

Rural Road Investment, Maintenance and Sustainability

*A case study on the experience in the Cambodian
Province of Battambang.*



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Background.

The International Labour Organization (ILO) was active in Battambang Province, between the years 1993 to 1998, constructing rural roads and establishing maintenance systems for those roads. In 1998, a decision was made to entrust the maintenance of the roads to the appropriate authorities in the provincial government. This decision was made partially in the belief that the provincial government, the development structures and the local communities would be able to construct and maintain infrastructure that is important to them, including tertiary and sub-tertiary rural roads. At that time, the ILO advised those concerned that this new strategy for the maintenance of tertiary level roads would lead to an erosion of the value of those tertiary roads. A report¹ was produced by the ILO Upstream Project in 1998 that predicted the anticipated outcome of this decision. Since 1998 no other program of systematic maintenance has been initiated in Battambang.

Systematic road maintenance consists of required routine, periodic and urgent activities to keep pavement, shoulders, slopes, drainage facilities and all other structures and property within the road margins as near as possible to their as-constructed or renewed condition. Maintenance includes minor repairs and improvements to eliminate the cause of defects and avoid excessive repetition of maintenance efforts.² Establishing a systematic program of maintenance is important because it results in significant cost savings to vehicle operators as well as to those responsible for maintaining the road by avoiding expensive rehabilitation work.

If road maintenance is terminated or is not conducted in a timely way the road immediately begins to deteriorate due to the wear of traffic and the effects of weather. For laterite surfaced rural roads this deterioration is particularly rapid. The road condition will quickly decline to a state whereby it is no longer cost effective to carry out routine and periodic maintenance. Instead, major rehabilitation works must be undertaken to restore the road to a maintainable condition. Thus road rehabilitation can be thought of as a very expensive penalty paid for delayed or deferred maintenance.

In year 2000, the ILO Upstream Project established an office in the Battambang Provincial Department of Rural Development (PDRD). From this office the Project launched the Rural Road Maintenance Initiative (RRMI) which is providing technical advice to PDRD and others concerned with the rural road program in Battambang and Bantaey Meanchey provinces.

As a part of the RRMI, the Battambang PDRD and the ILO Upstream Project in late 2000 and early 2001 conducted a provincial road condition survey and inventory. This survey evaluated the physical condition of all the provincial rural roads and estimated the resources that are necessary to maintain them. (The inventory included all rural roads in the province, both those that were previously maintained by the ILO project and those that were not. It includes rural roads of categories: Tertiary; Sub-Tertiary 1 and 2³).

¹ ILO Upstream Project, The economic impact of discontinuing the maintenance of 383.6km of rural roads in the provinces of Pursat, Bantaey Meanchey and Battambang, 1999

² PIARC, International Road Maintenance Handbook, 1994.

³ Ministry of Rural Development, Rural Roads Policy, 1999.

An activity that was initiated in parallel to the inventory by the PDRD and the ILO Upstream Project was to survey the agencies and the organizations that invested in the rural roads and rural transport infrastructure to determine the value of resources that were invested in the rural road sub-sector from 1996 to 2000. The information as kindly provided by the different organizations is presented in ANNEX A.

A reduction in overall asset value.

In 1998, there were 170km of rural roads, mostly tertiary, in maintainable condition in the ILO project. The ILO project road inventory of that year did not include the roads that other departments and organizations in the province were building and were also in maintainable condition at that time. So the actual length of rural roads in maintainable condition was in all likelihood more than 170km. The roads that the ILO project maintained were handed over to the local authorities when the ILO project closed at the end of 1998.

The rural road condition inventory of 2000-2001 included all of the rural roads in Battambang province and revealed that the total length in maintainable condition was only 112km.

The average cost to construct a tertiary road to the standard used by the ILO project is approximately \$15,000/km. An assumption is made that rural roads in maintainable condition are worth this much. Thus value of the maintainable rural road network in Battambang in 1998 was at least **\$2,550,000**. Over the three years since the maintenance stopped, from 1998 to 2000, the value of all of the assets has fallen to **\$1,680,000**, that is by at least \$870,000. In other words an expenditure of at least \$870,000 is necessary to restore the rural road system (not necessarily the same rural roads) to the value that it had, back in 1998. Of course these are not precise figures but are indicative. (The decline in asset value of the rural roads is illustrated in Table #1.)

Year	Length of Rural Roads in Maintainable Condition (km)	Estimated Asset Value (\$US)	Annual Increase or Decrease in Asset Value
1996	161+	2,415,000	
1997	168+	2,520,000	+ 4.3 %
1998	170+	2,550,000	+ 1.1 %
1999	141	2,115,000	- 17.1 %
2000	112	1,680,000	- 20.6 %

Table 1: Estimate of Asset Value of Rural Roads in Maintainable Condition

This decline in the length/value of the rural road network is a direct result of the lack of systematic maintenance.

Based upon the results of the survey of the donors and concerned agencies it was determined that in Battambang from 1998 to 2000, approximately **\$4,480,000** worth of resources were invested in rural roads and rural transport infrastructure.

Some of these investments were directed towards the level of sub-tertiary 3 roads and rural road cross drainage structures. However, the impact of these investments is significantly hampered when they facilitate connection to a higher order road network that is in poor condition.

On average the full cost of maintenance for a rural road in Cambodia is estimated⁴ to be \$1,625/km per year. That is, a little over 10% of the cost of construction. Maintenance costs are variable and the figure used herein is probably close to a maximum cost. Thus, a maximum average expenditure of \$276,250/yr would have at least preserved the length of maintainable rural roads at 170km. But, the cost of reconstruction and rehabilitation is not the biggest cost. The biggest cost is to the **local economy**.

Using the rule of thumb⁵ that every dollar not spent on rural road maintenance increases vehicle-operating costs by \$2 to \$3, implies that the local economy was penalized in additional transport costs of more than \$1.7M. Another loss to the local economy is the potential employment that the road maintenance activities would have generated to the local population. To maintain the 170km of rural roads over three years using proper labour-based methods would have yielded approximately 86,700 workdays of employment. Again these figures and costs are indicative, illustrative, and do not include the time value of money.

The important point to be made here is that while \$4.5M worth of resources were invested in rural roads and rural transport infrastructure, the total value of the maintainable stock of assets declined and that the local economy suffered heavy increases in vehicle operating costs and lost employment opportunities. The situation in Battambang is not unique. If one were to project the implications of these findings to the national level, the waste of resources would have significant implications for national development.

If only 18% of the total actual expenditure on rural roads and rural transport infrastructure was made on the maintenance of the 170km of rural roads, these costs could have been avoided. It is evident that there were ample resources available in the province to preserve the road network and to even expand it.

While new roads are being constructed existing roads are being left to deteriorate. Those new roads, once built, are neglected while even more new roads are constructed. In Battambang the current rate of deterioration is demonstrated to be exceeding the rate of new road construction.

⁴ ILO Upstream Project, Cost Estimates of Rural Road Maintenance, June 1999.

⁵ Heggie, and Vickers, Commercial Management and Financing of Roads, World Bank Technical Paper No. 409, 1998

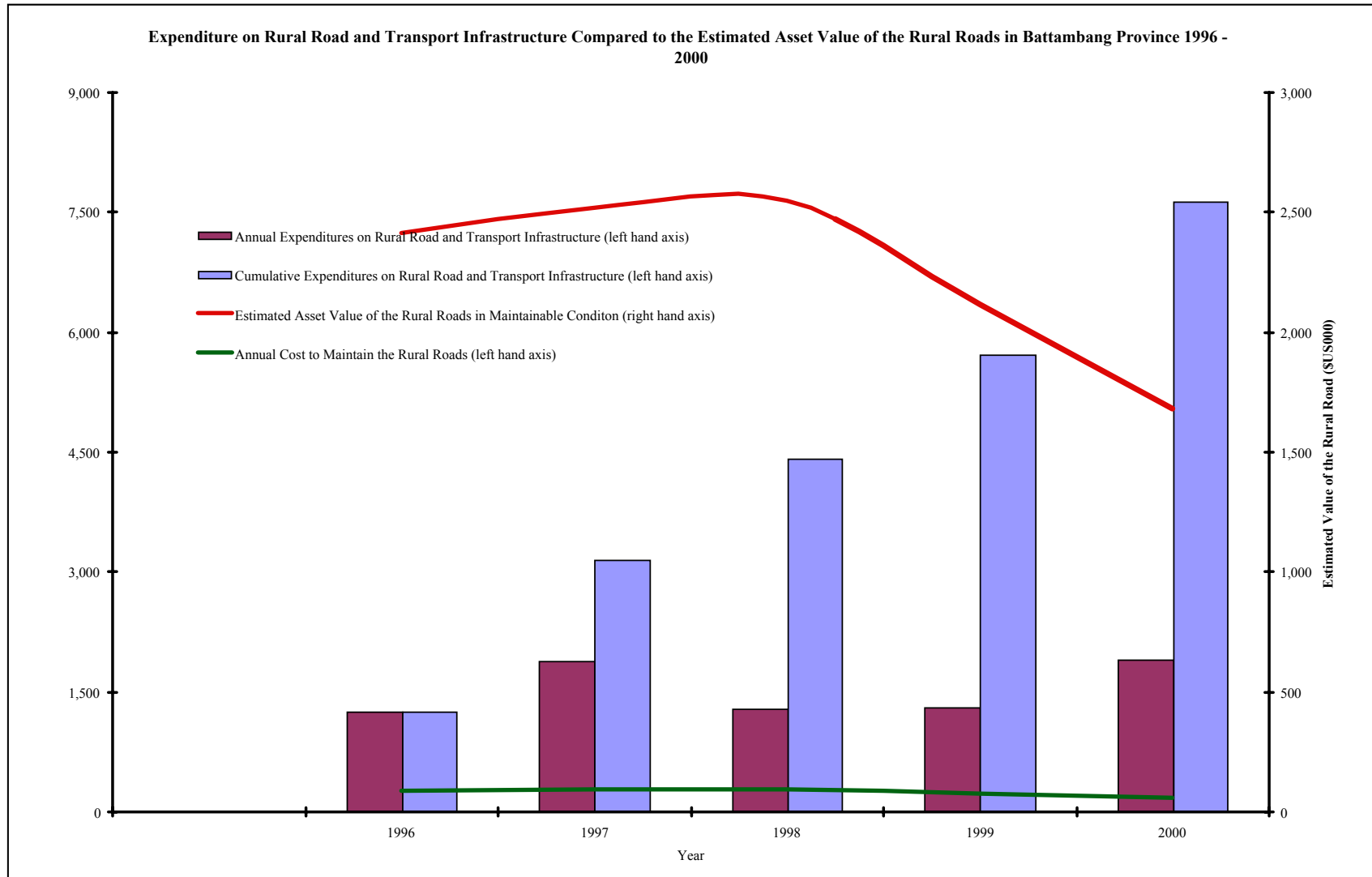


Chart #1: Illustration of Expenditures and Asset Value for Rural Roads from 1996 to 2000 in Battambang Province.

Rural roads are big business.

Battambang's rural road assets were worth \$2.5M in 1998, and since then investments have averaged \$1.5M per year in rural roads and rural transport infrastructure, but the value of the assets have fallen to \$1.7M today. This is a very wasteful pattern that no one can afford, particularly not a poor province like Battambang. Had this been a private company, such performance would soon result in changes in the approach to the management of the assets and the investments. Should not the same hold true for the public - development sector?

What went wrong?

How can such a large investment in rural roads and rural transport infrastructure made in the name of rural development have produced such results? There are undoubtedly many factors that have led to this outcome.

Many of the investments in Battambang are made on a project by project basis. The objective of most of these projects is the reduction of poverty. This is for sure a worthy objective, however, if investments are made without considerations for achieving acceptable rates of return, or for integrating those investments towards improving the overall efficiency of the transport network, economic growth will not be optimized and the poverty objectives may not be realized.

Clearly, there exists a bias by the current rural road investors to use resources for the construction of new rural roads and transport infrastructure over using some of those resources to maintain existing assets. This bias may originate from a number of factors apart from those discussed above. One reason may be the effort of projects to maximize their impact during the relatively short project life span. In contrast, the need for maintenance on rural roads is forever. It is common for projects to construct roads, to make an official hand over of the roads to the local government or to the community and in so doing complete that aspect of the project. The projects are not often around to face the consequences of the inability of the local entities to carry out the maintenance as was envisioned.

Another factor is the emphasis by many donors and organizations to decentralize all rural development activities and decisions, down to the commune and village level. For many kinds of infrastructure such as water wells, this may be a very sensible approach. However, for road investments to be efficient or even to make sense, they must be viewed from higher administrative perspectives and in terms of the relationship of the rural roads to the hierarchy of roads and indeed all transport facilities. The rural transport network can only function efficiently if it is planned and organized as a component of the larger transport network. A balanced approach is needed whereby investments are integrated, complementary, and resulting burdens and benefits are equitably distributed.

The local authorities have tended to accommodate the policies of the donors and implementing organizations. While they lack funds from the Government, the donors and implementing agencies have access and often complete control over the funds they bring with them. This puts the local authorities at a disadvantage in any

discussion over how road resources would be channeled. Many organizations have their own lists of what they will and will not support and how the work will be carried out, which may or may not result in the best long term impact.

Equity in local contributions.

A blanket assumption made by many rural road investors is that local communities will continue the maintenance of the local roads because they are the owners and beneficiaries of the roads. However, community participation and contributions need to be encouraged selectively to be sustainable. The closer the community is to directly, and equitably benefiting from the road the more likely self-help approaches will be successful. The sub-tertiary level may offer the most potential for this kind approach working. On the other hand voluntary labour schemes for higher level roads have rarely succeeded. A recent report finds that: *"With all participation, it needs to be recognised that this (rural road maintenance) is an on-going rather than a one-off exercise. However, it should be expected that the inputs from self-help labour would diminish over time. It has therefore proved difficult to use self-help schemes for on-going maintenance; most experience is with construction."*⁵

A further observation on the issue of voluntary labour for public works projects is: *"Wage labour and voluntary labour - The study concluded, from workers' interviews, that development approaches insisting upon "voluntary labour" in Siem Reap Province often encourage forced labour. Forced labour further limited the poorest families' opportunities to gain wage income, as they had to contribute labour to the village chief for communal works. Most workers felt very negative about contributing labour under these conditions."*⁶ It is reasonable to assume that the people in Battambang would also share this view.

Thus one should be cognisant of the risk that the labour provided for the maintenance of roads as a voluntary contribution to further local development may not be sustainable or voluntary, and may not even contribute to overarching development goals, particularly poverty reduction.

In summary.

- The current practice of investing in rural roads in Battambang province has been demonstrated to be unsustainable without a program of systematic maintenance.
- The problem in Battambang is not a shortage of resources for rural roads, indeed there were ample resources directed to rural roads and rural transport infrastructure.
- Decentralizing rural road investments to the commune or the village level or on a project basis does not necessarily guarantee the sustainability of the investments. An integrated approach is needed to improve the efficient functioning of the transport network and thereby allowing economic growth.
- The reliance on local communities to contribute voluntary labour needs to be done selectively and may be effective at the lower levels of the tertiary road network.

⁶ Center for Advanced Study, Employment in ILO Supported Road Construction and Maintenance - Impact of Wage Earning on Workers, August 2000.

- The implications of the Battambang experience, if projected to a national level are significant.
- Considering the value of the assets and the magnitude of the investments, rural roads can be compared to big business and need to be seriously managed as such.

Institutional improvements coming soon.

The MRD is creating a new Department of Rural Roads (DRR) that will be dedicated to bringing to life the policies and strategies of the MRD for the rural road sub-sector. The DRR will have offices in the PDRDs and units in the District Offices of Rural Development. The DRR will take a leadership role in the sub-sector so that the investments are made in such a way that they are continuously increasing the value of the rural road assets and the efficiency of the overall transport network. This in turn will allow economic growth in the rural areas.

Investments that have direct beneficial results at the village and community levels will continue to be needed for some time, but now there will be a department that can co-ordinate these investments. To succeed the DRR will need the support and co-operation of the concerned donors and agencies.

Those working in Battambang, should be aware that the PDRD has developed a five-year rolling rural road maintenance plan, that can be referenced when road investments are being planned.

ANNEX A

Year	CARE (\$US)	WVI (\$US)	CARERE Sector (\$US)	LDF-SIELA-CARERE (\$US)	ANS (\$US)	ILO (\$US)	WFP Cash (\$US)	WFP Food* (\$US)	SFKC (\$US)	Year End Total (\$US)	Cumulative Total (\$)	Length of Rural Roads in Maintainable Condition (km)	Asset Value (\$US)	ILO Maintenance Expenditures (\$US)	Projected Maintenance Cost (\$US)
1996			72,542	26,049		359,156		766,167	32,774	1,256,687	1,256,687	161+	2,415,000	112,756	
1997		2,150	10,500	179,742	230,000	344,648	21,431	851,667	248,571	1,888,709	3,145,397	168+	2,520,000	200,548	
1998		36,246	44,249	256,358	342,000	85,660	18,648	493,500		1,276,661	4,422,058	170+	2,550,000	85,660	276,250
1999	131,320	31,681	73,249	169,681	59,000			748,333	86,159	1,299,424	5,721,482	141	2,115,000	0	229,125
2000	112,000	29,321	137,500	368,558				831,333	425,251	1,903,963	7,625,444	112	1,680,000	0	182,000
Totals	243,320	99,398	338,040	1,000,388	631,000	789,464	40,079	3,691,000	792,755	7,625,444					

* For the purpose of this report the WFP rice contributions were translated into dollars at 6kg. per workday equivalent to \$US 1 rather than the market value of the food.

+ For the years 1996 to 1998, the length of rural roads that is reported above that were in maintainable condition are only those that were under the care of the ILO project. There were other roads constructed by other projects that may also have been in maintainable condition. Thus for those years the length of road in maintainable condition may have been greater than what is recorded herein.

However, for 1999 and 2000, all of the rural roads in Battambang Province were included in the survey. The survey included both the rural roads that were under the care of the ILO and any other rural roads.