 2008, Agriculture for Development.
[5] Njenga, Wahome, Hine, (2014) Pilot Study on First Mile Transport Challenges in the Onion Smallholder Sector. IFRTD Report African Community Access Programme, AFCAP/GEN/1.
[6] IFAD Rural Poverty Report 2011. New realities, new challenges: new opportunities for tomorrow's generation. IFAD Rome.
[7] David Neven. Developing Sustainable Food Value Chains: Guiding Principles. FAO 2014.
[8] IFAD Rural Poverty Report 2011.
[9] Ellis, S. and J. Hine, 1998, The Provision of Rural Transport Services. Sub Saharan African Transport Policy Program. SSATP Working Paper No. 37, World Bank, Washington DC.
[10] Rizet, C., and J. Hine, 1993. "A Comparison of the Costs and Productivity of Road Freight Transport in Africa and Pakistan." Transport Reviews 13 (2): 151-65.
[11] Teravaninthorn, S. and G. Raballand, 2009. Transport Prices and Costs in Africa: A Review of the international Corridors. The World Bank, Washington DC.
[12] Ahmed, R. and N. Rustagi, 1987. "Marketing and Price Incentives in African and Asian Countries: A Comparison." in Agricultural Marketing Strategy and Pricing Policy, edited by D. Eltz. World Bank, Washington, DC.
[13] Starkey, P. and J. Hine. 2014. "Poverty and sustainable transport: How transport affects poor people with policy implications for poverty reduction." UN-Habitat/ODI/SLoCaT.