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1. Introduction

The Rural Accessibility and Mobility Pilot Activity (RAMPA) is part of the Malawi Rural Transport & Travel Project, funded through the World Bank loan to the Government under the Ministry of Local Government. I.T. Transport of UK and the local consultant, Chapita provides consulting services to manage the assignment.

… The paper than briefly touches on the other components of the project namely development of Community Contractors for road improvements and promotion of IMTs.

[In March 2003 the MRTTP released its **GENDER AND RURAL TRANSPORT INITIATIVE (GRTI) – PHASE TWO Final Report on Promotion, Ownership and Use of Intermediate Means of Transport (IMTs) Among Rural Women and Men**. The report was an assessment of the utility of two IMTs. The first of which was the bicycle, with its long history of use in Malawi, virtually all of such use away from the farmstead. Bicycles are unsuited to the carriage of bulk materials such as water, firewood, or harvested crops, and therefore have little use on the farmstead. Handcarts are designed to carry heavy and bulky materials, and are ideal for use on and around the farmstead, as well as for carrying heavy loads for distances of several kilometers. Bicycles and handcarts complement one another, and a lightweight handcart of the AfriCart variety can easily be towed behind a bicycle as a trailer.

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"The other component of the [GRTI] project was distribution of IMTs. The type of IMTs which were proposed for the project were a bicycle and a Malawi Hand Cart [AfriCart]. A bicycle is the most common IMT in Malawi but it was proposed in the project so that its use among women could be studied in different areas and also the ownership and management trend among the rural communities. A Malawi Handcart is a new cart which was designed by Dr. Arnold Wendroff of United States of America who had worked in rural areas of Malawi for more than 20 years. This cart was proposed so that it could be promoted in the rural areas due to its robust in carrying capacity of a maximum capacity of 100kg and also due to its diversity in use. This was aimed at relieving the head and shoulder loading common among rural communities and also as an alternative to a bicycle which is subjected to heavy loading beyond its capacity. These [16 AfriCarts] IMTs were purchased in September 2001 and they were distributed in June 2002 to the focus groups of the areas where the baseline study was done." [The Malawi Cart / AfriCart design "was proposed," because it can be built locally by carpenters using hand tools and relatively inexpensive and readily available wood, bicycle wheels, bicycle bolts, common nails and wood screws.]

"The other main achievement of the project is that it managed to bring awareness to the people in the areas to be innovative in rural travel and transport to facilitate their mobility for example by adapting a wooden frame Malawi Handcart for carrying goods. This was also coupled with the gender and rural transport awareness in the rural communities.

In general terms this project was a success and it would act as a stepping-stone for the future interventions in the rural travel and transport issues."

"The bicycle was the most liked means of transport due to its versatility in use. The handcart was mainly used for heavy carriage e.g. manure, garden produce and going to the grinding mill. One lady in Dedza indicated that he had used the cart to transport farm manure to her garden. She had carried a total of 27 trips to the garden which is about 500m away." [The handcart excels at carrying bulky loads, which can be accommodated in its capacious box body, but which would require tedious packaging in order to be carried on a bicycle.]

"In the same area, another handcart was hired by a school to carry two cartons of school books from a distance of 6km. Another group was using the handcart for carrying horticulture produce and manure as well. One lady indicated that he had used it to carry 30 – 50 heads of cabbage from 3 km distance garden to a market.

Bicycles were generally used to transport goods which are not very heavy (on average not more than 40kg) to long distances. Some ladies in all the areas of the project indicated that they had used the bicycles for long distances, 20 – 30 km to buy or sell their goods. It was observed that the bicycle was generally durable and strong." [Once again, it is the ability to carry bulky and not merely weighty loads that makes handcarts preferable to bicycles in many rural transport applications.]

"In one group, the bicycle gave them more problems due to punctures. The reason given when asked why they did not have any problems with the handcart was that they were loading the handcart within the loading limit of 100kgs." [The bicycle wheels on a Malawi Cart are quite durable if they are not over-loaded. Their heavy duty bicycle rear wheels utilizing 40 12 gauge (as opposed to 14 gauge) spokes. In Tanzania, many handcarts using these components are in use, carrying loads in excess of 200 kilograms.]

"The introduction of the Malawi Handcart has also relieved the burden of head and shoulder loading and it has been taken as an alternative to the bicycle for heavy carriage for both business and domestic use."

"And generally, the project has also managed to bring awareness to the people in the areas to be innovative in rural travel and transport to facilitate their mobility by adapting a wooden frame Malawi Handcart for carrying goods."

"The Unit would like to carry out the following activities as a follow up of the current project: …
e. Train local artisans/suppliers on the manufacturing of common IMTs e.g. Malawi Handcarts."

CONCLUSION

"Though there were some constraints in the implementation of the project, the project was a success for it had achieved its objectives.

A baseline study was done which highlighted information of rural travel and transport situation in rural areas in Malawi. This information would be used for formulating interventions in rural travel and transport issues.

The project also managed to bring awareness to the people in the areas to be innovative in rural travel and transport to facilitate their mobility for example by adapting a wooden frame Malawi Handcart for carrying goods. This was also coupled with the gender and rural transport awareness in the rural communities.

In general terms this project was a success and it would act as a stepping-stone for the future interventions in the rural travel and transport issues."

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[Although the MRTTP found the AfriCart bicycle wheel wood frame handcarts to be useful, there seems to be no attempt to further assess and disseminate this or any other form of handcart technology. The current RAMPA report essentially ignores handcarts beyond stating that a total of 21 handcarts, (type of construction

unspecified) were found in Ntchisi District. One wonders to what purpose was the time and money expended on the GRTI – Phase Two assessment of handcarts expended?]

page 2 of Seminar paper

2. Summary Profile of Ntchisi District

No. of Villages 1,600

Total Population 212,073

Agriculture forms around 80% of the district economy …

[The overwhelming majority of agriculture in Malawi and in Ntchisi District is performed with manual labour, using a hoe to till and weed the soil. With per capita incomes in the order of $160 per year, and with tiny smallholdings of less than one hectare, there is no affordable mechanised agricultural equipment that has had or is likely to have significant uptake potential. However, one way to save labour is in the transport sector. Headloading of water, fuelwood, farm inputs etc. is not only time consuming, but also calorie intensive. If farmers could have more time and energy to till their fields, they would be more productive. Furthermore, if they intend to sell their crop surplus, they can not do it effectively if they have no wheeled transport to take their crop to market, or at least to the nearest road. The only viable IMT for this purpose is the handcart. It is not the bicycle due to its minimal volumetric capacity, nor is it the wheelbarrow, due to its ergonomic inefficiency (as well as its limited volumetric capacity). Draught animal carts are far too expensive for the vast majority of farm families. What other IMT is there for the majority of farm families in Ntchisi District?]

… According to **"*Profile of Poverty in Malawi, 1998*"** the poverty rate in the district was 76.3%.

[With this percentage of persons below the poverty line, how can we expect any substantive uptake of ox- and donkey carts that cost some $500 without any draught animals? What segment of the population is expected to have their own wheeled transport, if animal carts are the sole IMT being introduced? What effort has been made, or is intended to be made, to assess and introduce handcarts to this area?]

3. Development of District Development Plan Using IRAP

3.1 Establishment of Databank

Page 3 of Seminar paper

… Information collected covered:

Section	Information
Part C: Transport Infrastructure	Distances per village to nearest motorable road and nearest public transport stage; type of infrastructure connecting to motorable road; and most important tracks used by village within VDC.

[The presence of a motorable road even as close as 2km away, as targeted by the World Bank, still leaves poor farm families with the need to carry farm inputs from road to farmstead, and farm produce to the road. The 212,073 folks in Ntchisi currently have a total of 2,516 wheeled IMTs at their disposal. This is a ratio of one IMT per 84 persons. This is clearly inadequate to the transport need. What IMTs besides ox- and donkey carts does RAMPA plan to assess, introduce and disseminate which will result in an uptake greater than those IMTs currently available?]

Part D: Means of Transport	For each village, number of non-motorised means of transport per household such as oxen, donkey carts, hand-cart, wheelbarrow, bicycle, bicycle ambulance; and number of motorised means per household.

[No mention was made of the type of the 21 handcarts owned and where and how they were used. Most handcarts I am familiar with in Malawi are of the heavy variety, unsuitable for use by women or children. The AfriCart handcart, and most commercial handcarts are made so that a single average person, including women and children, can easily move 100 kg on level terrain with no lifting required. The authors wrote that "The wheelbarrow is mostly used for construction purposes." This is because the operator of a typical wheelbarrow found in Malawi has to lift half (50%) of the load (including half the weight of the wheelbarrow) as well as having to balance the wheelbarrow and load laterally. So, with a load of 100kg, the operator must lift and balance a weight of 50kg. This is not sustainable over any distance, and so the wheelbarrow's use is confined to short distance constructions sites. The cost of a wheelbarrow is about the same as that of a bicycle, yet its uptake in Ntchisi district is only some 5% of bicycle ownership. Wheelbarrows are purchased ready-made in shops, as are bicycles and in many cases ox-carts. To the best of my knowledge, there are no handcarts for sale in Malawi 'off-the-shelf,' and the sole handcart design in Malawi with any widespread uptake is the AfriCart.]

Part G: Water Supply — Water sources for VDCs by village; type (protected, unprotected wells &springs, rivers, dams, boreholes, gravity schemes, piped by pump); and condition (bad taste, smell, not working, pumps little, periodic); number of households using source, travel time to source; queuing time; means of transport used; who is responsible; and frequency.

[To what extent will the projected provision of donkey-carts assist farm families in Ntchisi District to transport their daily supply of water from source to homestead? What percentage of farm families are projected to purchase donkey- or ox-carts? Women and children are the main transporters of water from source to farmstead. The time and energy they expend on carrying water by headloading from watersource to farmstead is frequently time more profitably spent on gardening activities. By assisting these women to carry more water with less effort and less expenditure of time, one can only enhance their agricultural productivity, and their quality of life. Handcarts are the only IMT realistically capable of accomplishing this objective.]

Part J: Farm Inputs — Farm inputs used by village detailing: type; source; accessibility (RTI, degree, problems); distances; means of transport.

[Fertiliser is purchased in town or at a depot and must be transported from roadhead to farmstead. In most cases this is by headloading. Local origin organic soil additives, such as compost and manure must be transported from source area to the farm plot/s. This is also currently done by headloading. How can the average farm family be provided with their own wheeled transport so that they can save their limited labour for agriculturally productive activities? What type of IMT with a realistic uptake potential is most suitable for this application?]

Part K: Crop Production & Marketing — Main crops & livestock per village detailing: type; average distance to farm; amount used/ sold; accessibility to type of market; distance; number of households using means of transport.

[Small farmers, when they have a surplus, are faced with the daunting task of transporting their crop to market. Headloading over any appreciable distance is an enormous constraint on the amount of crop that can be marketed, yet most farmers have no alternative transport, at least for part of the farm to market trip.

According to the Malawi Demographic and Health Survey 2000 published in August 2001, the mean household size was 4.5 in urban areas and 4.4 in rural areas (Table 2.2 Household composition, page 11). Thus in essentially rural Ntchisi District, there are some 48,000 families, with only one IMT per 19 families. There is no way for most of these families to afford an animal cart for their own transport needs. There is much more of a possibility that many of these poor farm families could afford and put to good use a handcart. Possession of a handcart would enormously enhance farmers ability to market their crops.]

Part L: Maize Grinding — Grinding mills used by village detailing: type; condition; accessibility; who goes; distance; price per kg; number of households using means of transport.

[Women and children are the principal transporters of grain to the grinding mill. As mentioned above, this work competes for time and effort 'better' expended on agriculturally productive activities. What IMT solution is the RAMPA project proposing to assist these women and children with their water-carrying needs?]

Part N: Social And Economic Services	Types of socio-economic services available to each village detailing: type & location; accessibility (degree, problems); distance; number of households using means of transport; employment opportunities available by village detailing: type: farming, fishing, trading, etc.; number of people participating gender streamlined; average distance; number of people using transport means.

[Most households in Ntchisi have no transport other than headloading. Neither do they currently have a realistic ability to purchase appropriate wheeled transport. Handcarts are the only type of IMT that meets the weight and volume haulage requirements of subsistence and smallholder farmers, and is in the price range they could afford (perhaps with assistance from low-interest microfinance loans). Ox- and donkey-carts are most definitely not affordable to this sector.]

page 7 of Seminar paper

Chart 5: Farm Input Travel Time

Farm Inputs Average Travel Time by ADC

page 11 of Seminar paper

TRANSPORT

> … Charts 12 to 14 below show that the time householders take to reach transport services can be nearly two hours in Chikoko area.

[Based on the data presented in Chart 14, the average time to walk to the nearest road is 69 minutes, with a 'range' of from 27 minutes to 116 minutes. It should be apparent that to carry even 25kg for 27 minutes is a considerable burden. Some form of wheeled transport must be made available to all farm families living in terrain amendable to its use. Handcarts are the most affordable and appropriate IMT for these applications.]

page 12 of Seminar paper

Charts 12 to 14 Transport Service Accessibility

The World Bank is promoting the target of all to within 2km of an all weather road. The GIS has been queried to identify villages that are more than 2km from a classified road. These villages are shown [as] red dots in map 10 opposite. Unfortunately, not all classified roads are all weather in Malawi, but that should also be a long term target and the power of GIS is illustrated.

[Assuming the World Bank's target is met, how will substantial loads be transported the 2km to the nearest road? Is the World Bank satisfied to allow those living a 'mere 2km' from the nearest road to carry their marketable produce on their heads over that 2km? Have the World Bank consultants given any thought to providing some IMT to populations 2km from the nearest road to enable them to carry their goods to and from the road? If so, perhaps they could share those thoughts with the readers of this report?]

page 13 of Seminar paper

WATER

The GIS has also been queried to identify villages that are more than 300m from a borehole, well, river or spring. These are shown as red dots in Map 11 and clearly a water project starting up in the district should pay attention to these red villages, such as those circled below.

Map 11: Villages Coloured Red that are More Than 300m from Water Supply

[It will be a long time before all villages in Ntchisi will be within 300m of a water source. Even at a 300m distance the women and children who carry water will find it difficult to carry an adequate supply for domestic use, let alone for small-scale irrigation of a small home vegetable plot. 20 liters of water weighs 20kg. This is a lot of weight to carry on your head for 300m, and is frequently inadequate for a family's daily needs, so several trips have to be made during the course of the day. This is time and energy taken from agricultural tasks. Women debilitated by malaria, TB and HIV/AIDS, or who are caregivers to family members impacted by these and other diseases common in Ntchisi District, find it even more difficult to obtain adequate amounts of water. Yet if they possessed a small handcart, the carriage of 100 liters of water at one trip and with no lifting becomes possible. The only widely affordable IMT capable of carrying such a bulky and heavy load is a handcart.]

page 15 of Seminar paper

4. Improvement in Mobility

The RAMPA project also looked at how to improve rural mobility within the District. This focused on providing Intermediate Modes of Transport (IMT). The IRAP survey indicated that walking and head-loading is the most dominant form of transport, and hence IMTs could ease this burden.

The survey data given in the table below indicates that the district has IMTs in the form of bicycles, oxen, donkeys, oxcarts, and wheelbarrows, bicycle trailers and ambulances. The predominant IMT is the bicycle. The bicycle and oxcarts are mostly operational in flat and rolling terrains of Kalumo, Malenga, and part of Chiloko and there [they] are markedly less operational in the hilly and mountainous terrains of Nthondo, Chikho, Vuso Jere, and Kasakula. The wheelbarrow is mostly used for construction purposes.

With regard to gender access to the available Intermediate Means of Transport, the databank reveals that women own less of the IMTs and have limited access to the available means of transport. Yet, they share the greatest burden of domestic activities and assist males in field activities in addition to domestic chores. The male farm work is usually four months of the year (November – February). The women take over harvest jobs and other post harvest chores. The most common mode of travel and transport is walking and head-loading. As such, women bear the greatest burden of rural travel and transport burden in the district.

Table 2: Ownership of IMTs in Ntchisi District

	Oxen	Donkey	Animal Cart	Handcart	W/barrow	Bicycle	Bicycle Trailer
Total MHH	**148**	**17**	**232**	**20**	**74**	**2,116**	**15**
Total FHH	3	1	9	1	9	38	2

page 17

Under the project, four artisans have had two weeks training at Rumphi Polytechnic in making axles and wheels for animal carts. Thirty axles and wheels have been made and after delivery the artisans built the carts. Also, 32 donkeys have been purchased in Mozambique and are under

quarantine until blood sample results come back from South Africa. Delivery will take place as soon as the import license requirements for Government of Malawi are met. Regarding credit, a memorandum of Understanding has been signed between Malawi Rural Finance Company and Malawi Rural Travel & Transport Project/Ntchisi District Assembly for the administration of the credit. Groups have already been identified from the 7 ADCs; and will be handed over to MRFC for screening for the loans.

[Why was there no attempt to train artisans to build affordable AfriCart handcarts? Artisans could have been trained in Mzuzu by Hastings Mkandawire of the Malawi Handcart Project at minimal expense, or at Chitedze Agricultural Research Station by Chika Mughogho of the Malawi Handcart Project and Patrick Chisi and Joto Kasambala, Station carpenters? If the AfriCart handcart design was not deemed worth pursuing, why were other stronger handcart wheel-axle sets not obtained for assessment? We have recently ordered 12 sets of these purpose-built wheel-axle sets from SinoLink in Limbe. Details on request.

Using the data presented in Table 2: Ownership of IMTs in Ntchisi District, we obtain the following ratios of IMTs and draught animals per person:

Ratios of IMTs and Draught Animals per Person in Ntchisi District

Oxen	1: 1,404
Donkey	1:11,781
Animal Cart	1: 879
Handcart	1:10,098
Wheelbarrow	1: 2,555
Bicycle	1: 98
Bicycle Trailer	1:12,474

Note that although there are a total of 241 animal carts in the district, there are only 169 oxen and donkeys to pull them. Since many if not most ox-carts are designed to be pulled by two oxen, it is evident that the true number of available animal carts is far less than the numbers cited in Table 2. Even if all the animal carts were in use with donkeys and oxen to pull them, there is only one animal cart per 879 persons. What is the reason for the excess of animal carts over animals to pull them? The answer to this question might shed some light on the failure of animal carts to have had significant uptake.

Why are there so few animal carts in Ntchisi District? In fact, there are few animal carts in most other districts throughout Malawi. The main reason is that people are too poor to afford an animal cart. Their current cost is in the vicinity of $500 and the cost of an ox is some $200. As most ox carts use two oxen, the cost of the cart and animals is some $900. With per capita income of some $160 per year, it is hardly likely that animal carts could have significant uptake, and as history and statistics demonstrate, they have not. Only a very few animal cart owners could hope to amortize their investment in an ox- or donkey cart, or could repay the loan needed to finance its purchase.

With most farmsteads well under one hectare in area, few farm families can make efficient use of the carrying capacity of an ox- or even a donkey-cart. In addition, adequate fodder and water required by these draught animals is not available in many areas.]

5. Improvement in Access

Another element of the programme looked at improving accessibility. Training of Small Scale Community Contractors was completed with the construction of 1 km of earth roads labour-based standard in the 7 ADCs …

A total of 37 km were maintained under the trial contracts and all were completed with minimum supervision. This exercise demonstrated that labour based road maintenance can be managed at district level rather than through central programmes.

[The construction and maintenance of earth roads can be greatly facilitated by the use of handcarts for carrying fill from spoil pit to road. While wheelbarrows are suitable for short distances, they are ill suited for the longer

distances frequently encountered under Malawian conditions where no dump trucks are available to deliver fill to the work site. Unlike wheelbarrows, handcarts require no lifting, and are therefore suitable for longer hauls and heavier loads than wheelbarrows. Since there were only 83 wheelbarrows in all of Ntchisi District, or 1 wheelbarrow per 2,555 inhabitants, one wonders how the fill for the 7km of earth roads built, and the 37 km of earth roads maintained was carried? Was it by headloading, or did the road workers have a monopoly on the District's wheelbarrows?]

6. Conclusions

> The cost of the RAMPA project was $700,000 including consultancy, IRAP and GIS surveys, collection of secondary data, preparation of Socio-Economic Profile and District Development Plan, contractor training/trial contracts and IMT promotion. However, this was a pilot and it is estimated that a rollout to the remaining 25 districts in the country would cost around $250,000 per district. This information is valid for at least 5 years and hence around $50,000 per year [per district] would be spent on planning.

[One wonders what would be the result of putting at least some of the money spent on this and similar projected surveys towards the introduction of IMTs that have a reasonable likelihood of uptake, train local artisans to build them, encourage the importation and distribution of their basic mechanical components, and establish microfinance programmes to enable the poor to purchase them?

How can a serious case be made for the promotion of donkey- and ox-carts in this poverty-stricken area? Who are the potential buyers of these enormously expensive IMTs? What fraction of the population of Ntchisi District is expected to be directly assisted by this exercise in training artisans to build ox-carts? Why was there no attempt to assess the utility of handcarts, especially in light of the earlier MRTTP GRTI study cited and excerpted above?]

> Malawi receives around $500 million per year in development aid (OECD statistics). If half of it goes to district development then each district would receive around $10m/year each. This means that around 0.5% of aid would be spent on an efficient planning system and consequently it is recommended that this pilot now be rolled out country wide.

[Having first lived in Malawi for two years in 1967 and 1968, and having returned an additional 19 times since then, I am familiar with the large sums of money expended on 'development.' In 1967 there were some 4 million Malawians and their standard of living was little different than that of today's >12 million Malawians. However the life expectancy at birth in 1967 was in the mid 40's and today it is in the mid 30's. The per capita income is currently ~ $160 in 2006 dollars. Many development plans have been touted since my first experience as a secondary school teacher in 1967, "Vision 2020" being but one example. My suggestion is that if no new labour-saving technology is made widely available to rural Malawians, their standard of living is doomed to stagnate if not diminish. As we are all aware of, there are few labour-saving devices that are affordable and have the potential to save a lot of labour for a relatively modest expenditure. Handcarts are one such affordable labour-saving technology. Although ox- and donkey carts largely eliminate human labour for transport, their uptake potential is extremely limited, due both to their initial expense, as well as to the other factors I have alluded to above. I therefore suggest a more seriously exploration of appropriate handcart technology (of which the AfriCart is but one, albeit immediately implementable) design), and not repeat the same mistaken and demonstrably unattainable objective of large-scale (as opposed to wide-spread) ox- and donkey-cart uptake. Instead focus on an attainable objective that will assist the masses of the population, and not merely some relatively affluent minority.]

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