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TRANSPORTATION PROBLEMS IN THE NORTHERN PROVINCE, ZAMBIA

by

KAELA MULENGA

Presented to professor Frank Petrini at the Swedish University of Agricultural Sciences, Department of Economics and Statistics in partial fulfilment for the degree of Master of Science in Agricultural Economics.

TRANSPORTATION PROBLEMS IN THE NORTHERN PROVINCE, ZAMBIA

TABLE OF CONTENTS

Page

PREFACE

I.	INTRODUCTION	1
1.1	Introduction	1
1.2	Innovation and Transportation	4
1.3	The Region's Problem	12
1.4	Some Explanations of Underdevelopment	14
1.5	Purpose of The Study	15
1.6	Methodology/Approach	16
	NOTES AND REFERENCES	19

II	IMPACT OF GOVERNMENT POLICIES ON AGRICULTURAL DEVELOPMENT AS PART OF THE ROAD IMPACT	22
2.1	Government objectives	22
2.2	Importance of Complementary Sectors	25
2.2.1	Education	26
2.2.2	Health	27
2.2.3	Mass Mobilization	27
2.3	Long-Term National Policies and Ideology	28
2.4	Socialist Ambitions	29
2.5	Policy Review	30
	NOTES AND REFERENCES	33

III	REVIEW OF THEORETICAL CONCEPTS	38
3.1	Relevant Development Theories	38
3.1.1	Regional Growth Theories	39
3.1.2	Location Theory and Agriculture	39
3.1.3	Export or Staple Theory	44
3.1.4	Trade Theory	44
3.1.5	Popular Agricultural Development Models	46
3.2	Rural Development Strategies	47
3.2.1	Strategy Planning	47
3.2.2	Strategy Definition	47
3.2.3	Strategy Objectives	48
3.2.4	Elements of an Agricultural Strategy	51
3.3	Rural Structural Transformation	52
3.3.1	Catching-Up Process	52
	NOTES AND REFERENCES	55

IV	IMPACT OF ROAD SYSTEM ON TRANSPORT COSTS AND BENEFITS	59
4.1	Cost Effectiveness	59
4.2	Cost-Benefit Analysis	59
4.3	The Benefit of Reduction in Operating Expenses	61
4.4	The Benefit of Time-Savings	62
4.5	The Benefit of Accident Reduction	63
4.6	Secondary Benefits	64
4.7	Hypothetical Cases	64
4.8	Forecasting Traffic	65
4.9	The Effect on Pricing	66
4.10	Transport Investment Appraisal	67
	NOTES AND REFERENCES	70

		Page
V	ROAD IMPACT ON AGRICULTURAL DEVELOPMENT	72
5.1	Background-Agricultural Development	72
5.2	Stimulation of Agricultural Development	73
5.3	Effects of Feeder Roads on Agriculture	75
5.4	Transport System and Agricultural Development	81
5.5	Effects on Inputs Required	83
5.6	Access to the Markets	85
5.7	Relationship Model between Transport Improvement and Agricultural Development	87
NOTES AND REFERENCES		89
VI	OPERATIONAL PLAN	91
6.1	Background	91
6.2	Main Objectives	93
6.3	Policy Instruments	94
6.4	Feeder Road Plan Implementation - INPUTS	96
6.4.1	Proposals - Road Maintenance	97
6.5	Justification if Investments - Outputs	98
6.5.1	Recommendations	99
6.6	Selected Case Studies	100
6.6.1	Mulema Rice Scheme	101
6.6.2	Double Transport Problem	103.
6.7	Nutrition Promotion	104
6.8	Summary of Policy Instruments Required	104
NOTES AND REFERENCES		
VII	SUMMARY AND CONCLUSIONS	107
BIBLIOGRAPHY		114

PREFACE

It took a lot of deliberations and discussions with Professor Frank Petrini and a lot of my thinking before I could have it clear in my mind what I wanted to say in this book. Professor Petrini and myself knew that we wanted to make a very big and important comment about the agricultural situation in the Northern Part of Zambia, but we just did not know exactly how to put it. Especially that we knew that we were short of data and information.

In spite of this handicap, one hopes that the study is of some use. In particular, I hope that the study contributes in whatever scale or form to the spur of agricultural development in the Northern Part of Zambia, and thus hopefully to the development of the whole country. I have put my case in this study in such a way that I hope it will influence the opinion of the planners, inhabitants of this region and above all the farmers themselves. I want to provoke the discussion or concern which I believe already exists. As originating from this region, I hope my knowledge and experiences will help me rather than hinder me in making correct formulations.

My belief and reactions as an agricultural economist, are based on the conviction that *IF* we are to encourage agricultural development in the Northern Province, we must begin with the measures which will: - (1) either modify the production process of agriculture in this area, or (2) change the behaviour of farmers, or (3) change the nature of individual farms, or (4) change the relationship between costs and returns in the individual farm business holdings or dwellings.

These measures can only be those ones which are needed (essential) for the agricultural development or those ones which promote or improve (accelerate) the agricultural development. It is agreed almost unanimously by the agricultural economists and development theorists that "*transportation*" is one of those essentials. Athur Mosher, and Johnston and Kulp have made intensive studies in this line of thinking. This is the approach which we have also taken.

It is however, important here to note that while the author got influenced by Mosher and Kulp schools of thought about this subject, and that although a lot of discussions about the same subject were made with a lot of people, the author *alone* is responsible right or wrong for the conclusions made in this study. The interpretation of other scholars' works and findings are the author's. Therefore the opinions expressed in this study are mine and do not necessarily reflect the views of either the Faculty of Economics and Statistics of the Swedish University of Agricultural Sciences, under which I studied or of The Zambian Government whose many official reports I used.

We would like also to draw the readers' attention to the fact that this thesis cannot be fully understood if one avoids to read the notes and references provided at the end of each chapter.

A special note of acknowledgement is due to the 'Svenska Institutet' whose stipendium enabled me to go through the preliminary studies. I cannot forget my "telephone friend" Kerstin Herner of the Individuell Människohjälps, Lund, whose occasional financial assistance although small cooled down my nerves. The Lutheran World Federation, Uppsala came in with a financial grant at a time when nearly my studies got bogged down. I shall also never forget the personal financial assistance which I received from Swedish friends during some of the most difficult times.

I am greatly indebted to first and foremost my supervisor and friend Professor Frank Petrini of the Swedish University of Agricultural Sciences, whose frank comments and encouragement, kindness and moral support enabled me to complete this work. I also owe a debt of gratitude to Professor Lars Folkesson of the Swedish University of Agricultural Sciences, whose advice and recommendations helped me to formulate my future plans. Mr. Sigvard Nilsson my former study advisor gave me a lot of advice and encouragement. The personnel of SIDA (Stockholm) and Nordiska Afrikainstitutet libraries also patiently helped me in having access to the necessary materials. The family, himself Dr. Donald K. Kowet, my countryman and friend gave me a lot of support and advice throughout my entire stay in Sweden. There are many others who contributed to the welfare of my stay in Sweden such as Mr. and Mrs. Coster Nanchengwa, and others whom I cannot all list here, receive my word of thanks.

My most sincere gratitude should go to my own family: wife Margret Chilimbira Mulenga, my daughter Aida Mulenga, my two sons Clifford 'Kaela' Mulenga and the 'little' Vincent Kachila Mulenga whose patience, forbearance, understanding and suffering throughout the seemingly endless studies in Sweden made it possible for me to complete this book. I devote to them my unlimited thanks and rightly dedicate this book to them. Other members of my family I owe gratitude to are: my brother Mr. Luke C. Mulenga 'the poet', who has been throughout my life constantly pumping me with advice and encouragement. My brother Dr. Fausto M. Mulenga whose examples in forbearance, adventurousness, and determination I have been following. Last but not the least I must remember my beloved parents: daddy 'the brilliant planner' Simeon Mulenga Kunyansa and mummy 'the principle adviser' Monica Masansa who sometimes thought that I was dead. To them and other members of my family who gave me steadfast encouragement, I am most grateful.

My acknowledgement also goes to Birgitta Frisk and other department secretaries - who became very useful indeed - and for the efforts they put in when typing this paper. I also appreciate the contributions of Melinda Fones-Sundell of the Swedish Agricultural University - Uppsala. Her corrections and comments helped to improve the quality of this paper.

I should also not forget the people at the Zambian Embassy - Stockholm, that although they could not help me financially, did manage to provide other non-monetary resources and moral support. The assistance of Dr Peter Söderbaum deserves also mention.

Kaela Mulenga (Bernard Simeon)

CHAPTER ONE

I INTRODUCTION

1.1 Introduction

According to the study conducted by the World Bank on behalf of the Kenyan Government, the functions (to which we agree) of rural access roads were evaluated as follows:

(1) Roads have two major and interrelated effects on development - a *communications effect* and a *cost effect*. The first effect refers to the fact that information (about technology, prices etc) appears to be more rapidly and accurately passed along when there is a road than when there is none. This may result in people taking advantage of opportunities otherwise foregone, the importation of know-how and resulting changes in agricultural production and technology etc. (2) Also by better mobility, the people concerned can better utilize social institutions like hospitals, schools etc.

The second effect consists of savings in time and money cost. This effect has two parts, one that is quite straightforward namely savings to existing road users. By improving the road, wear and tear of vehicles will be reduced and vehicles will be able to travel faster thereby reducing travel time and spoilage of perishable goods. The other part consists of the development impact of the road (as far as road use is concerned it is measured by induced or generated traffic). Development in the area of influence of the road will take place because the lower transport cost makes it profitable for local producers to buy more inputs and produce more outputs. However, a number of conditions must exist for such development to take place. In other words there is a priori no automatic link between construction or improvement of a road and development of a certain region. For example in this Kenyan case it was found that: to assume a road to have a direct and substantial development impact, one must expect freight rates to fall. Freight rates will fall if: - (3)

- a) There is strong competition among transporters in the area; or
- b) Such competition will quickly develop; or
- c) The Government will intervene and fix freight rates so that they reflect the lower vehicle operating costs.

It was cautioned however that even though important, lowered freight rates by themselves are not sufficient to guarantee economic development. Farmers must have the right attitude and resources to supply more if the prices they receive go up and/or the prices they pay fall. This is by no means always the case. The rapidity and significance of agricultural expansion, the report contends, will depend on the number and background of people already in the area, the readiness of the land for cultivation, and the availability of credit etc.

If we are to ascertain these as being applicable to Zambia, we need to conduct field studies of our own. But since the conditions in Kenya are not very much different from those in Zambia we can use these findings as guidelines. If we were to

carry out an empirical study we would examine such problems as: (i) Savings which accrue to the existing users (normal traffic). (ii) Forecasting of growth of normal traffic. (iii) Assess the communication effect and the development of a road, and assess how in the case of feeder roads, development impact and accessibility are crucial factors. For example one can assess cases where existing traffic is either too low or nil. One can estimate the socio-economic impact of the road and identify whether there are any other bottlenecks which would prevent the road to have its full impact.

Some people may ask, why is it necessary to prove the obvious? Well, the fact is - what is supposed to be obvious, like transport implications, is vaguely understood. Besides, deeds in many developing countries show that although transport is believed to be important, it is however not given the priority it deserves. In very many cases, transport is completely neglected. While in other cases, very little is being done in spite of the understanding that transport is supposed to be important. Transport is given second priority in spite of this understanding. The problem here is that, while people may understand that transport is important, it is another thing when it comes to the implementation, since people are not fully convinced that indeed transport is crucial. Only conviction can lead to action.

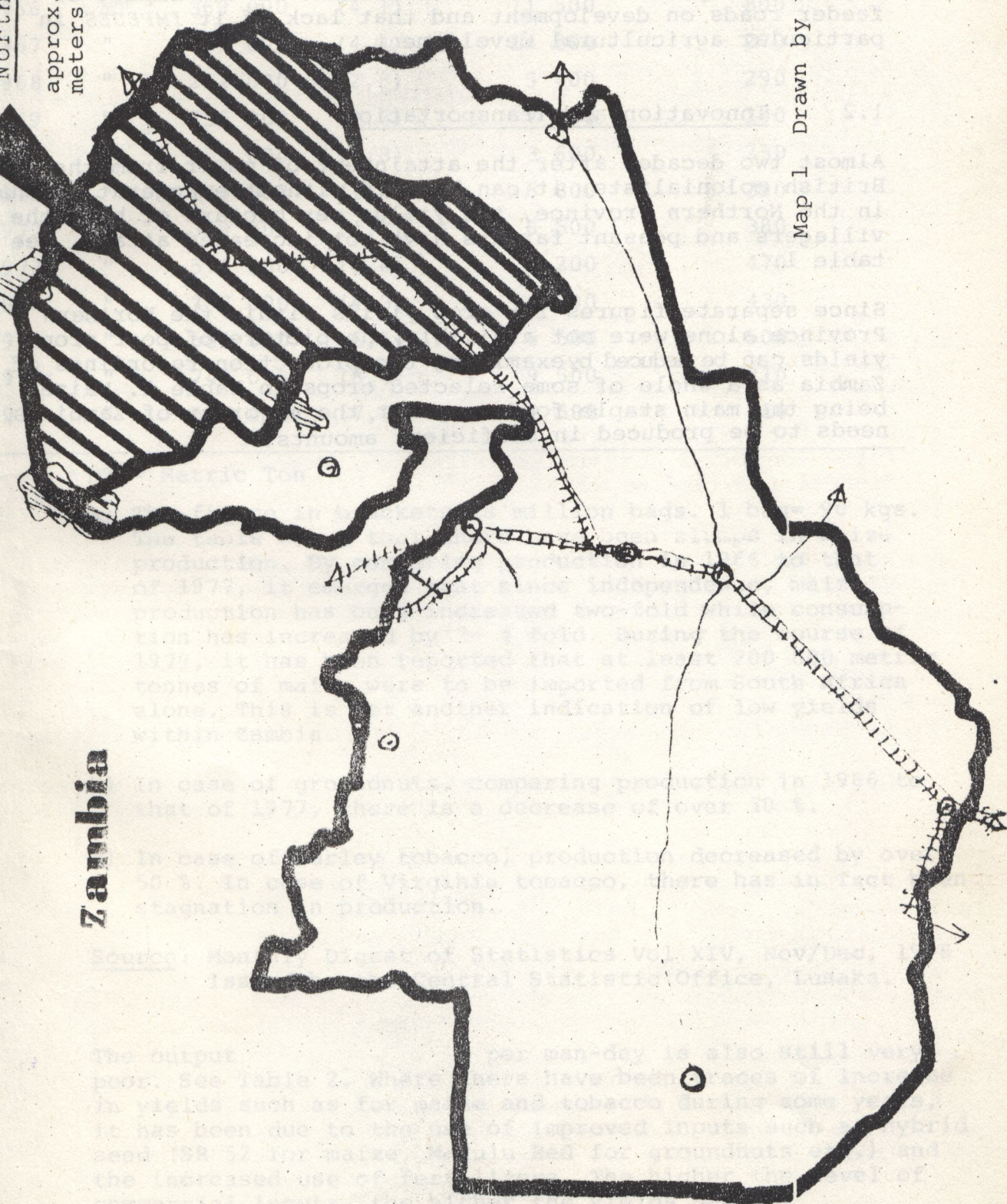
Therefore in our study, our duty will be to try and make a systematic analysis of transportation problems in relation to rural development. Thereby hoping to provide convincing evidences as to why we think that lack of transport can impede Rural Development.

By trying to illustrate the roles of transportation in rural development, two things are expected to emerge: (i) First, by providing enough evidences of the role of transport, this implies that - in all cases where transport is lacking, there is bound to be a developmental loss in a way of the foregone rural development. (ii) Secondly, after full conviction that transport is essential to rural development, more attention might be paid to it - say in a way of more investments and/or better co-ordination of the transport already existing.

Our ambition in this essay will be to tackle Rural Development problem in the N Province of Zambia, (see map 1 for location) featuring road transportation factors. By the time the reader reaches the end of this thesis, three things will be clear. First, that the agricultural sector in Zambia is so much essential to the economy. Secondly, that this sector although it has supposedly been of priority, has not performed satisfactorily. Thirdly, that if this sector is to be boosted, marketing system and the efficiency of farm operations must be improved. Thus changes in agricultural practices must be made, i.e., the rural areas must be innovated or at least rationalized.

approx. 320.000 sq.kilo-
meters

Zambia



Map 1. Drawn by the author

It is on these factors that 'feeder road improvement' creates an impact. In other words one must recognize the importance of transport system to the goal of raising agricultural output. Because transportation plays a very important part, that is why we have presented a detailed account of the impact of feeder roads on development and that lack of it *IMPEDES* in particular agricultural development.

1.2 Innovation and Transportation

Almost two decades after the attainment of power from the British colonialists, it can be said without exaggeration that in the Northern Province, the yields per hectare of both the villagers and peasant farmers have not increased at all. See table 1.

Since separate figures for crop yields within the Northern Province alone were not available, the picture of poor crop yields can be deduced by examining the production recordings of Zambia as a whole of some selected crops in Table 1. Maize being the main staple food crop for the majority of Zambians, needs to be produced in sufficient amounts.

Table 1 Marketed Production of some selected crops in Zambia

Year	Unit	Maize	(mill.bags) ^{a)}	Groundnuts ^{b)}	Burley Tobacco ^{c)}
1966	MT	369 000	(4,1)	11 500	800
1967	"	369 000	(4,1)	14 800	270
1968	"	252 000	(2,8)	5 400	290
1969	"	225 000	(2,5)	7 800	240
1970	"	252 000	(2,8)	3 600	250
1971.	"	126 000	(1,4)	6 800	390
1972	"	369 000	(4,1)	6 500	380
1973	"	576 000	(6,4)	3 200	470
1974	"	387 000	(4,3)	3 600	430
1975	"	585 000	(6,5)	6 500	500
1976	"	747 000	(8,3)	9 500	210
1977	"	693 000	(7,7)	7 500	310

MT = Metric Ton

- a) The figure in brackets is million bags. 1 bag= 90 kgs. The table shows that there have been slumps in maize production. By comparing production in 1966 to that of 1977, it emerges that since independence, maize production has only increased two-fold while consumption has increased by 3- 4 fold. During the course of 1979, it has been reported that at least 200 000 metric tonnes of maize were to be imported from South Africa alone. This is yet another indication of low yields within Zambia.
- b) In case of groundnuts, comparing production in 1966 to that of 1977, there is a decrease of over 30 %.
- c) In case of Burley tobacco, production decreased by over 50 %. In case of Virginia tobacco, there has in fact been stagnation in production.

Source: Monthly Digest of Statistics Vol XIV, Nov/Dec, 1978
Issued by the Central Statistic Office, Lusaka.

The output per man-day is also still very poor. See Table 2. Where there have been traces of increase in yields such as for maize and tobacco during some years, it has been due to the use of improved inputs such as hybrid seed (SR 52 for maize, Makulu Red for groundnuts etc.) and the increased use of fertilizers. The higher the level of commercial inputs, the higher the yields become.

Table 2. Output per head and year in Zambian Manufacturing Industry, 1965-1969. a)

	1965	1966	1967	1968	1969
Food, beverages, tobacco b)	2,1	3,0	2,5	2,1	1,5
All manufacturing	1,6	2,0	2,1	2,0	1,8

a) The table is obtained by dividing the number of employers in the branch into the figures for GDP at constant prices.

b) Food output per man, has been falling since independence.

Source: A Young, Appendix G-p, 314: Industrial Diversification in Zambia, N Y 1973. Comments on the figures are made by the author.

Thus we can see that outputs in Zambia are low. For N Province, one of the factors contributing to these low yields/low output, is the fact that rural transportation net work is still poor. Transportation needs in this region, are quite tremendous. Many districts in the province have no proper connections. In some cases bus services are only weekly. This situation has affected agriculture enormously.

There exists some slowness in adoption of innovations by the people living in this area, due to traditional handicaps and low or no education of the peasants. Thus subsistence agriculture is very commonly preferred to cash cropping. The old agricultural methods must be replaced by the new ones before production is expected to rise.

So long as people stick to their old traditions and believes

- (i) In this area innovations will not be dopted fast enough.
- (ii) Importation of foreign technology would be doubly difficult.

If an area is to expand its agricultural potential, it must innovate first. Numerous development studies have shown that, the problem of agricultural development is the problem of initiating sufficient amount of innovations in an area. This requires that there must be sufficient levels of innovation 'essentials' and innovation 'accelerators'.

When tackling the problem of agricultural development as that one which concerns the problem of meeting all the essentials and the problem of improving all the necessary accelerators, Johnston, Kilby & Kulp agree with Athur Mosher's classification and definition of these motive factors. Mosher has listed five essentials and five accelerators of agricultural development.

He defines essentials as factors which MUST be present for even one farmer to adopt an innovation. He defines accelerators as the factors which MAY be necessary to get an innovation adopted by all the farmers of a region.

Mosher listed these five essentials as being:

- 1) Market for Farm Products, coupled with the demand for the products, a system for distribution, and *farmer confidence* in the demand and in the system.
- 2) Constantly Changing Technology (new farm technology). There must be a ready supply of innovations to offer farmers, proven as to their technical feasibility on the farms of the region and their compatibility with the existing system.
- 3) Local Availability of Supplies and Equipment: The necessary supplies and equipment must be available where and when needed, technically effective, dependable in quality, and fairly priced.
- 4) Production Incentives for Farmers: The price offered to the farmers must make innovations sufficiently profitable to offset the uncertainties and risks inherent in all agriculture.
- 5) TRANSPORTATION: Is one of the most important essentials to agriculture.

The Five Accelerators listed by Mosher are:

- 1) Education for Development: With proper education, extension work is directed on specific innovations which are immediately and profitably applicable.
- 2) Credit: Credit must be carefully adapted to the needs of the particular crop and co-ordinated with proper education and technical supervision.
- 3) Group Action by Farmers: In developing countries like Zambia, the individual farmer is too small a unit to make the necessary services of the public and private sector economical. Farmers must be organized so that an agent of a service can deal with several farmers in one visit.

- 4) Improving and Expanding Agricultural Land:
Land resource can be expanded either by clearing uncultivated land or by irrigating or otherwise improving land already cultivated to permit more production.
- 5) National Planning: He stresses that planning should be on a region-by-region basis. That production and marketing possibilities should be considered jointly. And that emphasis should be on increasing farm income rather than production.

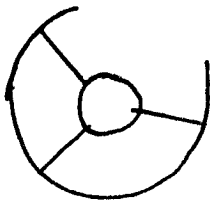
These accelerators, are services which a public or private agency applies actively to a specific innovation. Sometimes only one of two accelerators are required for a major innovation.

Mosher considers the Five Essentials as the FIVE Spokes and parts of the rim of a wheel on which *agriculture can move*. (4) None is useful without the other four. The five make a complete wheel. This crude wheel as he ascertained, can be made much more efficient by adding the Five accelerators.

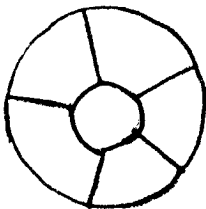
He presented this reasoning diagrammatically as: (5)



Markets for farm products provides one



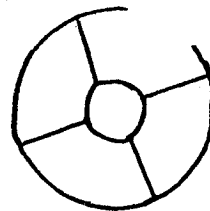
The local availability of farm supplies and equipment is a third:



TRANSPORTATION facilities completes the wheel.



New farm technology adds a second:



Adequate incentives for farmers provide the fourth

It is the "*transportation spoke*" which is our main concern. Roads to the remote parts of the region and other fairly developed centers - namely feeder roads are the ones we would like to put emphasis on.

It is estimated that there are about 2 000 km of main roads (graded roads) in the province. See map 2. Some of the main roads are:

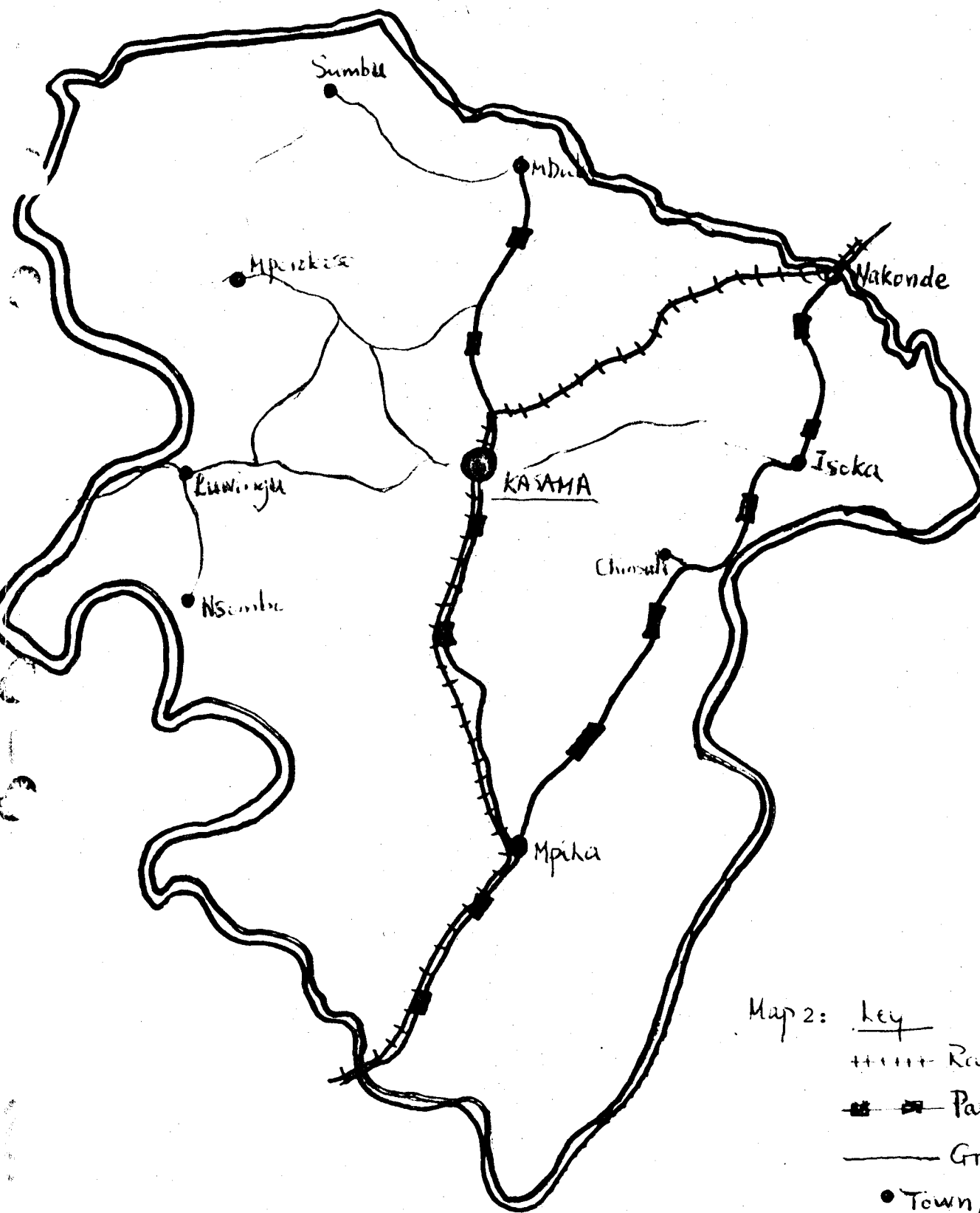
Kasama-Luwingu-Nsombo:	about 230 km
Kasama-Mpika	about 200 km
Kasama-Isoka	about 150 km
Kasama-Mbala-Sumbu	about 200 km
Kasama-Mporokoso-Sumbu	about 250 km
Mporokoso-Mbala	about 200 km
Mpika-Isoka-Tunduma	about 540 km

These are the major roads of communication. It is on these roads such facilities like collective bus service, ambulance services, extension services etc, are made possible. In addition to these you have other roads (access roads) linking to these main roads and to the 50 plus, outlying districts within the province. Rural development centers and villages are connected with each other by access feeder roads. The length of these access roads is probably double that of main roads. It is these roads which are important because it is on these roads that produce moves from the farm to the onconnections to the markets. It is for these roads that we are advocating improvement.

For example traffic is lowered up by the pontoons (as opposed to bridges) across many rivers in the province. Better bridges have to be built. Although there are few tarred roads in the province, much of the concentration has been on the Great North Road, the one which starts at Kapiri Mposhi to Tunduma on the Tanzania border.

See map 3 if development in remote areas is to be boosted, feeder or any other road going to these places ought to be improved.

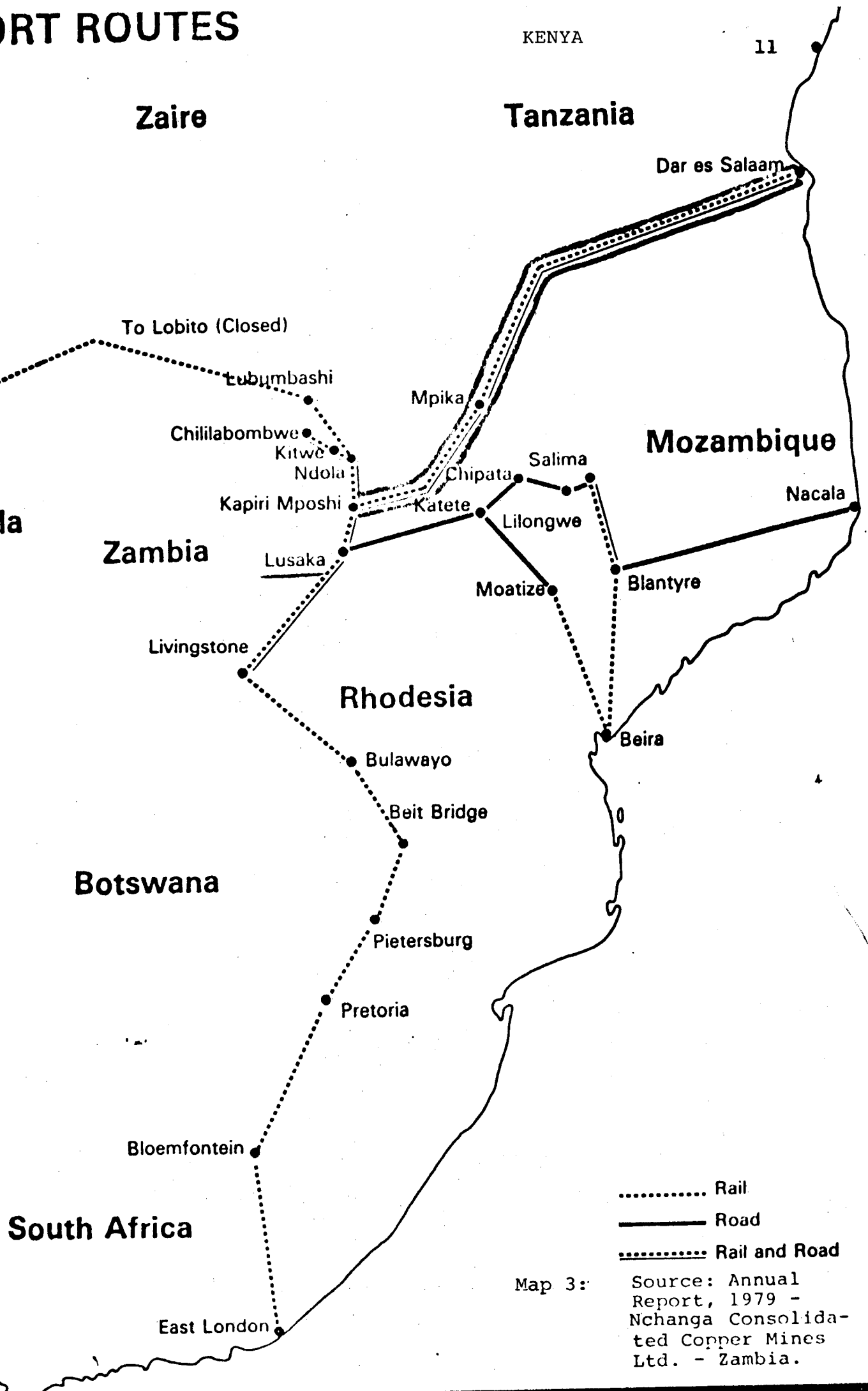
ROADS : N PROVINCE



Map 2: Key

- +++++ Road
- Pa
- Gr
- Town
- == Pro
- == Bea

PORT ROUTES



Map 3:

Source: Annual Report, 1979 - Nchanga Consolidated Copper Mines Ltd. - Zambia.

1.3 The Region's Problem

Northern Province's (see map 1 for the location of the province) problem can sometimes be viewed from the whole country's trend in which case planning seems to be emphasizing on the establishment of "growth points" first. The growth points in the case of N. Province are rural districts or bomas. The long distances between these points in a province which is approx. 320,000 square kilometers, poses a lot of surmountable transport and planning problems. The problem of distances is compounded by high oil prices. These growth points are the urban towns and cities which already are being developed at a very fast rate. But these growth points need to have essential linkages to various provinces, based on an analysis of existing and potential resource bases of these regions. (6) Farmers living in these rural areas are expected to produce foodstuffs and raw materials. To be able to do this, they need to increase their productivity. But in order to increase productivity one needs (i) improved tools, (ii) equipment, and (iii) use of better scientific techniques. All of these require transportation facilities.

Throughout the entire colonial period of some 100 years, cash crop purchases for the whole country were by and large from European settler farms. Three quarters of total production came from the line of rail. (7) Northern Province is one such area expected to meet the challenge of producing the national farm output. It must also be able to produce its own food requirements. Northern Province has a peasant economy, with production oriented for subsistence although even few cash crops are grown. Few secondary and servicing industries have been set up in Kasama, the province's head quarters. Thus to date the region is a net importer of goods and services from other provinces and the world. If this situation is to change, transportation must be improved.

Of the able-bodied population which has not been attracted by the mining industry, over 95 % of them are still engaged in agriculture. (8) Rural population is attracted to towns by such better social amenities as: - health services, education opportunities, likelihood of getting jobs, cinemas, better clothing, housing, better food supplies and such daily necessities as - salt, cooking oil etc. Things which are not available in rural areas. The drift to towns of able-bodied men and women has mounted to a flood since independence, creating rural - urban migration population problem. (9) This adds on to the long list of problems facing the N. Province region, namely: - too large unskilled or traditional population, shortage of farm inputs, poor transport network, old social patterns which obstruct the actual increase of crop output and sale of cash crops. These problems make it very hard for the people to produce enough food for themselves leaving some surplus for sale. This then also contributes to the problem of low incomes among the people (10). Consequently the purchasing power is low. In some remote parts

of the region for that matter, there has not yet been a taste of the modern way of living. Thus the people are still living under old traditional conditions. The agricultural output is still so low because of low productivity of both land and labour. (11).

Another observation typical of this area is that, the size of farm holdings is still very small: - about 1 hectare for a village gardener, 5-10 hectares for small producers, and 50-100 hectares for the so called big farmers. In fact the majority of the people do not at all operate a plot of their own since agricultural methods are still based on "shifting cultivation" and communal practices. (12) Cultivation practices are so poor that most of the land still remains unused. Most people depend on subsistence agriculture.

The poor cultivation practices can only be eradicated if other better methods of agriculture are imparted on the people. But this task can only be achieved if communication facilities are improved. *Bembas*, the largest ethnic group inhabiting most of the province, along with their shifting-cultivation practices known as 'chitemene system' have been reported to have grown enough food for themselves and have been for many decades planting many crops. (13) Patric Mushindo (14) lists some of these crops, most of which are even grown to-day as: - dwarf millet (amale), sorghum (amasaka), lentils, cowpeas (ilanda lyance), beans (cilemba), peas (intongwe), ground beans (intoyo), ground nut (imbalala), water melons (intanga), pumpkins (ifipushi), squash (ulungu), similar to English potatoes (ifyobo), butter beans (ifinkamba), tobacco (fwaka), hemp (ibange), water tuber (umumbu), maize (inyanje), sweet potatoes (ifyumbu), pink sweet potatoes (icumbu lubemba), white sweet potatoes (icumbu kandolo), cassava (kalundwe) bananas (inkonde), local bark cloth tree (umutaba), castor beans (imono), kind of plums (impwa) kind of thorns for stackade (popo), and such indigenous green or leaf crops as: - ububele, amankolobwe, makangala, ulubanga, ubusoshi plus many others.

Some of these subsistence crops, could be expanded so that they can be grown for the world markets. A lot of these, in addition to internal demand, are in a big demand on European and American markets - such as maize, soya beans, citrus fruits, cassava (for animal feed) ground nuts, water melons, millet and castor beans. All these have the potential for earning foreign exchange.

In addition, *Bembas* have been reported to have been occupied with dairying of small animals and raising cattle and goats, making cloth (amatonge: a so called native cotton), all of which are agricultural activities which have not been expanded. (15).

The Shila tribe (the people who settled in this region before *Bembas*), are reported to have been good gardeners. Munukwa people, another ethnic group, are also known to have been farming the plains in addition to being good iron workers. (up to to-day garden mounds and furnaces still remain in many parts of the province). Mushindo also writes that the burials of Bemba chiefs were only conducted when sorghum was being planted and that cooked cowpeas were used to preserve the chiefs' dead body. Again an indication that some sort of agriculture existed among the people. (16).

All these point to the fact that although people have been engaged in some form of agricultural production, production has remained at subsistence levels. By depending on a variety of these traditional crops, legumes and cereals, people managed to lower malnutrition levels - especially amongst children and old people.

One could read from an FAO-UNDP report (1976), that peasants in the N Province eat only about 1 kg/yr of beef meat as against almost 16 kg/yr for average urban Zambian. Today the province is also one of those with very low agricultural output. This shows that the patterns used so far have not resulted in increased production. Therefore the agricultural methods need to be changed. But IF these patterns are to be broken up, modern INPUTS like fertilizers and improved seeds must be used. It is to the distribution of these inputs to which transport is important. Otherwise it would be difficult to raise production using only old methods.

Another problem which is often ignored is that of unemployment. Expanded agricultural production, absorbs quite a lot of unemployed labour. Given the fact that agricultural production is still based on subsistence practices, a lot of labour in the remote parts of the province still remains *IDLE*. Thus any labour which cannot find satisfaction in continuing with traditional ways of living, naturally migrates to other provinces, usually to the Copper Belt (the copper belt is an area where all the mines are situated). (17)

1.4 Some Explanations of Underdevelopment

There is no argument about the fact that Northern Province is still poor. This state of great poverty is sometimes explained by the highly inefficient technology or methods used. (18) This is what we have just examined. Some people may also say that it is because of the shortage or lack of balance between the strategic factors needed to maintain human needs. This is not a problem, since farmers are not organised or well served by government agencies. That traditional social institutions have no incentive mechanism to innovate or that peasants do not make economic decisions rationally (afraid of taking risks), is another problem. (19) Or that due to low education, people's mentality still clings to the backward methods: - That they do not change their attitudes and cultural values to permit change, is a major drawback.

In capital-shortage theories of underdevelopment, capital is singled out as the most scarce production factor in most of the LDCs' (less developed countries). This is so also for the case of Northern Province.

In any case whatever explanation of underdevelopment we may end up with, one thing remains clear to us, that in the case of Northern Province, most of the people still remain poor. *It is the welfare and good of the people that we are interested in.* Therefore this state of affairs (of poverty) must be changed. It is in this light that we hope we can show that transport improvements of feeder roads make a contribution to change, which results in improving the welfare of the people. May be not immediately but later.

We are sure that this poverty inflicting the people of this area can be removed, because we know that in this province there are still large reserves of natural resources which have not yet been tapped. You have for example plenty of water resources (rivers and streams), plenty of woods, good soils and reliable climate, fish resources and mineral resources not yet known, not to mention the tremendous amount of idle human resources. (20)

It is this paradox of poverty's vicious circles which famous intellectuals like Myrdal have attacked. Kwame Nkrumah calls this paradox, "poverty in the midst plenty". (21)

1.5 Purpose of the study

The purpose of this study, is to assist in determining:

- a) the Impact of Road System on costs of transportation. In other words determine how effective the roads are in lowering the cost of transport and farm production and increasing mobility.
- b) The Impact of Road System on agricultural development. Study how effective the roads are in stimulating agriculture or how does road system affect it.
- c) The Impact on Social-Economic development. How effective the roads are in stimulating economic and social development or how it does facilitate socio-economic development. (22)

Of the many factors on which economic development depends, our concern will be to those: Aspects of technology and environment that characterize a particular time and place, in this case time being the 'nuclear age' (present day) and place being the northern part of Zambia. And those aspects which influence aggregate productivity, life of the people, and the general level of savings (or incomes) in this province.

This study is in no way an exhaustive study of transport activities conducted in the region. It will be only an attempt to see in which way poor road transport networks impedes rural development. Therefore the main theme of the study will be Rural Development (RD) in the Northern Province. The main task will be to try and *define* how transport problem affects agricultural development. We shall analyse one of the major factors affecting "Rural Structural Transformation", which we think is: transport problem.

Elaborating on this problem, Clark and Margaret Haswell emphasize that the first requisite for the improvement of the production of a subsistence economy is the provision of transport. Fertilizers, improved strains of seed, education and other objects all depend to a large degree on transport. - The need for transport is Prior to all these. - Selling implies transport to the markets. Just as to produce for sale, implies the need to earn cash income.

In many rural parts of Zambia, transport difficulties are checking economic development. For example, many parts of N Province are totally cut off during the rainy season due to poor road communications. Frequent ferry crossings, such as the one at Chambeshi river on Kasama-Isoka road, do obviously raise the costs of the journey.

In view of this strategic role of transportation to development, it becomes therefore important to study how lack of sufficient and/or efficient transportation net-work impedes rural development. One must analyse the impact of road improvements on rural development.

Efforts to try and expand agricultural output, requires for example: - timely availability of seeds, fertilizers, and other inputs and that farmers must have reasonable access to their markets. Expanded industrial outputs also requires the efficient transport of raw materials, as well as for the distribution of finished products. Access with towns and cities, is required to facilitate the outflow of commodities to urban areas and the inflow of finished consumer goods to rural areas, (23). It is on these aspects that we shall contribute, and it is our hope that our study will contain some observations and agreements which would be convincing enough to show that *unless* transportation is improved, agricultural development in the rural areas, will continue to lag behind. Our purpose will be to arrive at a discussion which would motivate the decisionmaker as regards to transportation problems. (24)

1.6 Methodology/Approach

Our approach will be to try and show that - if rural road transportation is not improved, then the general Rural Development in the area would be impeded. We shall try and illustrate the effects of the improvement of feeder road net work on agricultural and rural development in general.

Factors which have some bearing on rural development which get influenced as the road net-work gets improved are:

- 1) Accessibility - communication to far off areas, improves. Seasonal communication becomes - all year round.
- 2) Area coverage - the better the communication, the larger the area an extension officer can cover. Also the better the service function.
- 3) Vehicle speed - the better the roads, the faster the speed of travel. This way, a lot of time is saved.
- 5) Road distances - the less the swings and bends in road construction, (when improving the old roads or tracks), the shorter the road distances become.
- 6) Traffic volume - the better the roads, the more use of larger vehicles, the bigger the volume of goods/produce to be carried.
- 7) Perishability risks - the better the communication, the less the risk of transporting perishables.
- 8) Improved transportation - has a strong effect on price and market mechanisms. You also have the impact on socio-economic development.

We assume that if these functions are impeded, due to shortage or poor road transportation, this would in turn constrain rural development. We further assume that increased rural development, can be achieved if the rural road-net-work gets either expanded, re-built, renovated, or improved in some way. It is the relationships between road net-work and agricultural yields which makes this of interest to us.

We have to be aware, however, that the impact caused by road transport improvement may be either positive or negative, and that the extent of this impact may also differ at different time periods. Road transport improvement may also lead to other chain or spillover effects, some of which may not have any relationship to agriculture at all. These effects may be of either a social, physical, or monetary nature - short or long-term.

For example, road transport improvement, may result in more traffic - The effects of increased traffic may not only be upon agriculture. Increased mobility could also sometimes lead to negative population resettlements or movements. Just as a new road may provide no monetary gains to the users other than convenience, to name a few.

Although the study is by and large a pre-empirical analysis, it is hoped that the work will form a Model basis for later empirical studies. The study could for example be followed up by: field surveys, feeder road system surveys, farm population surveys, crop yield surveys, and collection of data on general transport infra-structure like was done in Kenya. (25)

In this study we are going to view the issues from a 'what it is' angle to a 'what to do' or 'what it ought to be' perspective. Our ambition will be to try and put the matter in the so called black and white terms road-transport-factorwise, thereby hoping to provoke further discussion, or at least attract some attention of the people concerned. (26)

Also since the scope of this study will only be provocative, it is sufficient only to assemble and produce evidence about the major transport factors which we believe help to determine the incidence of rural development in this region.

A critical review of other case studies and findings suits us because: a) Time and resources were not available for empirical studies of our own. b) Our study is an advisory of factors, most relevant to transport problem. Thus the study deals mainly with the elements of transport infra-structure which affect rural development. In this way it is hoped a contribution can be made to the fund of knowledge on the transport problems constraining the advancement of agriculture.

Because we believe that there must be co-ordination between policy and strategy, we have began the study of this problem, with the analysis of relevant government policies and its objectives, then proceeding on to the theoretical concepts. Since raising agricultural output is considered to be an important element in combating the problem of poverty, we shall analyse the scientifically proven factors for solving transport. In short defining and describing transportation impacts on agricultural production

Since the theme of our study is IMPACT, we shall be dealing with the effects of transport improvement. While feeder road system may cause different effects on the people of the province, but our main interest will be to try and identify those effects having some influence on agricultural output and the life of the people, such as the cultural impacts.

NOTES AND REFERENCES I

- 1) See the report: Monitoring & Evaluation of the Rural Access Roads Programme: The Impact Study, by Ministry of Works Roads Department: Government of Kenya, Nairobi Febr. 1977.
- 2) Ibid., No 1 above. The Zambian government too has now recognised that agriculture depends on the performance of the transport sector, for the timely delivery of inputs to the agricultural sector, and movement of agricultural produce to market centers. Together with measures that will IMPROVE the feeder road situations, this will have a direct impact on agricultural production in the immediate future. Economic Report, 1979, p. 48.
- 3) Ibid., Kenyan Report from above p. 1. For the nation as a whole, vigorous plans are afoot for the development of feeder roads, so essential to the development of the agricultural sector.
- 4) See Athur T. Mosher, Published for the Agric. Development Council, New York, 1966, "Getting Agriculture Moving" pp. 60-61 and Kulp, E. M. Preager Special Studies, New York, 1970, Rural Development.
- 5) See Athur T. Mosher, op. cit. p. 183.
- 6) Throughout the thesis the word 'region' will be also taken as to mean 'province'. The word province is used to express geographical position, while region is used in the planning sense.
- 7) See Republic of Zambia, Quarterly Agric. Statistical Bulletin Vol. 4, No 2, Lusaka June 1974. This line of rail does not include the new Chinese-built railway which was opened only a few years ago in the post-independence era (in 1975).
- 8) See SIDAs Fakta Blad: Zambia, and Robert H. Bates, Yale Univ. Press, New Haven, 1976, Rural Responses to Industrialisation, pp. 160-165. The colonial policy of reving poll and head tax, forced a lot of rural labour to migrate to towns seeking work even though the job opportunities were not sufficient. In 1974, it is estimated that the N. Province population as a percentage of the total was, 12,4 % or about 0,6 million people (600.000). In 1978, if we take it as being 10 % of the total (allowing for migration to towns), it stands at about 0,55 million (about the same as four years ago).
- 9) See Ann Seidman, Univ. College, Dar-es-Salaam, 1973, Alternative Strategies in Zambia. Seidman estimates that between 40-60% of Zambian adults are now at least temporarily resident in the urban areas. 20 % of this live in (illegal) shanty compounds and that at least 20% of the labour force is unemployed. See also Bates p. 160, that in 1969: of all the jobs, at least 83,9 % were on the

line of rail; and that at least 49,4 % of the population was on the line of rail; that off the line of rail, there were only 16,1 % of all the jobs; and that 50,1 % lived there.

- 10) The size of the income which reaches the N Province is very small, (peasants' income is about K50-200 per yr), since income distribution depends on factors for which the province is badly placed. These factors are: Size, and availability of family labour (males usually migrate to the Copper Belt); Availability of water and natural fertilizers (the province is remote from sources of commercial fertilizers, and that although there are many rivers and tributaries, a lot of land is dry-land); Storage, rural storage depots are very few and poor; Transport and Marketing facilities are critically short; Refer also to M R Bhagavan op cit, p 39.
- 11) See Anna Tibaijuka, 1978, Strategies for Smallholder Agricultural Development in West Lake Region: Tanzania (published Masters Degree Thesis) by Swedish University of Agricultural Sciences, Uppsala-Aug 1978.
- 12) See Doris Jansen Dodge, University of California, Berkely, 1977, Agricultural Policy and Performance in Zambia, pp 6-9 (There have been some efforts on the part of govt to stop citemene system).
- 13) See N R Fuggles-Couchman, Dar-es-Salaam, 1964, Agricultural Change in Tanganyika 1945-1960 p 48.
- 14) See P B Mushindo, Kenneth Kaunda Foundation, Lusaka, 1976, A Short History of the Bemba pp 5-6.
- 15) Ibid, Mushindo, pp 23, 25, 29.
- 16) Ibid, Mushindo p 19.
- 17) See Robert Bates, op cit, p 165.
- 18) The major part of the province is under peasant economy. In a peasant economy, a large part of the output does not go to the market. It is consumed where it is produced, the problem being largely due to lack of rural road transport system. This means that the economy is not yet monetized (Mpakati also makes this observation for the most part of Tanzania; Mpakati op cit, p 130). In this situation the role of cash crops becomes obvious. In turn, transportation facilitates the production and sell of these cash crops. This way it helps out in monetizing the subsistence sector.
- 19) See Wilkinson, R G, London, 1973, Poverty and Progress pp 198-200.

- 20) See Z. Cerevenka-R. Weiss, Uppsala 1974, Zambia: The First Ten Years 1964-1974, p. 4. Cerevenka reports that more than 50 % of total Zambian population, is under 15 years old. This indicates that at least Zambia has got a lot of human resources which could be used to blossom agriculture. Unofficial reports have been circulating that there are at least one million Zambian youth jobless - this is a lot of human resource.
- 21) See Kwame Nkrumah, Accra, 1965, "Neo Colonialism: The Last Stage of Imperialism". Many people fear that if nothing is done to break these vicious-circles of poverty, poor countries would continue on remaining poor. In order to break up these vicious-circles, agriculture in these poor countries has to be modernized. Other aspects which contribute to these vicious-circles are: too low rural productivity, low total rural output, and disgusted rural life in most of the poor countries. Outstanding studies on poverty-vicious-circles, have been done by people like, Gunnar Myrdal, Liebenstein, and Nurkse. Liebenstein for example, points out the fact of low nutrition as being associated with limited physical effort. Nurkse's argument on the other hand is that: low income is due to low productivity which in turn is due to lack of capital, and that low demand is due to lack of purchasing power.
- 22) In the case of the Kenyan studies, we see that empirical studies gave weight to the ideas suggested earlier on. In our case, we are drawing up these ideas. But we still recognise the fact that what is needed in N. Province, is not only consideration of speculative theories, but empirical investigation too.
- 23) Since we believe that good strategy choices can only be made among well defined alternatives, whose aim should be to try and maximize the attainment of these well-defined goals, then our task will be an attempt to try and define the feeder road problem in a rural region.
- 24) The Zambian Govt. Economic Report, 1979, p 48, confirms this. See also N. Province Annual Report 1975 p. 1 - Issued by office of the Cabinet Minister for the N. Prov. In a simple (field) survey conducted by Anna Tibaijuka in W. Lake Region of Tanzania, locational obstacles coupled with poor transport system has ranked as number 1 problem facing agricultural development. See A. Taibaijuka's M.Sc. thesis op. cit. p. 100.
- 25) See Kenyan report quoted in reference No 1 above p. 2.
- 26) See Gibson, W.L. Jr etc. 1966, Methods for Land Economics Research, Chap. 3: Identification of Problems.

CHAPTER TWO

II IMPACT OF GOVERNMENT POLICIES ON AGRICULTURAL DEVELOPMENT AS PART OF THE ROAD IMPACT

2.1 Government Objectives

We have so far been discussing the impact of improved low-class roads on agricultural production as one thing. But equally important is the impact of *government policies* on agricultural production and the general rural development. All the good things which road improvement creates, can only be felt practically if the government policies and actions permit. (1). Political conditions prevailing are of fundamental importance. There must be political stability and security.

In the national plans and according to Rural Development Policies, five major objectives appear to have received emphasis. (2) These are: Refer to figure 2.1.

- (i) The goal of self-sufficiency in food needs. The production of crops and livestock which must be sufficient enough as to meet the national needs, and particularly to be self-sufficient in staple foods such as maize, This is in order to reduce the growing dependence on imports.
- (ii) The second objective is the promotion of export crops, thereby increasing agricultural sectors' contribution to the GDP (it is better to express GDTP as net material product). The intention is to have surplus from crops such as: maize, groundnuts, beans, fruits and vegetables, poultry, pigs, sheep, goats, cotton, sunflower, sugar, rice, coffee, tea, bananas and tobacco. (3) Note that most of these crops can be produced in N Province, and sell well on the world market.
- (iii) The third objective is the involvement of rural farmers in agricultural development. Peasant farmers are to be encouraged to replace the exodus of European commercial farmers which happened soon after independence. The aim of this objective is threefold: a) That more participation of rural dwellers in cash agriculture, increases their purchasing power, thus help in reducing the rural poverty and improve income distribution. b) That more participation means more people employed. c) And that the rural standard of living can only be raised if people participate in rural development. For example, water supplies and dam schemes, can only be constructed if people are to take advantage of them, otherwise it would be a waste of resources. This third objective was also aimed at diversification into the rural areas.
- (iv) The fourth objective being the improvement of the Nutrition Standards, in all parts of the country. This means that production and consumption of protein and protective foods in rural areas ought to increase. In this attempt, more milk production was to be encouraged, and that direct food production schemes where necessary, had to be started. As far as this objective is concerned, N Province is strategic, in that, it is the only source of "Kapenta Fish" a staple

food for nearly every indigenous Zambian. It is also a good source of other favourite types of fish caught from Chambeshi river. It has also good grazing and ranching land (parts of Mbala and Isoka districts - ex, Mbesuma State Ranch, Shiwa Ngandu and Kalungwishi Ranches). It also has a lot of areas where vast agricultural potential has been demonstrated, eg Ngoli Coffee Scheme, Nashinga Rice Scheme, and places where mixed farming and settlement schemes can be expanded eg Mungwi, Chifwile and Mufubushi. Besides, the province has the best climatic and soil conditions for citrus culture.

- (v) The last and fifth objective being, to create in rural areas new employment and income opportunities, and to improve those infra-structural services related to increased rural productivity, in order to counteract migration to the urban areas.

Although these objectives appear to have been clearly defined, after intensive examination of government reports and case studies conducted on policy and plans, it does (4) appear that a lot of these have not been achieved, and that there is no concrete and clear cut policy, plan or strategy by which these objectives can be achieved. Plans fail to set out exact ways and means of reaching these goals and aims. (5) This is to say that the framework by which resource allocation needed for the achievement of these goals can be made, is not spelt out. The policies on agricultural development are not tied up with those concerning other sectors like mining. There are simply no linkages. What seems to receive emphasis is verbal pronouncements. (6). Plans are not backed up.

Concrete policies are those which back up or promote the agricultural production pre-requisites, namely:

- Regular supply of essential commodities and inputs.
- Education programmes tied to the needs of the people. Education which promotes self-confidence in the rural people.
- Minimization of rural malnutrition.
- Promotion of rural health services.

Each one of these has a direct link with road transportation service. These form what might be termed at complementary sectors to rural development.

Figure 2.1

OBJECTIVES

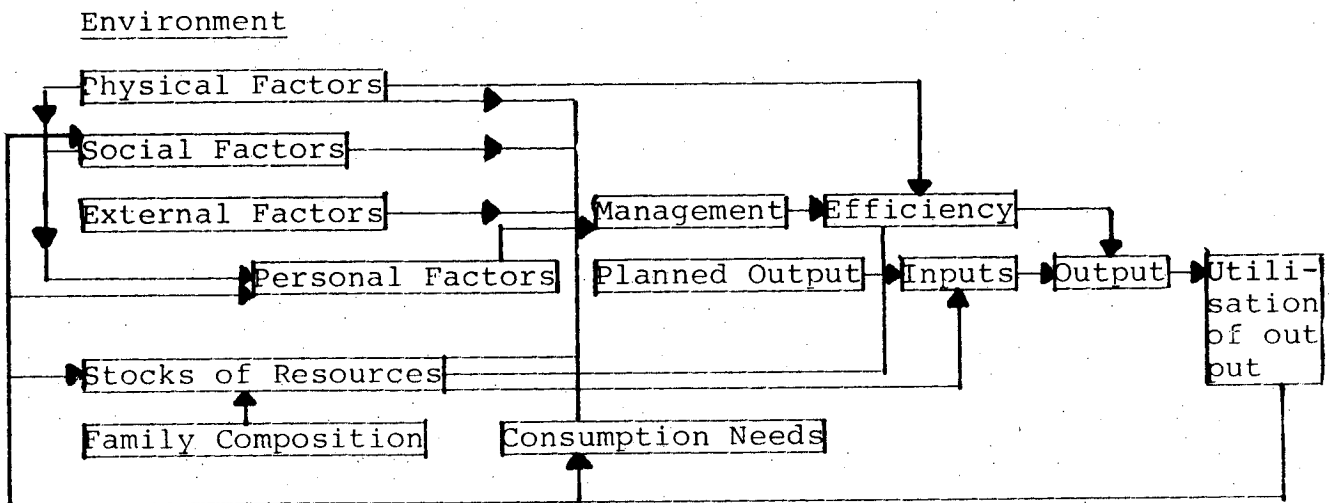
<u>Goals:</u>	<u>Expected Output:</u>
Self-Sufficiency	Reduce Food Imports
Promote Exports	Contribution to GDP Promote Diversification
Improved Rural Standards of Living	Create Self-Reliant Society Create Progressive Rural Society
Improve Nutritional Standards	More Production/Consumption of Protein/Protective Foods
Create new Employment And Income Opportunities	Improve Infra-structural Services Increase Rural Productivity Increase Employment Opportunities Counteract Migration To Towns

Note: The diagram is based on objectives Spelt out in The Second National Development Plan, Jan, 1972-Dec, 1976. Drawn by the author.

2.2 Importance of complementary sectors

Agricultural development requires other complementary sectors to be developed. Transportation facilitates their development. Many agricultural economists have argued that, the total absence of transport facilities is often a greater constraint to growth of rural income, than lack of agricultural development activities themselves. On the other hand it has been shown in many regions of the third world that the provision of transportation alone, without complementary agricultural promotion activities, is not sufficient in "getting agriculture moving", to borrow Mosher's expression.

Andrew Tench produced a Socio-Economic Model of village production factors in Zambia as something like the diagram below: (7)



Source: Andrew Tench, 1975, Socio-Economic factors Influencing Agricultural Output.

These *complementary sectors* are those that lead to the promotion of socio-economic development. These are the sectors of activities involved in the entire community development. The major ones are: Education and training. Health services, Family planning and Community development, Promotion of mass literacy and Radio Farm Forums, and Mass Mobilization.

2.2.1 Education

Education is a complementary sector and a major welfare service, and part of community activities. It is crucial to the development of the individual, and is therefore an invaluable social investment, which facilitates society's productive capacity. It is always contained in rural planning problems.

In education programmes, attention must be paid to giving vocational and technical training. For in Zambia, particularly in the rural areas, there is a severe shortage of skilful technical personnel. Education needs to provide youngsters with the necessary production skills. So that these people can also end up with a meaningful life. That is why it is always necessary for policy to emphasize on such trades as: agricultural production, gardening, domestic economics, carpentry, bricklaying, blacksmiths, mechanics and road building. Since rural youngsters normally end up with only primary education, this education must be complete in itself and prepare the pupils for a useful rural life. It must teach useful skills. Pupils must be taught how to work with hands.

Among the many roles of education related to agricultural development you have: (a) It produces cadres. (b) It facilitates innovations - by improving farmers' abilities to learn from radio and the printed materials. Zambia is one such country which places emphasis on Radio Farm Forums. This dissemination of new ideas and techniques through radio medium, depends on education levels. (c) Since most of the people in N Province cannot yet read and write, adult functional literacy is very important. In 1974, only about 43 % of the population were able to read and write. This is compared to Tanzania where over 80 % of the population is literate (8):

(d) Education is required when building a structure of rural institutions and local initiatives needed in broadening diversification. The success of farmer organizations, depends on their consciousness. But the key to this is education.

(e) With the educated populace, it becomes easier to develop and organise small scale agricultural holdings throughout the region, such as cooperatives. But it is hard to impart co-operative principles among the illiterate populace.

2.2.2 Health

Health sector is another major welfare service and also a very important investment.-(a) Rural health is an important element in welfare and in income improvement of the people (9): (b) It improves the ability of people to work, by controlling epidemic/endemic diseases such as malaria. Physically fit and healthy people, work better.

(c) Good health improves lives of the people.

(d) As more rural health centers are opened (clinics, dispensaries etc), this way the people get more access to medicine and better advisory services in important matters such as child care and dietary.

Family planning, promoted in social welfare programs goes a long way in improving the quality of life of the people. (e) Population crises can be reduced by family planning. Roads facilitate the spread of information on birth controls and use of contraceptives.

2.2.3 Mass Mobilization

In places where agricultural development has succeeded in a rural area, there must be proper and sufficient mass mobilization.(10) If the rural population is not mobilized (a) participation in agriculture would be poor, (b) the spirit of self-reliance dies, (c) participation in other community activities, complementary to agricultural development would be poor, and (d) mass consciousness would not be achieved.

(e) Without mass mobilization, people cannot stop practicing or believing in old traditional methods of agriculture and taboos (11). Negative cultural impacts are eliminated by mobilization.

Mobilization depends on a number of social and personal factors. Social factors must be influenced or changed in such a way that: the farmer adapts a normal economic behaviour. For example, that the trade-offs between leisure and working time falls in favour of working; That the rationality of the farmer must be increased. Some people have argued that a farmer can be taken to be rational even though he decides to spend his leisure on non-productive activities. But since the farmers' decisions and actions affect production, he must be made to respond in such a way that his actions are such that they would lead him to more production, otherwise progress would be at a stand still.

Personal factors on the other hand, are also very important to farm production. Provision of incentives, motivation, attitudes towards risk, life standards or cultural practices, progressiveness or independence, integration, educational background, awareness of environment, and contact with outside the village and with modern sector *ALL depend* on personal factors. Thus policy must be set in such a way that the levels of these can be raised.

2.3 Long-term national policies and ideology

United National Independence Party, (UNIP) the sole party which even controls the government, has drawn up a list of National Policies for period 1974-1984 (12).

In this document it is clearly put that the economy needs to be diversified, from dependency on mining to expansion of such sectors as agriculture. It is clearly stated that the objectives to be aimed at improving agriculture should be:

1. Self-sufficiency for food stuffs
2. Provide all-year-round irrigation and water conservation schemes
3. The increase of production of raw materials such as cotton, tobacco, kenaf, oil-seed etc
4. Stimulation of production for export
5. Influencing the crop patterns by a pricing policy which should stimulate competition between crops
6. Raising the level of efficiency and effectiveness of the marketing system (13)
7. Improving the outflow of inputs (seed, fert, etc)
8. Improve coverage of extension services and rationalize agriculture by use of new techniques, with an aim to promote the acceptance by the rural population of innovations.
9. Provide credit facilities as an incentive to farmers, as capital required in farming depends on them, and
10. That cooperatives are to be regarded as one of the instruments of development, a tool to reduce subsistence level, and hence must be stimulated.

In spite of clear formulation, there appears to be no concrete plans of backing up these objectives. Sufficient money and efforts is not being spent towards the promotion of these aims. Only when it comes to the last objective of co-operatives, can one see the encouragement in the form of the philosophy of humanism.

The fact that Zambia is composed of several African societies (or the so called ethnic groups) whose existence is basically socialistic by nature, does not mean that Zambia's immediate economic development would be brought about automatically or conditionally through socialism. This is further complicated by many Zambians unrealistic belief that economic development will come out from the process of "take off", first from capitalism to socialism, and then to humanism. It is difficult to know if/when socialism should be preceded by capitalism or vice versa (14). If capitalistic orientation is already existing, this requires careful and cautious re-thinking, if this is to be replaced by socialism. In addition to these isms, it is categorically stated that "land" remains the property of the State. That development of it can only be carried out through leasehold

titles. (15) To socialize land, is believed to be part of humanism and an incentive to encourage Zambians.

But those theoreticians like List, Rostow and Marx, who have intensely studied factors pertaining to economic growth, would argue that Zambia's ideals have tried to ignore some very essential steps in the whole process of development. They argue that true economic growth only comes about after a country goes through the total development mechanism, and that there is no short cut, even though acceleration might be possible. They point out that the major problem of development is the stage by stage transition (scientific in nature). Beginning with a primitive agricultural society, then moving on to an advanced agricultural/industrial society.

2.4 Socialist ambitions

So far we have tried to analyse the climate in which the N Province's agriculture is expected to develop (as part of the national whole). It is important to note that if all the plans projected are to be achieved, it is necessary to have a suitable development environment. Therefore a number of social and economic reforms need to be carried out. These reforms must be effective and progressive ones. Zambia has taken the path of socialism-humanism in hope that its reforms can be carried out effectively.

The development of socialism requires a much higher level of morality than capitalism. If socialism is the one desired, there must be full ideological commitment to it. If on the other hand it is capitalism desired, hiding behind socialism will simply bring confusion. It is also important to point out that - socialism from above cannot succeed. That is why some critics against humanism point out that - the approach as adopted now, only leads to what one might call "authoritative socialism", which is not real socialism.

One should avoid development from the top. The best way is to have development starting from the bottom - from villages. Thus it is very important for the villagers to accept the type of development proposed for them and co-operate fully in the implementation of it. Otherwise there would be failures. The rural people need to participate in development work. Only if there is a reliable transportation, can this aim be facilitated.

In Zambia, however, there has been a number of reforms and steps taken in the socialistic-direction such as: the 1968 economic reforms, which led to a lot of nationalisations and the 51 % shareholding in the mining industry of 1969 (16).

By all these reforms, the government hopes that the power will transfer to the people and thereby motivate them to increase production. In President Kaunda's speech cited above, he said that: "Our decisions in the economic field are meant to facilitate and to increase production This means we have to increase in the supply of goods and services essential for raising the quality of life of our people wherever they live". (17)

- If the goal of Zambia is to build a real development for the people, (socialist), then Zambia should direct her scarce resources towards supplying the basic needs of the entire Zambian population, including the rural areas. After all this is in accordance with humanism.

This goal, of course is not yet achieved. The implementation of this socialist strategy is still very difficult because of the absence of the four key requirements, which even the President himself has often recognised, namely: Hard Work, Honesty, Sincerity, and Sacrifice. These are cornerstones for development. To date only few Zambians can meet these requirements. The nonchalant attitudes and scepticism about the rural areas, is a drawback. In fact the President himself has warned that: "instead of exercising power on behalf of the people, some of us have been gripped with the 'get rich quick' approach". These attitudes must be changed. (18)

2.5 Policy Review

In the case of Zambia, (N. Province, only happens to be a part), although we can judge by the impressive list of objectives that the policies have been clearly defined, performance in practice has not been that encouraging. (19) In Zambia today there is no one who can deny the fact that the country still lies very far away from the goal levels. Production of most of the essential commodities is still below self-sufficiency (20) The failure has been largely due to lack of emphasis on agriculture earlier on. (21) Both the local and the international mass-media have reported critical shortages of essential foodstuffs; such as cooking oil and maize meal. (22) The better evidence of weak agricultural base has been the recent collapse of copper prices and poor export routes which have led the country to almost economic ruin. (23) Apparently targets projected in development plans have been hard to reach. (24) Although the crisis has often been blamed on geo-political location of Zambia, the fact remains that national policies for rural development carried out, have also failed to expand agricultural production capacity to the required levels.

Had, for example, agricultural output been large enough, some of the burden of low copper prices, could have been cushioned by this sector. It is in fact shameful for a rich country like Zambia, with such a big agricultural potential, to be relying on food imports 15 years after independence. Only a well calculated policy and planning can be able to take care of food needs.

There are many reasons for these inadequacies (which presupposes curing measures). We can identify some major ones as being: The first inadequacy is that the agricultural policies although drawn up in good intentions, have only ended up on paper. (25) After UDI (1965), it was urgent to see that agriculture took second place to the more urgent problems of re-orientating the economy away from the South. Verbal pronouncements have lacked back-up, total commitment, or belief in them. A.B. Chikwanda, the former Minister of Agriculture, once called this as "the difference between having concern for actual performance and rhetoric", Gibert Etienne calls this line of approach as "the conflict between dogmatism and pragmatism". (26)

Writing on this, he said that most developing countries consist of dogmatic versus pragmatic planners. Dogmatic planners believing in fine political slogans, empty of any content. This group consists of shortsighted or intriguing politicians. While pragmatic planners are those who are more interested in the implementation of the plan and its concrete achievements. These are the men who are endowed with a minimum of understanding and take measures which lead to fruition. (27).

- In spite of the plans of favouring agriculture, priority has been and still is given to the luxury needs of rich town people, at the expense of the basic needs of the villagers and the poor urban people.

- The policy has tended to promote - as someone put it "private car and town civilization" and as a result, urban attractions have robbed the rural areas of work force.

- Although some urban sectors of the economy might seem to be doing alright, in the meantime the whole Zambian economy suffers. Hence, as a consequence, you have today Zambia on the list of UN poorest nations in the world.

- Due to lack of effective measures, rural-urban and rich-poor gaps are growing. In 1972-73, 64 % of rural households and 19 % of urban households had incomes below the poverty line (K990/yr urban, K370/yr in rural) - ILO report, Lusaka 1977.

- The rural-urban terms of trade have also deteriorated by 20 % between 1965 & 1976. This widens the income differentiation. Urban life is thus more attractive. This way, nobody is willing to work and live in the remote areas. But as we have pointed in another section of this work, remoteness and rurality can be reduced by better transportation.

The second inadequacy is that the government has not exercised enough efforts in agriculture (like it has been done in other sectors), in a way of encouraging both short-term and long-term investments in agriculture. At best, less than 15 % of total national budget, has been allocated to the Ministry of Rural Development, for example. (28) Back-up to verbal pronouncements or intentions, requires that the government should provide sufficient amount of the necessary finance for investments in the rural infra-structure and services to the farmer. Where funds have been available, they have been misdirected to the wrong type of would-be farmers. A fact which has contributed to the slow Zambianization of commercial agriculture. Most of whom have deployed the funds on "non-agricultural" ends. In cases where funds were spent by government, these have been used on capital-intensive techniques having a large import element. A lot of these techniques have got strained during the periods of low copper prices.

The third inadequacy, is the pursuance of policies which have resulted in a highly uneven development of agriculture: having few viable large commercial farms on one hand, and many unviable peasant/village holdings on the other. This imbalance is even likely to lead to class conflicts. (29) Theodor W. Schultz, calls this - the "disequilibrium philosophy" - that is having on one side poverty and underdevelopment in agriculture, and on the other side richness together with a high level of production techniques.

Malnutrition and unemployment in Zambia are becoming worse amongst the poor people. Undernourished populace cannot be very productive. Besides, unhealthy children cannot be expected to develop better intellectual attitudes. The young generation needs intelligency for developing at least the "instincts of survival". Zambia needs dedicated rural youth. Government directives must not forget to consider these issues. The rural people's real situation and their possibilities to take part in production, must be correctly reviewed. Peasants can be able to grow enough food only if they had the means and possibilities to do so.

The fourth point is that crop pricing and marketing has had an adverse effect on the attainment of government objectives, in that it failed to narrow the gap between: urban and rural income levels; to increase self-sufficiency in food requirements; to increase cash incomes in the rural areas; and to diversify export earnings away from copper. (30)

The fifth inadequacy, is the failure to make a concrete review and evaluation of how much of the planned-for-activities have or have not been achieved in such a way that:

- one is able to see obstacles
- one is able to see the shortfalls of the plans
- one is able to see at the end of each year how much of the country has been developed/modernized compared with the previous year/s (modernization here implies improvement of the old technique to new one).

Concluding this chapter of "Impact of Government Policies", we go along with Patric Ollowa's summary of Zambian style of decision-making when he states that: "usually policies in Zambia represent political addresses and declarations delivered in different context to satisfy divergent psychological needs and expectations..... attention being focused primarily on dramatic shortrun innovations to deal with immediate pressing problems, rather than on long-range programmes". (31)

NOTES AND REFERENCES II

- (1) Improvements in the standard of living among the rural population requires enlightened policy measures which stimulate an increase in production and productivity, see Tench op. cit., p. 269.
- (2) For more details refer to 2nd National Dev. Plan. Lusaka Jan, 1972- Dec. 1976, issued by the Zambia government. See also Doris Jansen Dodge book p. 70.
- (3) See Zambia 1964-1974, Issued by Zambian Government in 1974, Lusaka pp. 23-24.
- (4) See Doris Jansen op. cit. p. 1 and 78. "The performance of the agricultural sector in Zambia in the twelve years since independence (1964) has not been very satisfactory by almost any criterion one might choose to use". Agricultural contribution to the GDP declined from 8,2 % in 1964 to 7,6 % in 1973, Doris Jansen pp. 1-2. See also Tench, op. cit. p. 269: "So far it is regarded that the measures taken, have been leaps in the dark". See Patrik Ollawa op. cit. p. 4. These people feel that Rural Dev. Policies in Zambia are promulgated without advanced exploration of the probabilities of their implementation, given existing circumstances and available resources.
- (5) The handicap of many developing countries, is that they rely too much on prescriptive planning, which does not formulate the alternatives well. This is when the planners just prescribe targets based mainly on assumptions, or chart out a development course for a number of years ahead without assessing how these targets could be reached. The Swedish 3-year agricultural negotiation periods, is a good example of how a strategy tied with the available resources should be.

- (6) See Doris Jansen, op cit p 3, "there is a great divergence between the governments' professed aims regarding agricultural production and rural incomes, and the performance of the agricultural sector of the economy.." See also Tench, p 269, "More debating is done than actual work".
- (7) See Andrew Tench, op cit , 135.
- (8) See Bistånd genom SIDA-Anslagsframställning. 1979/80, p 149. Ollawa has observed that: Most Village Productivity Committee members including the village headmen who serve as Chairmen, are illiterate and consequently cannot properly follow the organizational procedures outlined in the VPC Pocket Manuel". 22.
- (9) The Government must provide efficient, adequate and free health services for all people. This objective can only be reached if there is some form of good communication.
- (10) Mobilization of progressive or successful farmers is necessary, since extension advice is usually directed at mobilized and partly conscious villagers and family cooperative groups.
- (11) For example although kinship system plays a useful social function, by say preventing an individual from starving, it has some in-built disadvantages. It is hard to judge a person's individual contributions since everything is done in a group, and since these are judged as to the effort a person has put into his fields - regardless of whether labour is effectively used or not. See also Tench p 273.
- Tench observed that: - "rural dwellers feel that it is better to be involved with production than in actually achieving results. "p 273. To support this, he produced evidence which showed that land preparations and weeding are in fact very often times continued even beyond the point of increasing output. This is dab. Education must be used to remove these barriers.
- (12) See UNIP - National Policies for the Next Decade - issued by Freedom House, Lusaka, 1973,. Zambians are much more concerned with finding solutions to short-term problems, rather than investing their efforts in drawing up lasting and long-term solutions. Many observers say that Zambians are only experts at managing short-term crises.
- (13) See UNIP National Policies for the Next Decade 1974-1984 issued Lusaka.

- (14) See Speech by President Kaunda, Lusaka, June 1974, "Orientation to Consumption vs Production:" delivered to the 10th National Council of UNIP pp 14-15, concerning the ambitions about Zambian Humanism, read also the Mulungushi Declaration (1968), and Humanism Part II (1974).
- (15) All land became the property of the state in 1975. The opposite of leasehold is freehold, the latter in which case land is owned privately and could be exposed of by sale. Only careful planning creates motivation to exploit state-owned lands.
- (16) Many people believe that, the biggest difficulty encountered when trying to implement socialist measures in Zambia is that - the parastatal organisations, have still their enterprises managed on the capitalist 'mode of production' in which the process of production has the mastery over man instead of being controlled by him, and that control powers are still in the hands of external interests.
- (17) See President Kaunda's speech, Lusaka, June 1977, p 3.
- (18) Ibid, p 3.
- (19) While it may be easy to formulate the aims and objectives, case studies done in Zambia by various people Doris Dodge Adrew Tench, Joachim Lüring, and Ann Seidman, have shown that the question of implementing them has not been that easy. Socialistic and capitalistic ideas, have not been mixed well.
- (20) Doris Dodge comments that: "the lack of development in the rural areas in Zambia, inititally appears somewhat surprising for two reasons: (i) First, the fact that government has indicated a high priority for rural development, and (ii) Second the fact that until quite recently the Zambian government has had substantial funds (from copper boom exports which could have provided the necessary finance for investment in rural infra-structure and services to the farmers." See Doris Dodge op cit pp 2-3.
- (21) In a speech to the 10th UNIP National Council, President Kaunda said that: "I submit that some of the economic ills must be blamed not only on external factors but also on ourselves....." June, 1977 p 4.
- (22) Headlines like: "Maize crisis looms...", appear very commonly in the Zambian newspapers. Recently a Director of Agriculture when addressing a workshop on national policies for rural development, admitted that the country has not been harvesting enough maize, Times of Zambia, Jan 11, 1979.

- (23) Attati Mpakati, op cit, 125, claims that: "the fail-ures in implementation of development plans in the developing countries are created by what he calls 'the division of responsibilities' between the society on one hand (the political party in power) which makes project identification and experts on the other (who perform the actual process of plan making)". This results in a conflict between the politicians and experts - (Mpakati did forget about military power in command which can also take the place of political power).
- (24) In the 1978 Econ Report, op cit pp 39-40, it is reported that - low copper prices affected nearly all sectors of the economy. For example production of poultry meat and eggs went down by as much as 50 %, from an all record annual rate increase of over 400 % since independence.
- (25) This judgement is verified by the findings of Doris Dodge, Berkeley, 1977, Agric Policy and Performance in Zambia: History, Prosepts and Proposals for Change, pp 67-68. There are many, also who feel that: many of the developing countries' plans only end up in beautiful documents, because of "excited beliefs" in too academic and sophisticated economic theories, which are abstract and divorced from realitites in their race for trying to be 'as good as' the developed countries.
- (26) G Etienne, 1968, Studies in Indian Agriculture: The Art of the Possible. p 305.
- (27) Ibid, p 305. The collapse of COZ is a good illustration.
- (28) See Doris Dodge, op cit, p 68. Investments in immovable capital and improvements of agricultural structures, stagnated. Expatriate farmers concentrate on maximizing short term profits.
- (29) Mafeje, op cit, contends that: "in developing countries like Zambia, poverty of the masses is caused by the neo-colonial exploitive political and economic structures". In these countries he says: "the few, in the upper class have it so good while the majority lower classes, some of them live even below subsistence level".

In support of this, refer to M R Bhagavan Studies op cit Bhagavan has observed that: in Zambia "the income differential between the lowest and the highest paid employees is about 1:20, and 1:50 between lowest and highest agricultural employees". p 73".....and that 75 % of the people live at the bottom and only 11 % are at the top end. He compares the employees' incomes as:

	<u>% of Employees</u>	<u>% of Wage Bill</u>
Working class	74,3	48,6
Managerial and supervisory	10,8	37,7

These are very revealing figures. For more details, read Bhagavan Tables p. 73.

- (30) The little money that trickles down to the rural people, is probably all spent on supporting their basic diets, leaving no money at all for savings, (with no savings, Keynes laws would not be applicable) or other necessities.
- (31) See P. Ollawa, Hague, 1977, Rural Development Policies and Performance in Zambia: a critical inventory, p. 35

CHAPTER THREE

III REVIEW OF THEORETICAL CONCEPTS

3.1 Relevant Development Theories

When a person wants to travel from one place to another and there are so many ways to choose from, he will be forced to choose only one alternative: and this alternative must be chosen for its advantages, that it may be either the shortest, may be the best in terms of convenience etc, or it may be the cheapest. When discussing the road system, we cannot isolate it from the entire rural development concept. We must in fact connect the road system to agricultural development. But agricultural development can only be achieved after application of the most suitable theory or development alternative (1).

One of the basic things we have to accept from the beginning is the fact that development cannot take place in a vacuum. It needs development environment. This environment is what is commonly referred to as infrastructure. From here we proceed on to say that transport is part of this infrastructure. Transport problems facing many parts of Zambia like N Province, are not only due to internal constraints, there are external constraints too. Zambia, as a land locked country, has to rely on few export routes for all its imports and exports.

In our context we take transport to mean: (in general terms) all roads in the region including dirt roads and paths, subdivided as follows: a) connecting roads, which link market points. b) access roads, linking villages to market points or to roads leading to market points. c) and spans, which includes bridges and culverts.

In the road improvement (IT) IT = Transport Improvement package, emphasis is placed on improving the existing road net-work rather than construction of new ones, because it is very common that capital is scarce. Thus this package can consist of two parts:

- i) - to rebuild, expand or widen, and repair or reinnovate existing main and secondary roads in order to - a) support present and future traffic/development potential. (ie reduce overloading) - b) connect and serve better all major districts in the province.
- ii) - to construct the net-work of feeder roads which are needed to serve the remote parts. This includes the repair or construction of bridges. Road infra-structure is required in order to open up new farm areas, and facilitate current and planned-for population settlements.

When discussing agricultural development, many different kinds of development theories are raised. Factors leading (2) to economic growth are examined, and these are many. Of these, our main concern will be to examine those which seem to be contributing something to the reduction of poverty, and which help in bringing about progress. Of immediate need then would be to identify those factors which stimulate development and bring about quick structural development in rural regions like the N Province. For it is in the interest of all, that poor rural areas get developed. It is in this context, that transportation is one such important factor. It is important because it facilitates the utilization of factors of production.

There are many theories of agricultural development, but here we shall limit the discussion only to those models or tools from which we believe the N Province planning can benefit or in which transport is an important element or plays some role.

Through these theories, we have made an attempt to give some explanations of the hindrances of agricultural development in this part of Zambia. Although the applicability and suitability of these theories for use to the local conditions of Northern Province are yet to be worked out and confirmed, we chose those theories already in wide use and which we think stands a better chance of being used in solving development problems facing Northern Province.

3.1.1 Regional growth theories

As we have noted before, there are so many economic theories which try to explain either the causes of underdevelopment or backwardness of a region or ways in which strategies of making improvement or change should be planned. We shall try to limit ourselves to only few of those which affect "regional growth". Of the many "regional growth theories", three seem to feature very prominently in this discussion;

- a) Location theory
- b) Export or staple theory and
- c) Trade theory (3)

3.1.2 Location theory and agriculture

According to Berry, (4) this theory aims at trying to explain and predict the location of economic activities. It embraces three levels of observation: a) location of an industry/company, b) competitive locational equilibrium of sets of industries/companies, and c) the relative locations of sets of activities, such as land uses. We are concerned with the latter (c).

In the first observation, the concern is one of cost minimization. Transportation improvement contributes very much to this factor, as regards the movements of raw materials and finished products. Various cost levels in a region in relation to those prevailing in other regions are computed. This provides valuable information on which industries are likely to be successful in a particular region.

In the second observation, the problem is the competitive locational equilibrium for a set of industries/companies, either of the same type and scale, or of different types of agglomerations. These compete among themselves. For instance structural changes in the economic environment such as technological advance in agriculture, may cause marginal industries/companies at different levels in the hierarchy to fail, while more efficient ones survive during crisis periods.

In the third observation, Von Thünen's theories of location and land use, apply. (5) (See also section 4.8 of this thesis). This theory explains how different uses of land can be allocated in terms of economic rents. This theory can also help us to determine the location of areas with the greatest agricultural potential. The theory comes into our discussion because it touches on issues, which are relevant to road improvements, affecting the cultivation (use) of land far and near in a region.

One easy way of understanding the impact of improved roads on agriculture, is to go back to the theories of location. One examines how location factors affect, for example, the use of land. The main concerns of location theory in relation to agriculture are the problems arising from the general loss of time and the effect of distance upon the way in which each plot of land is used. (6) Thus scattered plots on a farmstead, or outlying farming regions within the province, pose significant transport problems, which in turn affects agricultural development.

In his major work, 'The Isolated State', von Thünen, tried to discover the laws which govern the prices of agricultural products and the laws by which price variations can be translated into the patterns of land use. Von Thünen argued that:

"the area distribution of crops and livestock and of types of farming, depends upon competition, between products and farming systems for the use of any particular plot of land". (7) von Thünen was concerned with two particular points. He tried to show that:

- (i) First, the money return over and above the monetary expenses increased by different types of agriculture.
- (ii) Second, the contention that such net returns pertain to a unit of land and not to a unit of product.

In order to demonstrate the process of competition as regards to land use, von Thünen did also use the "Economic Rent" concept developed by Ricardo. While Ricardo demonstrated the concept in respect with soil fertility, von Thünen demonstrated 'economic rent' in respect to location. See his simple diagrammatic presentation of the idea in Fig 4.1. (8) The diagram helps us to illustrate the significance of transportation.

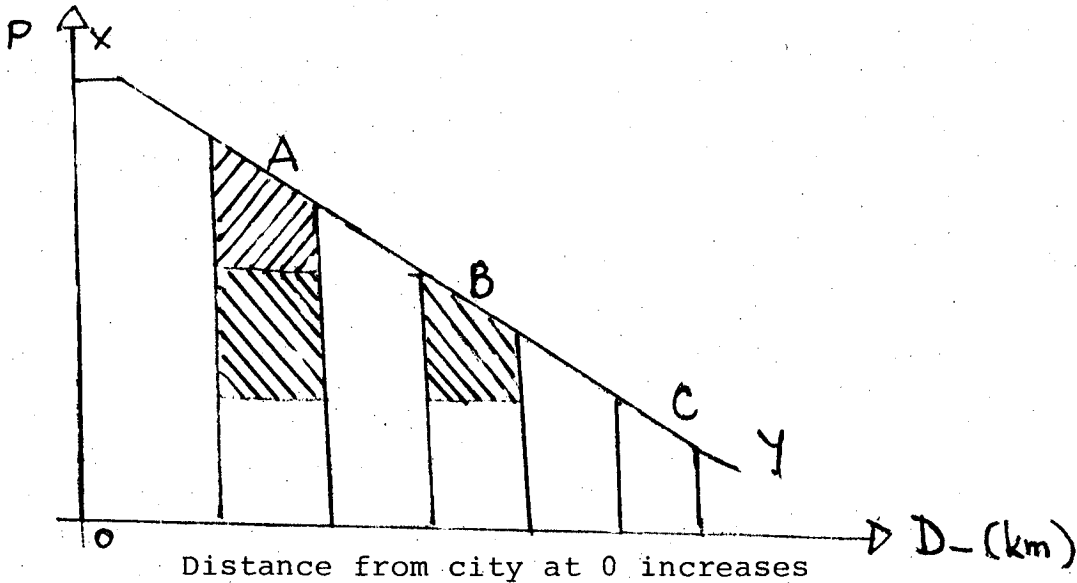


Fig. 4.1 Source M. Chisholm, p. 23.

-  Economic Rent of A land when B is cultivated
-  Economic Rent of A and B land when C is cultivated

The major elements contained in von Thünen's analysis are:

- (i) The facility ex, bulkiness with which a commodity can be transported to the markets.
- (ii) The perishability of the commodity.

These factors determine which crops are to be grown as distance from the market increases. Perishables are grown near the markets, to reduce spoilage. In support of this, you will find that the further away one moves from the urban centers, the more concentration on traditional crops one finds. In the sense that, as it becomes more and more difficult (due to distances and costs) to get the produce to the markets, the less of it is grown. Traditional crops are grown for self-consumption in a simple way.

Von Thünen also presented the idea of calculating economic rents in another way - the isolated state. He imagined a state with uniform soil fertility having a single city located centrally. A state with no trade connections with the outside, and having no lines of improved communications. All goods were being transported by horsedrawn carts etc (9). Based on the data which he gathered for this imaginary "isolated state" over a number of years, regarding: costs of production, yields, costs of transportation, and ruling marketing prices, etc he found that:

- (i) Economic Rent differs at various distances from a central city.
- (ii) That at greater distances from this single, central city, the economic rent would be less.

Thus he observed that by calculating the economic rent accruing to each type of land use at various distances from some central point, one then obtains an ideal distribution of production as a series of concentric circles around this central point. This theory helps us to identify regional crop patterns or say zones of production surrounding a village. This puts emphasis, on how important the distances are from the central point in a region where markets exist. In the case of N Province, the main markets exist around Kasama, with regional markets around different districts or mission stations. These have to be served.

The farmer usually calculates the price of any particular product at his farm gate (local price), which is the market price less the cost of transporting the commodity to the market. Therefore if the distance is sufficiently great and the cost of transport is very high, there will be no profit in cultivating low value crops on the more distant lands. Note that, the returns to be had from some particular crop at a particular distance from the market, become greater as transport cost element becomes smaller. The significance of this theory is that one can use it to grasp the impact of not only the distances from central markets, but also the impact of the improvement of the roads connecting these distances. As the roads get improved along these distances, the better the communication between these far apart places, thus the greater the level of agricultural development along these lines. Considering von Thünens "Isolated State"

theory a step further, it is easy to imagine the improvement of agricultural development taking place along the improved roads and around the district centers. The agricultural development swells around these districts and along the main roads, as the road transportation gets improved. FAO and some other international organizations have been recommending that Zambia needs to expand its agricultural production around town centers, in order to cope up with the swelling populations to the urban centers.

From these principles of location we can also see that road transport net-work will emerge in a region in a certain pattern. Feeder roads may develop along a single transport artery. In the N. Province, this is represented by a few major roads. But the road and railway lines from Kapiri-Mposhi through Mpika, Kasama, to Tunduma, forms the transportation artery of the Province. When an introduction of a single line of communication superior to existing ones is made, some of the impacts may be:

- (i) There is a reduction in transport costs along such an axis. This changes the pattern of production or expansion is expected to take place along this line.
- (ii) Along this line, almost parallel belts of land-use appear, served by feeder roads. More so if the economy within a particular region is especially based on the exportation of a limited range of cash crops such as cotton, tobacco, maize etc, this line of communication supplemented by a rudimentary network of feeder roads, taps agricultural resources and the mineral resources potential. Given data, information and capability to use them, it is then possible to manipulate this information and get a rough estimate of economic returns.
- (iii) Along this line, it is possible or easier for the planner/farmer to select the optimum locations where different crops can be grown. Due to improved accessibility which this line of communication creates, crop specilization becomes possible. This way, improved road/communication services surely make an impact on agricultural development. At least it cannot be denied that road improvement is likely to cause some kind of change within the areas where the road passes. More so, crop diversification may be a good thing from an ecological point of view.

3.1.3 Export or staple theory

The theory explains why entrepreneurs and capital move from region to region. Berry writes that: "migration of entrepreneurs and capital is explained by both the 'pull' of greater expectations elsewhere and the 'push' of displacement". This process is affected by the changes in distances and land values and other resource endowments of a region over time. It tries to explain the problem of settlement in underdeveloped region districts, in terms of the region's main export commodity or staple.

Thus, so long as the export activities (in this case cash crop activities) in a region still remain low, low levels of capital get allocated to such regions. In this way the staple theory is also concerned with the migration of the factors of production (factor endowments), to or from the region. Thus areas with abundant staple exports or local saleable produce attract more production factors. As the staple industry grows, the secondary activities may also eventually become staple exports themselves, helping the region to the point of "take-off" into self-sustained growth. Is this process taking place in the N. Province?

With the aid of the theory, one is able to explain allocations of factor endowments in response to, say, changing demands in towns. As the demand for farm produce rises in urban areas, rural regions must be properly organised to benefit from this. Also a region which has no export potential stands a chance of being allocated little or no development resources, for resources tend to move to regions from where commodities in demand originate. Is the export potential for N Province, being sufficiently exploited?

3.1.4 Trade theory

Berry argues that although 'Trade Theory' was initially developed to deal with movements of goods and money among nations, it can also be applied to deal with similar movements among regions of a nation. (8)

Based on the principle of comparative advantage, this theory helps a region in defining its economic position in relation to others. The principle of comparative advantage, is based on the fact that each area tends to produce those products for which it has the greatest ratio of advantage or the least ratio of disadvantage. The application of this principle in practice helps us to understand why some areas tend to concentrate on the production of a limited number of products, while looking to other areas for many of the other products which they use. This further explains why some regions tend to specialize in only a few crops.

In order to illustrate this, assume you have a production situation in areas A and B which looks as follows:

Land use	Area A	Area B
Maize	30	40
Cotton	50	30

Area A has an absolute advantage in the production of cotton. While area B has an absolute advantage for maize. If area A concentrates only on maize, then only 30 units of maize will be produced.

But in real life situations, the choice to produce is not only based on absolute advantage ratios. The choice may be based on other relative advantage productivity differentials. Even if an area may have absolute advantages for both crops, real conditions may be such that it becomes advantageous for A to concentrate on one crop while B concentrates on the other. There are many crops and actual resources which can best be exploited in N. Province region compared to others such as "Kapenta" fish and certain types of citrus trees.

Locational factors do affect these comparative advantage ratios. Since the Northern Province lies far off from the already industrialized line of rail, it suffers from transportation disadvantages. Produce and other agricultural goods have to be transported great distances from Northern Province to the market areas. Producers along this already developed line of rail, benefits from their nearness to the markets - they save in time, and their produce reaches the markets in fresher condition. They also save in transportation costs (from shorter distances). They are thus even able to compete on favourable terms. (9)

Although the trade theory has tried to give satisfactory explanations of cross-sectional differences among regions, it has failed to explain the effects of change, for example as to why wage differentials tend to disappear and why factor inputs still remain mobile among the regions.

Of the three theories, location theory is the most interesting for the present study.

3.1.5 Popular Agricultural Development Models

There are a number of agricultural development models which have been tried in many developing countries. Of these the popular ones are: - The Diffusion Model and the High Pay-Off Input Model

The interest in these models has been based on the fact that the major concern is the improvement of the backward rural farmer or the uplifting of the traditional agricultural sector. As these models are of great interest to many developing countries, Anna Tibaijuka in trying to scrutinize the contents of these models came up with a very good summary of them. (10) She defines the Diffusion Model as that one which rests on the empirical observation of substantial differences in land and labour productivity among farmers in any agricultural region. Through effective dissemination of technical knowledge from the most advanced to the backward farmer, agricultural production can increase. Today agricultural extension and research efforts are based on this model. The difficulties with this model arise because of the complicated nature of the diffusion process. The other problem is that there is an emergence of a new perspective that agricultural technology is highly "location specific" so that technology developed in advanced countries or regions can not in most cases be directly transferred to less developed ones. Innovations cannot diffuse to other areas without being readjusted to function in the new environment. (11)

In the case of the High Pay-Off Input Model, Anna bases her summary on the studies done by T.W. Schultz. Schultz developed this model in response to the limitations faced by the diffusion model. He contended that the key to transforming a traditional agricultural sector into a productive source of economic growth is investment to make high pay-off inputs available to farmers in poor countries or regions. Thus one has (i) to invest in agricultural experiment stations in order to produce new technical knowledge, (ii) to promote the industrial sector for the development, production and marketing of new technical inputs, and iii) encourage farmers to use modern agricultural factors effectively. The development of new rice and wheat varieties which shaped the "Green Revolution" in some Asian countries are given as some examples. (12)

The High Pay-Off Model is known to be incomplete because it does not (i) establish how investment resources necessary to stimulate agricultural growth are made, (ii) explain how economic conditions induce the development and adoption of an efficient set of technologies by a country, and (iii) attempt to specify the process by which factor and product prices relationships induce investment in research in a particular direction. A country should opt for an agricultural development method which it can cope with, and for which it has resources. These defects, make the diffusion model then more preferable.

3.2 Rural development strategies

3.2.1 Strategy planning

From the previous chapter, we have looked at agricultural development in terms of theories or guiding principles. In this chapter, we shall translate some of these theories in terms of strategies. How do we achieve self-sufficiency in foodstuffs, how do we promote cash crops, how do we know crop priorities, and how do we allocate development resources etc? These are some of the questions for which strategy is required.

Strategy Planning: Agricultural development must be considered as a strategy problem (13). The reasons for doing so are: (i) Subsequent decisions (annual reprogramming decisions) needs to be made at successive moments in time, e g multiyear or multi-season development plans.

ii) In agriculture, future circumstances are highly uncertain as regards to: - price, demand, weather trends, and actual feasibility of the programs. (14)

If there is to be a successful agricultural program, there ought to be also a good policy judgement. The first essential policy judgement, must answer the question of what is it that is to be maximized? One can have the objective of maximizing the net cash income of the farmers, or may be those of say: improving nutrition, urgent reduction of food imports, increasing agricultural exports to reduce the crisis of foreign reserves, lifting the standards of rural dwellers, geographic options, or the organisational option (to improve rural entrepreneurship).

3.2.2 Strategy definition

In Zambian government reports, it has been pointed out that transportation is the major "bottleneck" to the development in Northern Province. (15) It therefore goes without saying that if transport is the major problem or hindrance to development, then it requires improvements or expansion.

If we all recognise the fact that transportation still remains the number one problem and that agricultural development in the area is still low, one then would expect more attention to these problems from the people concerned.

One SIDA expert summarized the problem in this way that - the much talked about strategy of "go back to the land", evident even in Zambian plans has a slim chance of succeeding, so long as forms of communications in rural areas remain backward.

It is common to experience difficulties in designing development plans for rural areas. A lot of these difficulties are related to the "design of agricultural development strategies", asserted Anna Tibaijuka in her Master's thesis (referred to earlier). Anna Tibaijuka refers to strategy as: "Consisting of a mix of policies and programs that influence the pattern as well as the rate of growth, whose efficiency depends on promoting optimal use of available resources and on modifying existing constraints". From what we can observe, this approach has these fundamental characteristics. (16)

First, the identification of the objectives to be furthered. Secondly, the means (policies and programs) by which those objectives are to be obtained. Thirdly, the explicit recognition of certain constraints that in turn guide both the choice of objectives and means.

When talking about strategy approach, we must qualify that it differs from the formal analytical techniques in that whereas these are "planning for action", designing strategies is "planning for decision making". It is of integrated kind, taking all the important variables into consideration. (17)

The strategy should first, facilitate the process of structural transformation and growth in national product. Secondly, it should enhance the welfare of the farm population. Finally, it should promote changes in attitudes and behaviour in rural communities that have a favourable impact on the process of social modernization.

Johnston & Kilby categorize agricultural development strategies as falling in two types.

- (i) The first one being a UNIMODAL STRATEGY, which is defined as one that aims at a progressive modernization of the entire agricultural sector. Examples include Japan and Taiwan models.
- (ii) The second type being the BIMODAL STRATEGY, which is defined as a strategy which results in a development pattern based on a dualistic size structure of farm units. The examples of this are Mexico and Columbia (18). Bimodal strategy, stresses sectoral or differentiated agricultural development, in which case some areas of the overall agriculture, receive more emphasis than others. In this case commercial farming might at one time be more important than peasant or vice-versa.

3.2.3 Strategy objectives

Whichever strategy we choose, we must be guided by the fact that a good strategy is the one which will be directed towards satisfying political and economic needs of the people living in a region. Thus the rural development (embracing even agricultural development) strategy chosen, must therefore try to meet the following consideration with respect to objectives.

1. Archie Mafeje a well known South African (black) intellectual commenting on strategy formulation in black African States, has observed that, the greatest single incapacity of under-developed countries is lack of self-reliance. This incapacity affects agriculture very much. Mafeje contends that from this incapacity, an external dependence is derived at which might defy even the little progress which can be made. By external dependence he means technology (19).

Mafeje insists that developing countries must look for strategies which lead to the improvement of agriculture. He therefore urges that: "of the many specific conditions of predominantly agrarian societies, one of the greatest prospects for

a broadly-based technological start comes from agriculture." He further comments that "the success of the Chinese has been under the slogan that: while industry should be the leading sector, agriculture must be the base." (20)

The major components of Mafeje's strategy are: First: that there must be proper agrarian reform. Thus a region must introduce land reforms. This is an important "non-investment factor." Second, one must opt for technologies that can be handled locally at relatively low costs. This raises prospects for internal accumulation and relieves pressure on foreign reserves. (21)

Thirdly, Mafeje suggests that these regions must opt for a socialistic strategy (some people may argue with him here), rather than a pure capitalistic strategy. According to Mafeje, a good strategy must aim at tackling the question of poverty of the people. From this viewpoint legitimate development must be the one aimed at the interests of the people. For any development which is not for the people, is pseudo- and should not be encouraged, for this only creates more poverty and misery for the masses.

2. In the case of Zambia, many economists have observed that the terms of trade facing the rural sector has deteriorated since independence, because:

- there has been rapid increases in wages of the urban areas
- while there has been only a slow increase in the prices of the agricultural produce.

The consequences of this have been: - (i) wider gaps in incomes between urban and rural population, - (ii) exodus of people from rural to urban areas. And (iii) that rural development has suffered even more because most of those who immigrate to towns are the most active part of the population.

3. You will also find that agricultural production is below the desired levels, due to sharp competition with the mining industry. Up to now, the Zambia's economy has always been dominated by a huge profit making copper mining industry. It is against such a powerful sector that peasant agriculture in rural regions has to compete (22). The agricultural sector has not been able to attract sufficient investments. As it lags behind, so does the general life in rural areas - inciting more population drifts to urban areas.

4. Many people agree, that lack of sufficient investments in rural sector has contributed to poor agricultural development. A lot of development funds, has been wasted on unviable industrial projects.

The economic policy which puts emphasis on unproductive investments and forgetting completely about the rural areas, is following what once a French agronomist termed as - "false-development line". Although elements of profitability needs to be considered when planning for projects. Viability is preferable to profitability. Viable projects are those which improve the distribution of resources and wealth, contributing

to the improvement of the conditions of people on the lower ladder. Enterprises creating social profitability in form of surplus values or socio-economic benefits would therefore be preferred.

5. To understand the dimension of the Zambia's economic problem, one might regard it as what some economic-historians would call - "the crimping down of the surpluses-class", in the sense that within the society, the classes which produce the surpluses: such as the agricultural workers, craftsmen, miners, technicians, factory workers, carpenters, physical workers (the so called labourers), etc are either diminishing in number for the country as a whole or are producing less than before.

While on the other hand the consumer classes (living on the other class's surpluses) i.e intellectuals, administrators, clerks, and office workers of all grades - the so called 'elites', is growing. Nobody can deny this. This has resulted in the situation that too many people are deriving their existence from too small surpluses and services. The solution to this, lies in identifying the concrete sources of surpluses within the society and concentrate on those. Consumption and rewards must be related to production. The situation of consuming more than one produces, should be avoided.

In Zambia today, there is a great talk of having socialistic approach. This is being expressed through what is known as the philosophy of humanism.

Humanism is Zambia's guiding philosophy for all its planning and action. It places 'man' at the center of concern in all its considerations. Well then, if in the rural parts like, N Province dwell 'men', some form of contact is necessary with this group of people - but this can only succeed if there is good communication. In fact if rural people are going to be self-reliant - as humanism contends, then they must have all the supporting services they need.

The success of humanism implementation is rather limited, because few people are fully committed to it.

Humanism's built-in handicap, is the fact that many people can easily misconstrue it as a tool for developing capitalism and socialism simultaneously, which it cannot do. The likelihood of this happening is very remote. Ideological mixtures, hamper development - for this complicates the definition of objectives. Some writers on the development suggest that it is better to develop capitalism first, and then socialize it later, or if possible begin already with socialism. In the case of Zambia and thus N Province, the latter seem not to be possible, because people have already recognised in some way the capitalistic aspirations. In Zambia today, it appears that, many seem to have interest in capitalistic system. Peoples' current attitudes, beliefs, morals, tastes, life styles and even policy formulation are indications of this. Thus in reality, the country operates on western capitalistic model.

3.2.4 Elements of an agricultural strategy

A further close look at agricultural strategies reveals that:

- (i) A good strategy must aim at modernization, and accelerating the rate of increasing farm output, - an increase in output at the lowest possible cost.
- (ii) Must aim at structural transformation, which promotes the widespread of improvement in welfare of the farm people and promotion of social modernization (23).
- (iii) To avoid trying top-down processes of development. Too much central planning and central controls prohibits development.
- (iv) To restore creative initiative amongst the masses, and promote collective self-respect in the rural society.
- (v) Encourage conscious and determined human action. There must be full participation of the people in development efforts.
- (vi) Leadership and guidance must be committed. It is better if the leadership is democratic and mass-centered. Masses must not become objectively and subjectively dependant on being led.
- (vii) The sincerity and the ability of the link-cadres or extension workers, must be assured. This can only be facilitated if one has efficient institutions and administrative capabilities.
- (viii) An effective land reform, offers a powerful instrument for the release of mass initiative. A massive go-to-the-land thrust cannot succeed without people's initiatives. Full participation of the people and larger investments in land resources, cannot be achieved in the absence of a well defined strategy objectives (24).

3.3 Rural Structural Transformation

After our analysis of strategy above, we are now faced with the problem of how, after discussing the strategy requirements, we can through scientific methods bring about development. We have to analyse the ways of increasing production, investments required and discuss factors which bring about structural transformation. (25)

3.3.1 Catching-Up Process

The catching-up process can be expressed in many terms. The "Catching-up fallacy" is usually discussed in connection with the gaps between the rich countries and the poor ones. The formulae, methods, strategies, techniques or things to be done have been proposed by rich as well as poor countries themselves. Our concern here will be how these poor countries can reduce the 'poverty gap' between themselves and the rich ones. Our concern will be to try and find out how the people of N. Province in particular can catch up (26) with development.

Modernisation in a developing country, is a progressive increase in productivity of land and labour, plus the replacement of traditional inputs in order to get growth in output.

Since the output per worker depends on (a) yield per unit of factor of production, and (b) as well as on quantities of factor of production utilized, the options open for increasing the agricultural output are two: - First: yield improvement and Secondly, area expansion. (27)

We could also express this in another way as: - growth in productivity plus growth in output is equal to advances in technical and managerial efficiency and the availability of several supporting services OR the greater adoption of innovations (new inputs). We again return to the fact that *WITHOUT TRANSPORT* these requirements cannot be met, hence production would not be raised, causing the chain reaction already discussed.

Johnston & Kilby presented these principal factors (see Fig 2:3-2), influencing changes in farm productivity in diagrammatic form. Of course the effectiveness of these measures depend on agricultural policies and programs adopted, since policies affect such factors as farm sizes, work force distribution etc. In Zambia, increased agricultural productivity can only be achieved at a cost of massive investments in infrastructure facilities such as transportation, roads and markets, irrigation systems, and water conservation systems. (28)

Closer examination of the diagram reveals that proper application of divisible inputs leads to yield increases per hectare, which in turn leads to farm productivity growth. From the diagram, it appears very clearly that emphasis must be put on either increases in hectareage per worker or increases in yield per cultivated hectare as these are the factors which increase agricultural output. To both of these, transport contributes heavily. As indicated by Johnston and Kilby, both of these get affected by relative prices, but the first one (hectareage expansion) gets also pressure from capital/labour price ratios. The second one yield expansion per unit area, is sensitive to land and land saving inputs (fertilizer, improved seeds, etc), as well as to product/fertilizer response ratios and product/fertilizer price ratios. Innovations could also be said to be another factor affecting yield-increase per unit area. These are all important factors.

Other factors having influence on hectareage and yield are: foreign exchange, which becomes a constraint when larger share of inputs needs to be imported such as the importation of large amounts of fertilizers. This has also much effect on farm equipment imports.

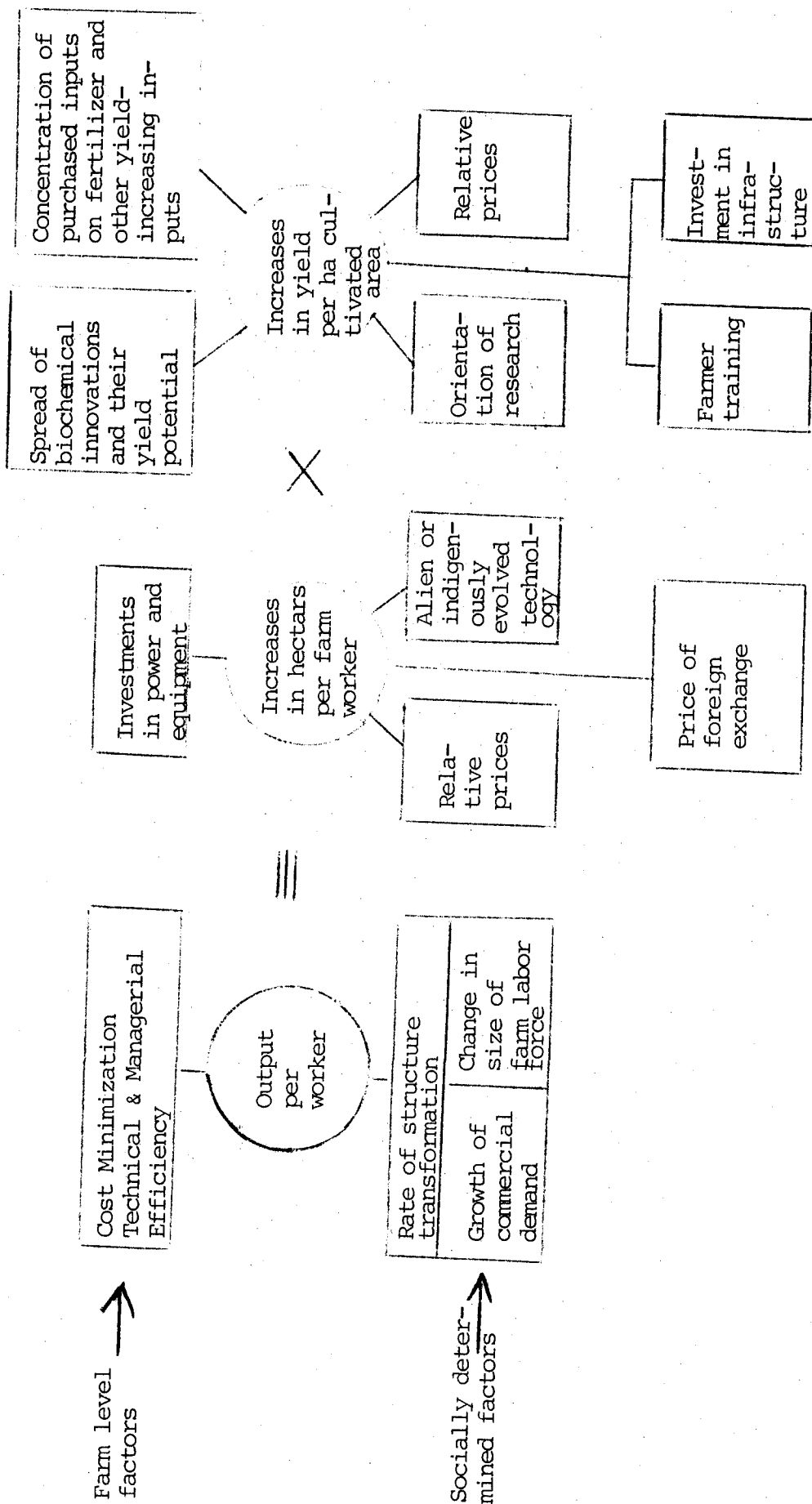


Fig 2:3-2. Principal factors influencing changes in farm productivity.

Source: Johnston & Kilby, chap 9, p 391.

NOTES AND REFERENCES III

- 1) The major factors on which economic development depends are: - aggregate production, population, general level of savings, the way economic decisions are made, aspects of technology and environment, and imbalances in supply and demand. The lack of economic development, usually is due to: - imperfect or sub-optimizing decision making rules, and strategy decision-making which leads to rapid transformation of traditional agriculture.
- 2) In this context many people discuss the well known Cobb-Douglas production functional model.

For more details on development theories, refer to other literature on the subject, eg E M Kulp, Praeger Special Studies, N York, 1970, Rural Development Planning.
- 3) Berry, B J L, USDA Washington DC, 1967, Strategies, Models and Economic Theories of Development in Rural Regions, seems to have a good coverage of these theories, pp 12-19.
- 4) Ibid. above
- 5) See section 4.8 of this thesis.
- 6) See Chisholm, M, op cit, pp 13-15.
- 7) Ibid. p 21
- 8) Ibid p 23
- 9) Ibid p 29. Chisholm also makes a diagramatic presentation of this "isolated State" case.
- 10) Anna Tibaijuka is directly quoted (published M Sc Thesis), Uppsala 1978, Strategies for Smallholder Agric Development in West Lake Region, Tanzania, p 5.
- 11) See also E M Kulp, New York, 1970, Systems Analysis and Working Method, and Praeger; Special Studies in International Economics and Development, pp 34-37.
- 12) Anna Tibaijuka, op cit, is again directly quoted p 5, See also T W Schultz, New Haven, 1964, Transforming Traditional Agric p 40 and Yujiro Hayami & Vernon W Ruttan, 1971, Agric Dev - An International Perspectiv. There are some people who advise against the use of expensive modern agricultural methods such as the use of tractors.

- 13) There are sound reasons for discussing strategy plans, as many strategy plans implemented in Zambia have sometimes lacked reasonable forecast of economic possibilities. That there are so many factors which could have been avoided by the government such as: (i) To improve the unreliable statistical basis on which the plans are based eg, population data, removal of ambiguities of agricultural production statistics. (ii) Too much reliance on incorrect "outside advice" (foreign experts), who in the case of Zambia must have given government wrong assumptions that the world copper prices would hold stable during at least the entire Second National Development Plan period (1972-76). These experts failed at least to translate the government's ambitions into plans, and have had the full knowledge, that without a fully developed agricultural base, the economy of the country would not be stable.
- 14) See Kulp, E.M. op. cit., p. 268, Peter Söderbaum also discusses the decision basis and choice of alternatives using Position Analysis, Uppsala, 1978, Samhällsplanering i Ekonomi, Miljö, pp. 144-150. and p. 178.
- 15) See N. Province Annual Report 1975, Office of the Cabinet Minister for the N. Province, Kasama, Zambia, p. 1. In the opening paragraph, it is reported that shortage of reliable transport has been one of the major problems in the province. This is a case where transport is clearly the only significant bottleneck to development and where all other requirements are already met fairly well.
- 16) Johnston & Kilby summarizes these elements of a strategy, as consisting of 1. Programs of institutional building related to Agric. Research and Education. 2. Programs of investment in infrastructure, including tapping of water resources, irrigation, drainage facilities, and rural roads. 3. Programs to improve product marketing and the distribution of inputs and 4. Policies related to prices, taxation, and land tenure."
- 17) See Anna Tibaijuka's M.Sc. Thesis, op. cit., p. 7. Thandika op. cit., believes that developing countries need only to argue between two broad strategies identified historically in promoting a reduction in the degree of concentration of land ownership: - 1. The kind of egalitarian land reform, the kind implemented in Japan, where all farms are in effect converted into owner-operated enterprises. 2. The strategy that goes beyond land redistribution and organises some form of communal land use like in China. See Thandika p.35.
- 18) See Johnston & Kilby, op. cit. pp. 127-128, & pp. 446-447. Comm. Farming in Zambia is used for short term necessity of boosting agric. production, needed only to reduce the food imports and due to the limitation of foreign reserves

- 19) See also Archie Mafeje, Uppsala 1978, "Science, Ideology and Development: Three Essays on Development Theory". The idea brought out is that, one should aim at adopting an industrial strategy that could stimulate or become a catalyst of small-scale labour-intensive economic activities, leading to abundant supply of basic items.
- 20) See Mafeje, op cit, p 40.
- 21) See Bostock & Harvey op cit, pp 102-104. They report that: "The outstanding external debt at end of 1969 for Zambia was K111 million (p 103)". SIDA reports that in 1977, Zambia's debt service stood at 21 % (p 149 Bistånd genom SIDA, Verksamhetsberättelse 77/78). See also Second National Development Plan 1972-76 p 8 where it is reported that foreign loans for 1st National Dev Plan equaled K125 million. Over time, the debts must have increased.
- 22) See Mark Bostock & Charles Harvey, Praeger Publishers, N Y 1972, Econ Independence and Zambia Copper: A case study of Foreign Invest "another aspect of export instability and the vulnerability of the economy is the extent to which government has committed future export earnings for repayment of foreign borrowing." p 103.
- 23) See Johnston & Kilby op cit, chapter 9 and pp 133-139.
- 24) According to UN standards, participation means: willing, informed and active involvement of people in the decision making process on issues affecting their lives. This implies organized group action, and the sharing of political and managerial power by hitherto unorganized social groups (farmers included). Needing a greater voice for these groups in planning and implementation of development programs and in the sharing of benefits from them.
- 25) Rural transformation involves the following: growth of marketed surplus; - accumulation of industrially produced capital goods; - increasing use of off-farm inputs especially fuel, fertilizers, electricity, and high yielding varieties ; decline in traditional farm practices; - and disappearance of more or less self-sufficient subsistence activities.

This kind of rural transformation is made possible in part by policies that: (i) encourage the development and introduction of new high yielding seeds etc, (ii) maintain price levels that enhance investment incentives, and (iii) that increase regional supplies of scarce capital goods and variable inputs (tractors, fuel, fertilizers, electricity) See also Johnston and Kilby, op cit p 34.

- 26) We think of catching-up process in terms of relationships between poverty and progress levels existing within N Province and Zambia as a whole. We think of poverty in terms of lack of incomes and consumption in subsistence sector. Progress in terms of reducing the existing disparities (not between rich and poor countries), in material well-being of the people as is usually thought of. We think of progress as the stimulation of the lagging behind areas/people in their efforts so that they can be able to catch-up. For example N Province lags behind from the level of food production it is supposed to have been producing by now, and its due share to the national production.
- 27) See Johnston and Kilby, 1975, Agriculture and Structural Transformation New York, pp 390-391. Also Tench's Zambian case studies have observed that land is not a limiting factor. What is limiting is that production is related to opportunity, i e, those farmers with funds are enabled to achieve higher production. Analogous, one can also say that those provinces with funds are able to improve their agriculture.
- 28) See reference note above, chapter 9: "Catching-up Process", Johnston and Kilby, op cit, p 391 and P Ollawa, op cit, p 14.

CHAPTER FOUR

IV IMPACT OF ROAD SYSTEM ON TRANSPORT COSTS AND BENEFITS

4.1 Cost Effectiveness

The impact which the road system makes on the cost of transportation is probably the most important effect transport contributes to agricultural production. Because the intangible benefits are hard to measure, cost-effectiveness is the best measure of road impact. The target then is to find least-cost-way. Effective road system must lead to the lowering of costs of transportation of farm production. It is this cost-benefit of roads which contributes to the development of agriculture. Farmers and any other users of the improved roads make savings in money terms, for example the spoilage of perishable goods gets reduced.

The feeder road system facilitates the haulage of farm produce. In Malawi, Clark & Haswell found evidence (1) which shows that - transporting maize by portage on an 8 km journey, cost about 2,5 shillings per 32 kg, compared to a 96 km journey by a motor vehicle which cost 2,5 shillings per 90 kg of the same maize. This means that the same cost, motor vehicle was able to carry three times as much load and cover twelve times as much distance as portage. This again is more than a clear demonstration of the need for improved transport.

4.2 Cost-Benefit Analysis

Cost-benefit analysis (C-B) is a useful technique for making investment and other types of decisions. It is a practical way of assessing the desirability of projects or programs, in a long term and broad perspective. In C-B analysis one makes the enumeration and evaluation of all the relevant costs and benefits, trying to express these in monetary terms. C-B analysis provides at least three different types of recommendations. First it provides a recommendation of expressing consequences of costs in monetary units. Second, it provides a recommendation displaying the added up effects which would accrue after the completion of a project. Thirdly, a recommendation which sums up consequences (monetary or otherwise) of a project - over a period of time including the project's present value.

In our case the effect of C-B analysis as concerning the improvement of feeder road system will be broken up into two parts. Part I dealing with costs, and Part II dealing with benefits.

Part I: Costs

Cost analysis for road systems concerns such items as: maintenance and betterment, expenses on new extensions, pavements or construction of new feeder roads, acquiring land, destroyed farms and buildings, and compensation. Adler splits up road transport costs into four classes: (2)

- (i) wages, money paid out to road workers or seasonal labour,
- (ii) taxes: the expenses of using the roads, which is paid in form of taxes on petrol and other road licence fees,
- (iii) foreign exchange; when large investments are to be made, there is a need sometimes of foreign exchange, and
- (iv) interest: this is the cost of capital or the investment funds borrowed from abroad or provided to regions by the central government. This class also includes feasibility studies' costs.

In the N. Province annual report of 1975, produced by the Cabinet Minister for the province, it is reported that of 1975 total budget of about two million kwachas (Zambia's local currency), K450000 went to power, transport and works. (3) This is about 22 % of the total region's budget. Of this the money allotted for transportation was spent on development of feeder roads and road maintenance.

In the country's annual report of the Roads Department for period 1st January - 31st December 1974, of this year's national grand total of about K1,590,000 expenditure, about K79 000 or nearly 50 % was spent on road maintenance and betterment. (4) This expenditure on roads, increased over the previous year by about 21 %. Unfortunately this is not broken down to show the share which went to improving feeder roads. It is reported however, that this increase was due to expenses on widening of paved roads and the need to cope with the ever-increasing volume and the weight of traffic on the roads which caused more wear and tear. (5)

This is cost element which must be evaluated or planned for in relation to benefits. Fortunately, these transport costs can easily be measured. The objective of minimizing transport costs as much as possible, is related to: distance, frequency, and cost of hauling goods and people.

Part II: Road Benefits

Literature on transport economics identifies four major economic benefits of transport improvement and/or introduction. These are: (i) Reduces operating expenses. (ii) Stimulation of economic development. (iii) Increases time-savings. And (iv) Accident reduction. (6) In addition to these, there are several secondary benefits. Although it is difficult in measuring the economic benefits, some kind of assessment of these should be made.

4.3 The Benefit of Reduction in Operating Expenses

This is probably the most important benefit of the impact of road improvement. Improved roads immediately leads to the reduction in operating expenses initially to the users of this new facility or improved road. To those who continue to use unimproved or existing facilities, less congestion reduces also their expenses. Poor roads, pushes up the transport costs, in terms of wear and tear and time consuming.

Thus the question of cost is probably the most important when discussing transportation, as the reduction of transport cost concerns both users and transport owners. Both the producers and consumers of goods, benefit. This reduction in cost is also measurable in monetary terms. (7)

Chisholm contends that transportation costs in relation to the value of goods become less: (i) When the substitution of improved means of transport for more rudimentary methods is made. (ii) When improvements within individual transport media are made. And (iii) when the greater degree of processing undergone by products and changes in types of product towards more valuable ones take place (as service quality changes - due to speed and reliability). (8)

RUCOM's Mwinilunga pineapple factory, sometimes operates below capacity because small pineapple growers cannot be reached due to poor - impassable roads. (Univ of Zambia - UNZA Z.E.D. Report, 1979).

As a result of this improved road system, new transport techniques can be used. The use of these new techniques yields savings. More goods are carried by trucks, which leads to cheaper large volume-haulage. Chisholm has also urged that even if the actual operating costs remain constant, the average cost per metric-ton kilometer will certainly vary, either if the length of haul changes or if the composition of the traffic alters. (9) Both of which indeed alter when roads get improved. It is the use of modern innovations which leads to substantial decline in "real" transport costs.

The types of reductions in transport costs vary widely. For example road and rail improvements usually lead to lower operating costs for vehicles and rolling stock. It can also be said that an improvement of one transport mode frequently affects the costs of other modes e.g. new railway construction affects competitive road services, or vice versa. (10) Adler gives some guide-lines in the estimation of costs and benefits of road improvements (although this is not an important aspect in our discussion). He asserts that one could either: (a) perform "before and after test", i.e. making an estimation of costs and benefits before road improvement and assess what these will be afterwards. Or (b) perform "with and without test", i.e. assessing benefits to be accrued when there is road improvement or without. (11)

Although both of these tests may be erroneous, they are good guides if used objectively. In one case study conducted by Adler, (see section 3.8 of this thesis: the effects of paving a gravel road), he argues is possible to illustrate. When a gravel road is paved, there occurs savings in operating costs. (12) (or that operating expenses would have been raised had the new road or improvement not taken place). Using the same type of tests, Adler proceeded to show that vehicle operating costs are reduced with a trunk or gravel road improvement. He warned, however, that these reconstructions or improvements may sometimes result only in meagre economic benefits. To ascertain these findings in the case of N. Province, empirical studies would have to be done. But the important thing is to note that new road improvements reduces operating costs. There is also the benefit of new generated traffic as the result of lowering of transport costs,

Cheap transport is one essential that leads to expansion of agricultural output. In this region since most of the potential areas of development are widely scattered, it is important to see that better transport, facilitates the movement of both goods and people.

According to FAO survey conducted in Zambia, (1977), - an average Zambian farmer has to travel 180 km to go and get spare parts and another 140 km to reach workshops for minor repairs.

A new and improved network also enlarges the market for commodities. As transport costs decrease, farmers fetch higher returns on their commodities. This encourages expansion of the production. Transport also opens up new land for development. This also encourages more intensive settlement of land.

4.4 The Benefit of Time-Savings

The mere availability of transport facilities in the remote parts saves peoples' time. Seed and other farm requisites reach these remote parts in time for planting. Many transport improvements reduce travel time and increase the reliability of transport services. An improved seasonal road may be passable all year round. Cut bends or curves, improved surface, all help in reducing travelling time. This saved time, may be used for increasing production or for voluntary leisure.

Sharp supports Allan Evan who made studies of the value of leisure time, that this is only useful if the utility of this time saved is maximized. (13) Evan noted that, "time savings are only of value if the individual can transfer the time saved to some other activity which he prefers. Bearing in mind that the time saved must be large enough if it is to be used for economic activities." (14) Saved time could for example be used to improve housing, clothing, household goods and diet.

In many developing countries, there is unfortunately extensive underemployment of human resources. So in this case, there may be the problem of valuing the saved time. So if time saved is to be of any use, it must be incorporated with production. In developed countries, the basis adopted for valuing working time, is average earnings. But since in a rural area there are no earnings, the valuation of time must be related to actual production.

From the development view, time-saving is valuable to new entrepreneurs, government service personnel, and other persons involved in the marketing system.

The savings may also benefit the perishable goods, and the urgent freight items such as spare parts for broken machinery. Fast delivery not only reduces spoilage, but it helps conveyance of capital. Building material have to be transported as quickly as possible, less building projects stand idle in rural areas.

When it comes to the villages lying in the periphery of towns, time savings benefits the commuters. Moreover, a shortened trip encourages more part time farming. In this way areas lying around towns or bomas can be turned into farms. With an improved road system, not only does it make the introduction of bus services possible, but this makes these usually long trips slightly more comfortable. And for this saving, even rural people are prepared to pay. People would rather have a bus service introduced than it not being introduced on account of high fares to users. Time savings and convenience, motivates the rural dwellers.

4.5 The Benefit of Accident Reduction

Although the bulk of accidents occurs in major cities and industrial urbanites such as Kasama (provincial town head quarters), still, a good number of accidents do happen in the rural areas, causing a considerable loss of property and life. Zambia as a whole ranks very high on the list of developing countries where the number of accidents (which leads to high hospital expenses) on the roads is very high. Thus a considerable number of vehicles are destroyed or damaged each year. Replacement or repair of damaged vehicles, costs a lot of money. Amongst the people killed in road accidents, you always find the most educated Zambians.

From the studies conducted in developing countries, (15) some of the major reasons for high accident rates are: (1) Pavements are narrow and shoulders often dusty. (2) Geometric alignments tend to be poor. (3) Law enforcement is not sufficiently effective. (4) Drivers are often inexperienced, reckless and drive under the influence of liquor. (5) Many vehicles are in poor mechanical condition. (6) Trucks/vehicles tend to be overloaded, and (7) Roads through towns/bomas are congested. It is easy to see that road improvement directly influences factors 1, 2, 5, and 6 above. For example narrow pavements make vehicles

passing each other very difficult. Just as poor geometric alignments makes driving very difficult. The condition of the roads obviously affects the condition of vehicles. Bad roads result in high operating and maintenance costs. Too long and hazardous trips cost petrol and encourages overloading on trucks, since transporters aim at carrying as much load as possible at one go. Transportation of requisites, fertilizers, seeds and feeds, needs to be done frequently and at appropriate times. Frequency and speed, are both factors which are affected by the condition of the roads.

4.6 Secondary Benefits

There are a number of secondary benefits which are as a result of road improvements. There are many intangible benefits which are contributed by road projects to objectives other than say, national income creation and production efficiency. Some of these are: creation of more effective national integration, improvement of self-sufficiency, - and more equal distribution of income. Also you have environmental benefits such as the promotion of recreation facilities, and so on.

There are also the secondary benefits related to the changes in prices or competitive conditions to external economies or to the inducement of further investments which a road project may cause. For example increase of the income of the people in the area, leads to greater consumption and gives rise to additional employment.

There are also technological and pecuniary spillovers at length. These are side effects taken into account via prices of products. Here we have in mind cases such as when the improvement of a road leads to a greater profitability of the garages and restaurants on that road. Many small rural shops or retail stores and rural guest houses, mushroom along these roads. In cases where property has already been developed, the value of adjacent property goes up.

4.7 Hypothetical Cases

As a means of further clarifying road benefits, we shall consider two hypothetical cases. Case study 1 and 2. We shall build these on simple reasoning rather than on mathematical models.

Case 1: Benefits of Paving a Gravel Road (16)

Let us suppose the existence of gravel road between Kapatu and Mporokoso (these are two districts in the N. Province). The road between them is narrow in width say only six meters. It has several grades about, say, 8 % and many sharp curves. The daily traffic is not more than 50 vehicles. Thus there is no congestion on the road except that dust occasionally forces vehicles to keep a substantial distance, and passing is thus difficult. The speed limit is only up to 30 km p.h. and that there is no other way to get to Mporokoso.

Suppose now the Rural Council or Government responsible for the road, proposes to pave the road and make certain minor improvements in the alignments, bridges construction etc. Case studies

like this conducted by Adler (17) have shown that when you make improvements to roads like this one, the effects would be:

(a) The size of the normal traffic grows and average speeds increase. Paving the road would also be expected to generate some new traffic. Better transport would also make it possible, for example to expand the market for such items as dairy products, fruits and vegetables in the area. (b) The most important benefits of paving the road, consist primarily of (i) reduced vehicle operating costs, and (ii) the avoidance of the maintenance cost of a gravel road. In the actual study conducted by Adler, it was shown that the benefits exceeded the cost.

Case 2: Construction of a Development Road

Suppose an area has a good surplus of food or is a major source of, say, fish for the whole country, but is only accessible seasonally. Take some remote part on the river Chambeshi in N.

If we assume that a road is constructed to this place, the immediate development benefits we would expect in this case are (a) The generation of agricultural potential. (b) Transport costs decrease, (c) The all-weather road improves accessibility, thereby permitting the marketing of agricultural commodities (the perishable crops even benefit more), and (d) If the area is rich with fish, the annual catch expands and that fish become available all the year round. This is yet another way of showing how road improvement affects rural development. There may be of course other benefits, in particular, if improvements mean asphaltting.

When considering road benefits, we must however be very careful not to overestimate economic benefits. Depending on the road design used, it has been shown in some cases that costs could exceed benefits.

Improvement/construction costs, would of course depend on such factors as: (i) how remote the road is from industrial areas/towns - the further away it is, the less vital an area is and the less money is invested and the greater transport costs become. (ii) Population densities/activities and (iii) Main roads versus feeder roads etc.

4.8 Forecasting Traffic

One of the difficult tasks in finding justification for heavy transport investments, is the estimation of its future use. Benefits which accrue to for example road improvements are the ones which help decision-making. Therefore estimation of correct future traffic is an essential factor. This helps us for example to assess the life length of roads and their capacities, thereby reducing the risks of overestimation and underestimation errors in planning.

Adler identifies three main stages of traffic forecasting: (18) (i) The estimation of the volume and location of future agricultural, industrial, and mining output and its consumption, including also exports and imports. Analysed parallel to this, is population volume and location assessment. (19) (ii) The second stage requires translating output and population data into traffic

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- both volume and by origin and destination. (iii) Thirdly, that traffic must be distributed to the transport mode which can carry it most efficiently. (Modes available may be road, river, railway or air).

These three stages are interrelated.

The data on which to base traffic predictions is normally scanty. For N Province, this information is very poor. Often times one only relies on past traffic trends and figures from population/census and regional offices. But if it is known that road improvement would lead to a definite cost reduction in transport or price commodity reductions, more road utilization could be expected. For example a reduction in bus fares to and from rural areas, encourages more travelling, just as an improvement in crop returns (due to reduced transport costs) encourages more production and consequently leads to more haulage, (haulage here is motor vehicle-trucks, the transport mode suitable for these roads and having the lowest cost).

Adler divides the future traffic in three basic types. (20)

(i) The normal traffic, which grows even without a new investment. This type benefits by the full reduction in operating costs made possible by the new facility. For example conveyance of goods to and from already established production and settlement centers. (ii) The Diverted Traffic, the traffic which diverts from somewhere else to the new facility. For example the use of a personal car by an extension officer who before might have relied on only limited government vehicles. This arises because with good roads, more people are encouraged to use their own private vehicles, even when on duty. (iii) The Generated Traffic, due to lowered transport costs. Profitability of agricultural and industrial production encourages more people. Commodities normally sold locally, start flowing to markets with better prices.

4.9 The Effect on Pricing

In many African countries including Zambia, the two-price-system on agricultural produce has been in use in hope that rural dwellers could be helped. Within this system, there is the provision for public subsidies etc for certain crops - in some cases, one has even used special tax concessions to new agro-industries. This way, one hopes that the low-income group and new industries would be assisted.

Regardless of whether a farmer is in U S A, China, Soviet Union, or Zambia (in this case N Province), *he is price responsive*. He will therefore respond to all price mechanisms given the proper conditions. Therefore for him, anything which will reduce his costs or increase his returns (income) would be welcome. A farmer may fail to respond, since his aim may be that of minimizing risks, or due to the fact that he may be lack of resources for expansion. Improved road transportation does set commodity prices in motion.

In the case of N. Province, setting the price on the roads so improved or constructed, is not as important as the actual existence of the roads. Existence of good roads promotes the efficiency of marketing. When marketing system improves, farmers are offered guaranteed outlets for their produce. If in addition to this, policy ensures the announcement of producer prices in advance, farmers have a chance to plan well.

Farm production responds quickly to price mechanisms set on different crops. For this reason, government pricing policy becomes very important to the farmer.

In USA, crop yield levels can easily be controlled by either direct money incentives, or commodity prices manipulation. Some countries operate a two-tier pricing system i.e., set domestic prices on those crops which are to be sold on domestic market, and another one on those that are to be sold on the world market. This is done in such a way that production of different crops is either induced or discouraged by price manipulation. (21)

4.10 Transport Investment Appraisal

Road improvements or construction do require money. Money has to be spent on the basic equipment and maintenance tools. Hence road transport routes must be located optimally. But it is not easy to set out road investment priorities (22). In principle, priority should be placed on those feeder roads which have a direct bearing on agricultural development. For example shortening of feeder roads, results in savings. Bridge repairs, improve the dependability of seasonal roads. Tarmac, reduces wear and tear.

Hawkins suggests that in most areas when traffic reaches 300 vehicles per day, bituminization becomes worth while.

(E.K. Hawkins, 1958). Other people might use annual freight tonnage as a criteria. This must be large enough to make the construction of a paved road economical. Also large tonnage, implies the use of large trucks. In other words, roads need to be made better in areas where large outputs are expected.

There are many ways in which transport investment strategies can be planned for. 1. One could plan a road project or improvement program on the basis of maximizing net benefits of the usually limited investment funds. 2. One could consider making investments on certain access roads which provide a necessary service, or roads which form a basis for rural diversification, or which happen to be in areas where innovations are anticipated.

3. Since it is thought that the underdevelopment in most regions of Zambia, is largely on account of the poor transport facilities therefore it is important to provide roads where existing and potential agricultural production can be encouraged. Roads which provide the effectiveness of transport services and increase the profitability potential, have to be improved.

4. The roads must be situated or improved where the amount of actual or potential traffic which may be tapped per route kilometer, is at a maximum, i.e. the aim should be to maximize traffic expected per unit distance of the road, or to minimize running

costs. Physical shortening of the routes or improvement of possible speeds, improve the traffic flows and lessens costs. Roads must be improved where return goods traffic and passenger movements, can increase or in cases where link improvements to other transport services, e g road-to-air, contributes to development.

5. Road improvements may be induced by other rural, urban or industrial needs. The construction of roads are necessary, where these help in promoting the general development.

6. Other ideas behind the improvements of some roads, might be in terms of the development/creation of new rural centers, or changes which cause in-land uses and/or more production.

From pure transport economic terms, transport investment may be based on the following considerations: (i) To choose transport program with the greatest pay-off. That is to say locate transport in areas with great pay-off potential, i.e. maximization of profits, or choose areas where roads are needed most, or choose a backward region needing the greatest stimulus. In all these cases, the use of cost-benefit concept can come into play. The objective of the option is aimed at getting a reasonable or maximum net return on the investments made. Making investment decisions based on probabilities of rate returns or based on uncertain C-B levels, may not be easy - especially in areas where more than one form of transport mode compete against each other. For example, it may not be easy to decide on whether money should be spent on improving a railway siding or on a road, as the situation in N. Province is now. (ii) The option of Arteries versus Feeder Roads: that is either choosing the creation of new road net works or the expansion and improvement of existing net works. The objective of this option is aimed at eliciting, if possible maximum local investment of savings. (iii) The option of Hard versus Soft Financing: this means building roads with maximum self-help versus building roads on grants or some kind of aid. The objective of this is to minimize interregional disparities.

There are many techniques of making these investment decisions. It sometimes happens that the market mechanisms are allowed to determine transport investments. The only problem with this approach, being, the difficulty in charging for roads. While social costs and hidden benefits are hard to compute. Decision making may be done by centrally planned organisations, public corporations -(such as the state transport corporation), the public itself, local authorities or central government. The problem with this is that central, political difficulties and complexities arise when there is a large transport industry. Having many organisations, makes it difficult to make correct transport investment decisions, due to lack of co-ordination or the likelihood of the misallocation of resources. Investment decisions may also simply be politically inspired. A decision to set up a rural road may simply be based on political judgments. In limited cases, optimal decisions are reached at by the use of computers - if available. Computers may be used, particularly in cases where large volumes of data has to be manipulated before a decision can be made. So far N. Province has not yet reached this stage.

In Zambia Road Works Departments or Rural Councils (local authorities), are usually the ones responsible for the allocation of a predetermined amount of investment funds, (since usually funds/grants come from central government) between alternative road projects. Prior to fund allocations, these authorities make the preliminary estimates of the costs or rough cost-benefit calculations. These rough estimates assist the central governments in establishing the prima facie worth of the potential road schemes for different regions. Funds allocated to the regions are then distributed between two main classes of roads. (i) The trunk roads - the major roads connecting different districts in the province, and (ii) Feeder or Access - the small roads connecting the rural centers, villages and remote parts to the main roads.

NOTES AND REFERENCES IV

- (1) See Colin Clark and M. Haswell, 1970, Table XL VII, p. 196.
- (2) See Hans.A. Adler, Indiana Univ. Press, Ontario, 1971, Economic Appraisal of Transport Projects: A manual with Case Studies pp. 20-23. In Zambia high increases in costs of inputs are expected to keep on rising.
- (3) See Northern Province Annual Report, Kasama, Zambia, 1975, Office of the Cabinet Minister for the N. Province. It has been discovered that the high maintenance costs incurred was due to the shortage of skilled labour and the great distances between service facilities. In spite of these expenses on maintenance, many roads in N. Prov. are poorly maintained, and in fact a lot of them become impassable during rainy seasons.
- (4) See Annual Report of the Roads Department for period 1st January- 31st December, 1974, Lusaka Zambia.
- (5) Ibid.,
- (6) Refer to Hans A. Adler op. cit., p 23 and C.H. Sharp p. 55 1973. McMillan Studies in Economics; Transport Economics
- (7) Refer to H. A. Adler op. cit., p. 23
- (8) Refer to Chisholm, M. op. cit., p. 162.
- (9) Ibid.,
- (10) Before the Chinese built railway from Tanzania was opened up, the bulk of Zambian exports and imports, were conveyed by road haulage to Dar-es-Salaam at considerable expense.
- (11) Refer to Hans A. Adler op. cit., pp. 25-26.
- (12) See Hans A. Adler: op. cit., Case Study No 1: Paving a Gravel Road p. 55.
- (13) See C.H. Sharp, MacMillan, London & Basingstoke, 1973, op. cit., and A.B. Tench, op. cit., pp. 117-122. Tench's utility studies produced evidence to show economic behaviour of Zambian villagers in reference to the trade-offs between leisure and income, using the idea of indifference maps to find out their relationships. There was of course the problem of setting out economic rationality in villages. But he managed to show that in Zambia the work-leisure relationship is determined by the number of mouths to be feed in a household, i.e. the households output increases with the size of family needs. p 277. Tench's exercise has also produced evidence to show that higher crop returns could be achieved from a reallocation of time. Planning must look into this.

- (14) See reference note no 13 above.
- (15) See Lahore-Multan Highway Feasability Study, Government of West Pakistan: Communications and Works Dept., 1964 cited by Adler p. 36.
- (16) Reasoning is based on Adler's Case Study model no 1 pp 55-62.
- (17) Refer to Adler op. cit., Case Study No 1.
- (18) The word traffic here denotes, both goods and the people (goods in our case being agricultural commodities)
- (19) See Adler op. cit., p. 17.
- (20) See Adler op. cit., p. 20.
- (21) See Farm Policy Proposals: An American Enterprise Institute for Public, Washington D.C. 1977. In USA, there are and there have been so many methods of setting up farm price policies.
- (22) See C.H. Sharp, op. cit., p. 28. Priorities must be set well, less the construction of new roads or bridges becomes irrelevant to concrete development.

V CHAPTER FIVE

ROAD IMPACT ON AGRICULTURAL DEVELOPMENT

5.1 Background - Agricultural Development

The roles of agriculture should be to:

- increase rural incomes
- act as a source of occupation (indeed the majority of the people are in agriculture) (1)
- act as a source of industrial raw-materials
- and to contribute to the GNP, and a potential alternative to copper as a source of foreign exchange.

The agricultural development in Zambia, is below the required level. Agricultural production is even below the domestic needs.

According to FAO-UNDP report, Rome 1974, and some other Zambian report, - the major complaint by rural farmers is that: "Everything arrives late". Why? This is due to lack of or poor transport, organisational problems, and lack of agricultural finance. Poor roads prohibits the efficiency of marketing. NAMBOARD (the Stage Marketing organisation), often collects produce late. Because of this, it is indicated that some 15-20 % of maize is rotten and the other part also often deteriorates in quality. Vegetables and fruits by the time they reach markets, are often destroyed completely - and so must be thrown away.

When seeds, fertilizers, information and loans, arrive late - planting is done late, if at all it gets done. This lowers the final yields (Research Report, Lusaka 1977). It has been established that when planting is done late, this definitely affects yields. Also when insecticides come late, crops get damaged by insects.

In fact it has now been established that, in the recent years, agriculture in Zambia has been on the decline. (FAO, UNDP, & Z.E.D. report refers). This is partly because, the commercial farmers as well as the peasant farmers are not producing enough crops - as they should, due to lack of steady supply of inputs and supporting services complicated by transport difficulties. Agricultural production will continue on being hampered in the rural areas especially - unless, proper marketing, consistent supply of inputs and organised agricultural finance exist. The commercial farming sector which forms a large portion of the agricultural production, has also been tremendously declining since independence, due to similar complications.

Anyway, government as put in a lot of efforts, but without achieving results. For instance after independence, the Zambian government decided to expand aggregate agricultural production to at least self-sufficiency levels. It called for the massive formation of cooperatives, the Credit Organization of Zambia (COZ) was formed. Several agricultural programmes were monitored in National Development Plans, and people talked about President Kaunda's slogan of 'an egg a day for every Zambian by 1970.'

To achieve the goal of self-sufficiency, not only had Zambians to increase their own production capacity, but they were also required to fill the gap, created by emigrating expatriate farmers.

As time went on after independence, not only did agriculture fail to meet the internal industrial raw-material needs, agricultural production was no longer able to maintain food supplies. As a consequence, large amounts of food (in particular maize) had to be imported. At the time of writing, the situation has in fact deteriorated to catastrophic proportions. In such a case, it becomes therefore imperative that agricultural output be expanded. But this expansion cannot be achieved without good and reliable road connections to farm lands.

In order to visualize how and what agricultural development can gain from the improvement of road net works, we have to look back at how in many European countries and USA in 17 and 18th centuries, and see how improved communications boosted agriculture

The investments and expansion of the road and the railway systems, facilitated the industrial revolution. Large blocks of unsettled land became opened up. This did not only boost agricultural output, but it also promoted the distribution and consumption of agricultural commodities.

As a complement to the railway system, the road net-work scattered through out USA, made the spread of new methods, seed varieties, new techniques etc, possible. The consequence of this being - the agricultural production boom. This catered even for a large share of the world market needs. Agricultural sales to the world market, improving the general economic system of the country. It is this communication phenomenon which acted as a contributing factor to the speedy increase of the rate of economic progress in USA, which we believe can have similar impacts in isolated regions such as N Province.

5.2 Stimulation of Agricultural Development

We know that certain locations are favourable to agricultural production while others are not. If the destination of the farm produce, the location of the resources of inputs, the scale of the farm enterprises being undertaken, and consumption are known; then the real and pressing problem is to find: (i) Where this output is to be produced or concentrated. (ii) Ways of stimulating this output. (iii) Ways of expanding this output. And (iv) Finding ways of arousing the agricultural potential beyond the main interest of just producing for survival. The idea being, to try and find ways of switching people from subsistence agriculture, to productive agriculture.

Assume that we have rational farmers in the province, (note that the level of rationality increases by such factors as mass consciousness), and that farmers possess reasonable human responses to economic circumstances, such as the desire for them to have a better life: (a) Improved transport services, leads to improvements in innovation trends. (b) Improved transport services, creates more developmental advantages, and strengthens economic activities in the area. The already existing demand for transport services or, new economic development, expands. (c) As the density of the rural populations increases, a factor important in regional planning, roads facilitate specialization. As these affect land settlements. Roads, may also cause high and low density population concentrations. (d) Improved transport services, also lead to the increase in use of motorised transport services on the farm itself, since sales and service from towns and maintenance of equipment improves. (e) Improved transport services, also changes the nature of agricultural produce. Resulting in better living standards, and improved dietary habits. Roads, widen the agro-economic zones and the supply of agricultural products, this way again widening the scope of specialization. (f) With better roads, factory manufacturing and processing, spreads out from the town centers. (g) Not only does improved transport services affect population settlements, but it also increases the actual personal mobility. People are able to use more motor-vehicle transport or use more bicycles. In case of the areas surrounding the urban areas, there is more use of idle labour or unemployed labour in the peripheries. (2) Finally, (h) as road transportation improves, this lessens the acuteness of the planning problems. With better roads, transport planning becomes easier. This makes it possible for people to be able to work out rational economic solutions, since communication problems are eased. As distances between different places become reasonable, through better planning, people are able to satisfy their consumers' needs. Good planning, then improves the utilization of resources, which in turn leads to not only positive development within the agricultural sector, but also within the commercial sector, and the society as a whole.

There is also ample evidence to show that as transport communications are improved, prices of commodities tend to rise. To demonstrate this, we can use Chisholm's example from Kasai region in Zaire. In 1951, when manioc (cassava - which is also widely grown in N Province) was being transported to the mining towns - just as parallelly cassava could be shipped from N Province to the Copper Belt; it was selling for 1,5 Bfr/kg (30 dollars/ton) within 15 km radius from the railway line. But this price decended progressively to 1,0 at 150 km distances. This demonstrates that - crops grown in remote areas, far away from towns, fetched very low prices.

Fuggles Couchman (1939) found prices of maize very low in East Africa, while reports coming from West Africa (Ghana) at the time, showed that it was over nine pounds per ton around cocoa-growing districts. In these districts, transportation was reasonably better. All these evidences are given just to demonstrate the cost effect of improved transport. I contend that the same situation exists in Zambia, that prices in remote areas tend to be low.

Another demonstration of the significance of transport in the subsistence economy, is given by Lockwood who quotes a Japanese evidence. He states that - when most transport in Japan was still by wheel-barrow, (note that the Chinese invented the wheelbarrow and that the wheelbarrow is widely used in Zambia) along narrow paths, the maximum radius over which vegetables could be supplied to towns was only 12 km. With the advent of better roads and waggons, this distance became 20 km. When motor vehicles came, it reached over 40 km. This clearly shows that, the better the method of transport is, the wider the radius of supplies. In Zambia there is a need to expand agricultural production not only in rural areas, but also around the big towns since many people have already moved to these towns. Production cannot be encouraged when transport is erratic. A vegetable grower must be sure of getting his produce to the market in fresh condition.

One thing also clear is that - as the roads get improved, e.g. by macadamizing or asphaltting, this pushes down the real transport costs. There is evidence from USA which shows that - soon after the first world war, it was quite uneconomic for anyone much more than 1 000 km from the railway to produce wheat, because transport costs used up a third of the crop in transporting it to the railway line.

Areas lying far away from the railway, were only made cultivatable after the introduction of motor transport. (Thorn - 1954). According to the studies conducted by Hawkins (1958) in several African countries, it became evident that - most African countries (including Zambia) can make as much as 15 % savings on a 5-ton vehicle by providing a bituminized surface as compared with gravel roads. Savings are made on the depreciation of the vehicle. Yet again, a clear demonstration of road improvement.

5.3 Effects of Feeder Roads on Agriculture

To illustrate the importance of feeder roads, we can reproduce a table from Clark and Haswell which is based on the studies conducted by Healey in India. (3)

Roads in India

	Operating costs kg grain equivalent per vehicle-km	Estimated no of vehicles/day required to justify concretisation
Unmetalled road-Earth Road	0.51	
Do -- Gravel	0.45	
Waterbound Macadam	0.41	315
Bitumen	0.25	410
Concrete	0.22	1 820

Source: Colin Clark & Margaret Haswell, p 209.

As it can be seen from the table, operating costs on concrete roads are lower than on earth roads. But Healey also found out that the operating costs can be brought down by the use of smaller vehicles and lower wages, i.e. where operating costs are high, one should avoid the use of large trucks.

Other evidences which emerged from Healey's studies are: -
It was found out that, each km of new road build, had an effect of opening up some 60 ha of new agricultural land. It was also estimated that, each pound spent on road building, has the effect of permanently raising gross agriculture production. (This was found to be distinct in Borneo (Indonesia), where the raise was as much as four pounds/ha/year).
It was also found out that as soon as new roads were constructed, new settlers moving to otherwise empty land, immediately turn it into production.

As modern mechanical road transport reaches the rural areas, this causes a relative reduction in the costs of transport of say, heavy and bulky goods. With better transport, it becomes feasible to transport away from the producing areas, even comparatively low-valued crops. This way its effects upon agriculture are more immediate than could be expected.

With modern transport, specialization within agriculture rapidly follows, which in turn leads to further increases in productivity. Also perishability risks are minimized.

If costs of transporting produce to the markets are high, unless the crop is of a high-value, the costs of transport, takes up most of its value. But since farmers tend to give up crops which do not bring any returns to them, these types of crops are not popular. To demonstrate the point, again we can borrow Clark and Haswell's example of Tanzania. It is stated that, before the wars (1902), and before the railway line was built; long distance transport costs in Tanzania were estimated as high as 6 shillings/ton mile. Under these conditions at the time, no crop could be grown for export. Only ivory could be exported.

More so, Clark and Haswell also report that - they found out that, many E. African cultivators, have preference for high-value crops such as tobacco and coffee. For, high-value returns are necessary if the crops have to stand the cost of transport or portorage for long distances. In cases where there are no roads in some parts of N. Province, only chiefs, traders, and fairly well-to-do cultivators, can afford to hire helpers for delivering the crops to the selling depots far away.

In a summary form, some of the impacts of feeder road system on agriculture to be expected are:

- 1) Sales of local produce tend to rise, because such crops as corn, tobacco, beans, raising of chickens etc, increase. This is as a result of better communication. The pricing on local commodities, gets stimulated as communication to and from rural areas improves. This causes:
 - (i) Government price policy to change
 - (ii) Local buyers bid higher prices to encourage the production of crops, which they can buy cheaply and sell for more
 - (iii) More accessibility, leads to greater information flows to the farmers otherwise foregone
 - (iv) Low transport costs, stimulate production. Consequently, as the rural farmers learn to grow more, their earnings tend to rise.
- 2) Feeder road net-work improves the services of government agents, education, credit, extension, and health workers. All which contribute to the increase in agricultural production.
- 3) Feeder roads, brings in new influences to the farmers as regards agricultural development. Since some of these roads get to be built by the rural people themselves, (through self-help schemes). The consciousness of the people gets improved.
- 4) Feeder roads, are an essential part of the agricultural transport net-work. These feeder roads, link the rural areas to long distance transport routes which goes to towns. Serving them with the agricultural produce collected from the country side.
- 5) Feeder roads open up new lands, and creates new advantages.
- 6) In an area where feeder road net-work exists, the construction of e g a new railway system, results in a direct contribution to agriculture. Planning for the Chinese Railway, was associated with the optimism for large farming potential in N Province and the western parts of Tanzania. But only after the development of an adequate system of feeder roads, can increased agricultural production be expected. Feeder road system, allows motor transport to play a dominant part in crop transportation, (4) for without it, the remote areas cannot be reached by motor vehicles.

In the rural parts of N Province, it is feeder road net-work and not tarmac roads or railway system, which is at the moment requiring attention. Agriculture in many parts of N Province like in any other region where railway net-work does not yet exist, gets immediate advantages/benefits from road net-work improvements. It is roads, and not railways which need to be built in remote areas, at least at this stage of development.

In the N Province, there are no water ways or navigable rivers which can be used as transportation mode. Most rivers are obstructed by trees and rain-forests. Parts in N Province which do not have good road connections, cannot be expected to take

advantages of modern transport techniques such as the use of big trucks. Since most of the agricultural produce is bulky, the use of large truck is often necessary. Small roads can be feeding into central collection points along the main roads, which are accessible by heavy vehicles.

The development of transport facilities, is not only an important element in the development of agriculture per se, but also plays a crucial role in the whole economy.

If we are to look at the imports of maize alone, the price differences - between the cost of importing maize (K20/bag) (5) and the domestic price of K12/bag, indicates how necessary the promotion of domestic output is. If better transport facilities can contribute to the production of crops, such as maize, then in this way it is helping in improving the balance of trade.

If we were to make a guess-estimate of the savings in foreign exchange which can be made when feeder road network is built, we would come to a conclusion that - investments in access road development (roads which make links to other bigger roads), brings about long-term benefits.

If we assume the cost of maize imports to remain at K20 per bag, and that N Province - as one of the six rural provinces, contributes one sixth to the total production; we would arrive at the guesstimates given below: - (The average import price multiplied by the average amount of maize imports). Table on page 79 refers.

In 1976, N Province contributed about 185 000 bags of maize against a national total of 8 350 000 bags. (Dept of Marketing 1976). Although this is below the guesstimate of 1/6, the province should be able to have the capacity to contribute at least this 1/6 share.

In 1972/73, Zambia imported about 702 500 bags of maize. At K20:- per bag, you have the guess-estimate of the cost of maize imports to Zambia - K14 million. One sixth of this - assuming equal distribution of costs per province gives about K2,34 million a cost to the province alone.

Similarly, in 1979/80, Zambia is believed to have imported about 200 000 tons or about 2 250 000 bags. This gives the guesstimate of $K20 \times 2\,250\,000 = K45$ million or K7,5 million (1/6) for the N Province. This is equivalent to about 375 000 bags (compare this to 185 000 bags produced in 1976 above). This is the amount which could be bought if the possibility of producing it was there. Due to lack of sufficient information, it is not possible to extract the share of imports which can be spent on feeder roads. (6)

If sufficient number of outlets (marketing depots) were to be provided - the goal which can only be met, if access roads were developed; agricultural production can be expanded, (even to reach 375 000 bags), in several potential areas of the province. See table below.

Delineation based on 1979/80 maize imports^{a)}

Area	Share ^{b)}	Prod.loss/ contrib-bags	Pecuniary loss/ contrib-Kwacha
Kasama	1/5	75.000	1,5 mill
Mpika Rural Isoka Distr Mporokoso-"	1,5/5	112.500	2,25 mill
Mbala Area	0,5/5	37.500	0,75 mill
Chitimukulu/ Makasa Senga Hill/ Nondo Chinisali Rur	1,5/5	112.500	2,25 mill
Kapatu Mis. Lumingu Area	0,5/5	37.500	0,75 mill
	5	375.000	7,5 mill (1/6 of Zambia)

a) Maize imports are based on government reports. The figure used, is not the exact figure for the whole year. The yearly figure is probably greater. About 50 % of the Cif. Zambia price reflects transport-related costs from port of origin. If subsidies are included, these costs would account for as much as 80 % of actual Cif prices (Source, Transport Survey, 1977). It would be better if a portion of this import cost - say 10 % is spent on feeder road development instead.

b) The share calculation is based on area potential as judged by the author. These are, however, reasonable guesstimates. - These are the shares which selected potential areas can contribute to N Province's total production.

The connection with feeder roads in this sense, is the fact that the development of these, would help in pushing up the production of maize, from a below 5 bags per hectare capacity, to an average of between 8-20 bags/ha. (7)

Average yields of about 50 bags/ha are produced from demonstration plots within the province.

Although it is not possible to estimate the cost of feeder road development, if we were to assume that all the money spent on imports of maize was instead invested in feeder road development, over a ten-year return on the investment, the guesstimate per year would be K0,75 million (1/10). And since this 1/10 (K0,75 mill) < 1/6 (K7,5 mill), it would be worth while - at least in the long-run to invest in feeder roads. We have already seen from other evidences that - transport problem appears in many cases to keep production down.

Some of the effects of lack of transport on the agricultural sector in repetition are:

- Without it, there would be no exchanges of food from areas with surpluses to the areas with shortages, like in the case of Chambeshi plains which are sometimes isolated due to bad roads. Isolation from normal marketing and transport facilities is not desirable because this may cause the prices of commodities - in these isolated areas, to fluctuate. Isolation may also mean, the isolation of fertile lands.
- Without transport, there can never be the efficient transfer of labour from one region to another. To illustrate this, again we use Clark and Haswell's example from West Bengal where rural areas were found to be offering larger and larger proportion of crops for sale - as soon as the access to the markets got better.
- Urban settlements (for which Zambia is already well known), depends upon transport - as food, fuel, building materials and many other things would have to come from a distance.

Clark and Haswell writes again, in their most exhaustive study of transportation problems facing Africa - that the economics of many African villages today (1970 is when their studies were published), if they are more than a few kilometers away from the railways and mainroads, remain very similar to that period of the more backward villages of mediaval Europe. For Zambia this implies that, unless roads are improved to the rural areas, villages are not expected to change much. This state of affairs, has been recently confirmed in the ILO-Report produced in 1977 - in which it was stated that: - most of Zambian rural villages are today leading a very poor life. (ILO-Report, Lusaka 1977).

Therefore if things are to be improved, it is very important to understand that - cottage industries, so much required in villages, agriculture, and the continuous processing of goods for distribution to larger markets, absolutely depend upon reasonably cheap transport. In fact subsistence economy in rural areas, can be checked if there is no reliable transport.

Although we have talked so much in defence for feeder roads, there are some limitations. For example it is not always that an improved road system results in pay-offs. Sometimes due to shortage of resources for development, or shortage of manpower, or some other limitation, no gains accrue. But since this problem is of a temporal nature, the solution does not lie in the further neglect of feeder roads, but in the removal of these other constraining obstacles, such as shortage of manpower, lack of credit, poor education-health, poor farmers response, or shortage of farm requisites. It is these problems which are likely to delay development rather than the negative impacts of the roads creation.

5.4 Transport System and Agricultural Development

What is transport problem then in relation to agricultural development? How can this problem be solved? (8) We can simply say that - a region/province needs to have a well-developed road net work system if the flows of goods, produce, and people is to take place. In the case of N Province, without roads, the choice is between air transport, limited railway line and footing. Agricultural development is embodied within this whole complex of communication flows. That is why among the many factors affecting agricultural development, singly, the transport problems ranked on top. When considered in relation to the other named AD-problems, still more transport element forms an important part in nearly all of them.

If agriculture is to prosper, then rural transport net-work must be workable. It must be efficient and of low cost. Inexpensive transport costs, provide favourable incentives to farmers. Costly transport, discourages them from being surplus-producers. Where agriculture is widely dispersed, cheap and reliable transport is necessary.

Factors affecting costs are many, but some of them are: First, the nature of commodity to be hauled (how heavy or bulky, perishable or not, requiring special packing or not). Secondly, distance. Thirdly, quantity to be hauled at one time, and Finally, the kind of conveyance used. These factors, (9) affect crop patterns of farmers and thus affect the rate of agricultural development, the kind of agriculture, the particular crops, and livestock products to be produced in a region. In Zambia although transport costs varies from area to area, a bag of maize costs the same throughout the country. The differences are covered by government subsidies. If these subsidies are to be kept down, roads must be improved. One must bear in mind, however, that even a subsidy still remains as a cost, indeed a cost to the people. Thus keeping these costs down, is also necessary.

Expensive transport links, lack of proper agricultural development program, constrains rural development. We must therefore distinguish two levels of transport development which will have an impact on agriculture. First, one needs to develop major connecting road-links or rail-links between districts in the province and between the provincial town and other regions. These form capital projects. Then one has to develop the rural/village access-links and access between different district centers. These are local access-roads (i.e. farm-to-market) roads. It is important to provide a better system of feeder roads, connecting with the spine roads within the province so that satisfactory access to the areas of potential development, could be given. One must invest money in improving this type of roads, so that they can be brought up to a reasonable standard.

As soon as the road links are improved, this Improved Transport (IT) affects Agricultural Development (AD) - or more accurately - Agricultural Output (AO) through, communication and cost factors already discussed, is raised.

Some of the immediate effects of Improved Transport (IT) are:

- (i) reduction in transport costs,
- (ii) improvement of requisite distribution,
- (iii) improvement of marketing system, and
- (iv) improvement of extension coverage etc, all which are crucial factors having a direct bearing on agricultural expansion.

Two immediate effects of the agricultural expansion are on:

- a) Food problem and
- b) Poverty and progress.

a) Food problem

Many areas in the Third World, are experiencing problems as regards the food supplies because of relying on uneffective production systems. Before, food supplies were in balance in some parts of these countries due to low populations. But today, the situation has changed, because a lot of natural population stabilizers have been disturbed by such things as improved medicine and other new modern methods. If populations keep on rising like it is doing at about 3 % per year, in the case of Zambia, survival cannot be assured if production is not well organised. (10)

Production which is even already below self-sufficiency levels, needs to be raised - if famines are to be avoided. Food production must improve, particularly in the rural areas - where there are no incomes to buy food necessities and other items. The rural area's survival, only lies in their ability to feed themselves. (11)

Peasant farmers cannot have this ability of producing food for themselves if at all they don't have outlets or inlets (feeder roads) to/from the markets. The constant supplies of supporting services have to be assured. Only if at all, there were reliable rural road system, can this organisation be possible. The problem of food production, is thus also the problem of agricultural production.

b) Poverty and progress

R G Wilkinson has asserted, that a society's survival depends on how it can organise the productive system so that the society's "equilibrium" can be maintained. (12) To do this one requires:

- (i) integrated productive technology, and (ii) balance between demand for natural resources and supply.

But these two requirements cannot be met in an area like the N Province where transportation is still a major problem. The agricultural productive system, and the distribution of agricultural produce, cannot be effective if road transportation - particularly the rural roads, are still poor. It is the earnings from the sale of surplus cash crops, which improves the incomes of rural people and hence their standard of living. Cash crop production apart from contributing to individual welfares, also contributes to the economic progress of the whole country.

Thus, better road net-work does not only promote food production, it also indeed paves the way for the entire economic progress. Therefore areas having no reliable access to the modern economic system, are bound to remain poor - because the traditional hand-to-mouth system, makes people remain stagnant.

5.5 Effects on Inputs Required

Perhaps the biggest effect on agricultural production, is the effect which road improvement makes on the use of inputs. This is because of the low operating costs which is a result of road improvements or new road constructions. This contributes immensely (in many interlocking ways) to the level-use of inputs required in farming. There are many practical experiences from East Africa. (13)

According to some studies carried out in some East African Countries (mainly Tanzania and Kenya), the effects on "inputs required" use, can be briefly summarized as follows:

- (i) Water house-hold supplies improves with the introduction of improved well, pumps and piping. This encourages small-scale irrigation schemes, thereby promoting vegetable and citrus fruit production, as well as raising of animal husbandry
- (ii) It facilitates the use of commercial fertilizers, seeds and pesticides. Projected yield increases in plans, presupposes organized supply of fertilizers etc. But this is not possible without good communication.
- (iii) It facilitates research and extension work. Cheap road transport, helps to improve the coverage and quality of extension machinery and promotes more use of preparatory research.
- (iv) Marketing and Credit facilitation. Administration and supervision improves. The two, are essential factors in the improvement of traditional crops.
- (v) It facilitates the movements of agricultural implements. The projected cultivation plans, require improved farm implements. Indeed, even effective hoe-cultivation does require constant supply of spares. Good and large enough roads are required to move sizable farm machinery which is necessary when, for example, clearing virgin lands and large bush, is to be done.
- (vi) And finally reliable transport net-work is required for the promotion of other investment activities for the region, such as hydro-geological surveys.

Even in Zambia, since most farmers do rely heavily on the use of external inputs such as - tractors, ploughs, hoes, chemicals, fertilizers, hybrid seeds, pesticides etc, there ought to be an effective road net-work, if these things are to reach them. In addition to the supply of these items, farmers need the necessary knowledge to be able to use these things. Extension officers who can provide this knowledge need to travel, so that quite clearly then, roads must be in good order.

We should also not forget that - machinery and water pump engines reaching the rural areas, often break down and thus need servicing. A constant supply of spare parts is also required. So far, Zambia has been paying some attention to the development of big trunk or tarmac roads, but very little attention has been given to the feeder roads. These are the roads which are crucial to agricultural production.

Recently a new tarmac road - Mpika-Kasama-Mbala, has cost about K49 million. But it has been found out that - this road has very little traffic. Some money at least could have been spent on feeder roads or earth roads which can reach many more villages. Feeder roads are needed to make it possible for the buses, government vehicles, goods lorries and vanettes, to reach villages so that water, firewood, harvests and other things should not continue to be carried on peoples heads. At least there ought to be some earth roads, which would make the use of scotch carts possible.

Any cost conscious Zambian would also realize that - as the cost of imported motor vehicles and spare parts become more expensive, (due to oil prices effect), the economic advantages of having improved roads are quite obvious. Operating costs would be brought down even on the smaller and more isolated roads, only if they were properly maintained. This was proved to be the case in Basutoland where the high jeep costs were found to be due to rough tracks and poor roads. Also in Nigeria, the average transport costs in the northern regions, are found to be higher compared to the costs in the more developed southern regions. Cost could even be reduced further down with the introduction of the railway techniques. If one was to conduct a similar survey in Zambia, it would come out quite clearly, that costs in remote provinces are much higher than those prevailing in urban areas - Livingstone up to Ndola.

Clark and Haswell again provide an excellent example for our purposes. They point out that there are reports from Senegal which show that - the costs of motor transport, rise with distance, the further one goes away from Dakar. So is the case in Zambia according to the World Bank Report of 1977.

One other important contribution which feeder road development makes, is the promotion of innovations. The construction of modern roads, or the improvement of poor ones, promotes innovation absorption. Innovations, raise both qualitative and quantitative change in production. Increase in factor productivity can be in a way of increasing capital/labour ratios, labour/land ratios, capital/land ratios, or raising output per man-hour, through technical changes and increase in capital yield. (14) Improvement in these factors, leads to improvements of production. It is the relation to these factors that transport improvement contributes.

Many other economists have also tackled innovations. (15) Works like those of Schultz have elaborated greatly on innovations concept. Innovations are considered as the basic motive forces and the basic elements of increament of economic development. Thus many have regarded innovations as: new products, new techniques, new resources, or new markets. Innovations may simply mean the adoption of a new enterprise in place of an old one. In the case of N Province, innovation may mean change from subsistence, shifting cultivation, replacing a hand hoe or digging stick with improved equipment. Adoption of innovation package, may mean the use of new inputs (fertilizer or improved seeds), these complemented with improved cultural practices. This results in increased output, which brings in more income to the farmer. In fact, innovating is the most useful planning tool in increasing the incomes of the farmers or villagers. Introduction of innovations or new ideas cannot be possible before the bulk of the areas can be accessible with reliable communications. Certainly, innovations cannot reach rural peasants if there were no roads reaching them. But we also know that if peasants are not made to adopt new ideas, they cannot be able to produce enough food even for their own consumption, for old methods have proved to be useless. Where people stick to old tools and methods, production has fallen, or remain persistently low.

5.6 Access to the Markets

As soon as the access to the markets of produce is improved, since farmers are usually price-responsive, the price relations between the crops (e g those created by price incentives), influences the crop patterns and creates changes in farm production. There are many examples to demonstrate this. If the staple crops for farmers in the area are maize and vegetables, when the price of vegetables is increased, while keeping that of maize down with the possibilities created by a road of selling vegetables to towns, the hectarage devoted to vegetables will tend to rise since vegetables become the most attractive. The production of maize will also, however, tend to rise as the general access improves. This consequently leads to more income flowing to the area. In this respect transport becomes of value. The main essential role of transport in this respect is: - to permit the exchange of goods between the cultivators and urban centers, thereby making it possible to raise the conomic position of the cultivator, because the commodities fetch higher prices.

Diagramatically this could be expressed as:

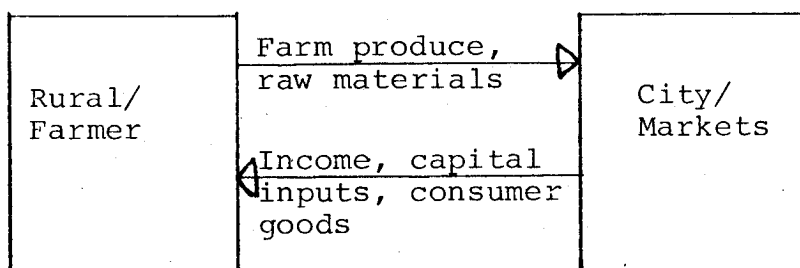


Fig. 4.4 Access to the markets: Drawn by Author

Therefore the links between rural and city does not only help to reduce rural poverty, they also help to promote and sustain vigorous regional growth, as more areas participate in the market economy. Apart from the facilitation of the exchange of commodities, links also promote inter-district or inter-regional dependencies. From this angle, that is why many development theorists argue that the rural poverties can only be better appraised in the entire national matrix, in which transport plays a crucial role. (16)

Improvement of the accessibility between the farm areas and the urban areas, is probably the most important end product of improved transport services. Accessibility or reduction of remoteness has got many characteristics, but some of the important ones are:

- (i) The intensity of farm production depends on proximity to the markets.
- (ii) The proportion of land in farms, and the proportion of farm land in crops, are joint functions of the quality of land resources used and its accessibility to urban areas is indexed by population potential. (17)
- (iii) The greater the access, the greater the number of part time farmers (this applies only to large cities). It has been found that as the city/town grows, its entire functional economic area, benefits, as more workers commute.
- (iv) There is an increase of rural manufacturing activities due to accessibility to the urban system. This leads to higher local activities. This way the resource-extracting activities increase. However, if not under control, this trend may lead to exploitation of the rural country-side by the money mongers as Mafeje has warned.
- (v) Accessibility and distance to the metropolis, also some times, puts stress on agriculture in that: a) average size of farms tend to rise too fast, b) average value of some land and buildings per hectare tend to fall. This results in urban-oriented rhythm of agricultural activities, which affects the rural life *negatively*.
- (vi) The greater the farm population in an area, the greater/higher the access requirements, the greater the population mobility. On the other hand, if you have excess migration (mobility) of farm labour, this is dangerous in that this may result in underpopulation and removal of needed labour to develop the untapped local resources.
- (vii) Thus accessibility is not problem free. There are many problems such as: diffused extension of urbanization into former farming areas, and rural poverty may become polarized in urban centers. One then, should also be aware of the fact that even if in the country as a whole, the effects of accessibility on incomes may be appreciable, but within a region, this may result in increasing the income gap between city/towns and the rural peripheries. It is again common knowledge that in Zambia today, the income gap between urban and rural areas, has been widening. In some

rural areas, the poverty of the people since independence (1964), has in fact nearly doubled.

- (viii) There are also other factors connected to accessibility such as: - urbanites contribute to the efficiency of local factor and products markets. - Cities facilitate the transfer of excess labour out of agriculture and of needed capital into agriculture. - Accessibility helps to reduce excessive differences of resource endowments, and that there must be access to urbanities, which are major growth poles on which even the surrounding rural areas depend.

We have here again demonstrated beyond doubt that, accessibility is important and needed, if at all the rural agricultural areas are to be developed. But this accessibility is nothing other than improved transport services.

5.7 Relationship Model between Transport Improvement and Agricultural Development

There is a very strong relationship between Transport Improvements (IT) on one hand, and Agricultural Output (AO) on the other. That, given data and other relevant information, it could be easily proved that: stimulating investments in transport system, would result in the agricultural output levels responding to these investments - namely, as you improve your road connections, you should expect (all other things operating at reasonable expectations), a change in the agricultural outputs. Improvement of tertiary and feeder roads, for example, stimulates agricultural development in the affected areas.

Improved transport, improves the performance of the agricultural sector through, as we have pointed above, - the communication and cost effects. Improved rural transport network, causes an impact on cost efficiency during the process of moving the goods and/or the people from one place to another. The service function improves. The provision of spare parts and other auxiliary services such as agricultural extension also improves. An extension officer becomes able to cover a wider area. Provision of food and other necessities to the people working in the rural centers, get better. Rural health workers, teachers, and other government staff can now be reached by their superiors, more often.

Not only does far out-lying areas get opened up, but travel distances to these places get shortened. Vehicles move faster and avoid unnecessary stoppages. Due to the improved transport mix, it then becomes possible to transport perishable goods over longer distances without spoilage or loss of quality. Better and stronger bridges, better and more reliable road surfaces (with no pit holes), improve the road safety. This in turn saves the loss of valuable man-power through accidents. Not to mention the new general development opportunities which are generated by the better roads.

These factors affect the agricultural production in the sense that - a) marketing of produce and the distribution of input, improve. - b) Provision and the supervision of agricultural credits, improve. - c) The level of agricultural innovations and

the use of new techniques, rises. - d) Better agricultural husbandary and practices, spread to the peasants. All these will not only induce hectarage expansion, but will also improve the socio-economic conditions within the rural areas. If these effects and changes cannot be disputed, then the importance of improved rural road transportation becomes in turn undisputable.

Other evidences which could support our argument are the following: - Where there is lack of transport, there are also costs in terms of lost time and portorage charges, since produce would have to be carried on the backs of people (as is still the case in most parts of Africa) over considerable distances - sometimes over 40 km.

One other important effect connected to costs, is the economic effect of high transport costs as reflected in the price of land.

In Philippines, the studies conducted showed that - near the markets, a hectare of land sells at the equivalent of 3,3 tons of rice. At distances of 6 km or over from the markets, it sold at only at 1,9 tons of rice.

These figures in effect mean about one-tenth of the difference in land price i.e 140 kg rice/ha/year, or 13 percent of gross product. (Clark & Haswell - 1970).

Usher has also come up with some sound evidence that - due to what he calls "transport bias", any country with high internal transport costs and if at all it is exporting to the world markets (like Zambia is);

- domestic prices will tend to be lower than the world market, and even lower, the further away one gets from the urban areas.
- due to the same reasons, in mid-nineteenth century in Ghana, the price of a ton of maize was only 112 pence, compared to about seven pounds on the world market. (Usher - Economica, May -63 & Nov 1966).
- in Zambia today the price of a bag of maize is about K12 as compared to about K20 the importing cost. (World Bank, Dec 1977, Times of Zambia, Aug 29, 1980)

Poor communication, also encourages traders to speculate in the necessities of life reaching remote areas, doubling or trebling the original prices of goods. Black market is thus encouraged. UNZA A.E.D. 1979 has come up with such findings in rural Zambia. Also according to Hans Hedlunds' report at UNZA, June 1977, in the N Province, there is a well established "un-official" market for the agricultural produce left over from local consumption. These "private buyers" or 'black marketers', pay about K48:- for an 80 kg bag of dried beans, as compared to K34:- per bag the official price. Another demonstration of the transport effect, is this price variation. These buyers pay K15:- for a bag of millet in dry season, and are prepared to pay for the same bag K18-K20:- during rainy seasons. Furthermore, Hedlund found out that - in the remote areas, people are prepared to accept barter trade, i.e someone can easily exchange fish with millet or can use beads to get beans etc, instead of money.

- In Malawi, it has been found that the longer the distance from roads, the higher the charges for ex-wagon transport. (C & Haswell, 1979). How much more, can one demonstrate the need for a reliable rural road-net work?

NOTES AND REFERENCES V

- (1) According to SIDA Fakta Blad, (Sweden Aug 1979), the following figures were reported on Zambia.

<u>Employment (1974), %</u>		<u>Production, % of GNP</u>
Agriculture	52	10
Industry	15	58

According to Zambian government statistics (Digest of Statistics, 1978), there are about 5,5 million people. Out of this only about 385 000 have some kind of regular employment - of which about 33 600 are employed in agriculture, forestry and fisheries. What do the others do? Jobless or villagers?

- (2) See Chisholm, M op cit, p 146.
- (3) See Clark and Haswell, op cit, p 190-205. The Indian case provides us with a lot of information. See also Fuggles N R & Couchman, Dar-es-Salaam, 1964, Agric Change in Tanganyika 1945-1960, p 52.
- (4) This is covered in detail in chapter 5.
- (5) Surplus crop production can be sold on the world market to earn much needed foreign reserves. Inability to meet self-sufficiency, is a symptom of poor/low agricultural production. In 1978, the agricultural share of GDP at producers' value (at 1965 constant prices) was only 14,5%. At current prices, GDP in 1977 stood at K2010 million. P Ollawa cited earlier on, has observed that a major impediment to peasant farming is lack of transport: see p 16.
- (6) Estimations are based on government statistics.
- (7) This is indicated in Hedlunds UNZA survey, 1977; op cit.
- (8) We are discussing transport problem in a macro - rather than a micro sense. It's solution aiming at achieving the whole bunch of benefits rather than achieving optimization in a micro-sense.
- (9) See Arthur Mosher op cit, pp 11-120 for a comprehensive discussion.
- (10) To begin with, agriculture should concentrate on those crops which are already, familiar to the people. The most common grain crops are maize and millet. In developed countries, large proportion of the food grains produced are fed to livestock to be consumed later in form of meat or milk. Grains are consumed directly in poor countries.

- (11) Ibid.
- (12) In any poor society, the first problem is, that of producing enough food. This is the first step in tackling poverty. When it comes to food shortage problem, the "pessimists" recommend triage strategy (this is the strategy of abandoning those countries and social groups whose situation seems hopeless, so that others can survive. On the other hand you have "optimists" who argue that it is possible to increase food production. These contend that individual countries and the world food production has in fact been increasing. They believe that there are no technical reasons why presently known resources, science and technology, could not be harnessed to feed adequately more people.
- (13) In East Africa, it has been found that, the annual rate of net income accruing to the farmers, increases when extension programmes are conducted complementary to road development programmes. Mosher has also made similar conclusions.
- (14) See wilkinson, R G, London, 1973, Poverty and Progress pp 200-210. Poor roads affect marketing facilities, since this limits the capacity of transport services. For instance, where transportation of poor, rural marketing depots are not reached: hence a considerable portion of the agricultural yield is left unpurchased, a factor which discourages many peasant farmers.
- (15) Singh and many economists from the Third World, do not accept the notion that people living in less developed countries (LDCs) are tradition bound (that they behave according to rules so different, that micro economic theory is not relevant). They argue that this has been disproved. They argue that on the contrary, many people have now agreed with Theodore W Schultz's argument, that peasant farmers are economic beings in the same sense as their western counterparts. Schultz argues that, it is the disequilibrium or imbalance within the economy which leads to price movements, income differences, profit possibilities, which in return leads to new initiatives, innovations and resource redistribution, rather than peasant reactions.
- (16) See Berry, B J L, op cit, See also M Bostock and C Harvey op cit, p 13.
- (17) Case studies of this phenomenon are reported in Berry UN, FAO believes that factors contributing to poverty in many developing countries is due to having increasing number of families trying to extract livelihood from poor quality land, a lot of them being displaced from good lands because of migration to urban centers; and the growing competition for the use of good quality lands by entrepreneurial farming, or non-agricultural establishments.

VI CHAPTER SIX

6. OPERATIONAL PLAN

If we recall, the main purpose of the study has been to try and define the role of rural networks in the development of agriculture and the rural life. In order to enhance the ideas and submissions made in our findings, an OPERATIONAL PLAN for feeder road networks is hereby attached.

The support to our proposals is by and large based on the government policy formulations; spelled out in its plans - like SNDP (Second National Development Plan) and TNDP (Third National Development Plan); recommendations made by different expert groups; Aid Donor's recommendations; the experiences gained in other developing countries; and the authors' own personal judgments.

In the plan we shall attempt to show how those elements related to feeder roads can be a part of planning. Proceeding on to show how the situation in rural areas can be changed by the existence of efficient feeder road networks.

6.1 Background

Northern Province has a population of about half a million people (580 000 per 1974 census), rising at an average of 3 % per year. But the current food production does not meet this rising demand.

The shortage of food stuffs and raw materials plus the fact that food prices charged, are beyond the reach of the majority of people, calls for intensification of domestic production.

The per capita income of Rural Households is only K20/month or less - this is really a sign of poverty. Those employed in urban areas have a per capita of K75 - K100 per month or K900 - K1 200/ annum. (1)

There is a steady increase in migration of people from the Northern Province to Copper Belt and Central Provinces. People move out for the purpose of hoping to go and find employment in the urban areas. This unfortunately, reduces the limit of labour resources in rural areas, since it is normally the effective labour which leaves. This naturally limits the capacity of cash crop production from these areas.

Employment opportunities in urban areas are still very limited. In 1974, there were only 386 270 employed in the urban sector - this number has since declined considerably. If there is to be any job creation today, this can only come out of the rural sector and the so called informal sector (self employed or craftsmen).

For Zambia as a whole, the industrial strategy adopted has not been too successful, because it has been too capital intensive and needing very high protection, for example, the fertilizer factory.

In the last five years the GNP for Zambia has declined by nearly half. This has been accompanied by a fall in national income, which has led to hardships being noticed in all sectors. The reduction in mining revenue has thus affected the standard of living of people. The situation in rural areas, is even worse. Today people in rural areas have a lower standard of living than in 1964. All these point to the importance of the agricultural sector.

The development capacity which is still existing in the agricultural sector, can be utilized only if the resources lying idle are utilized properly. There is plenty of human resources. - Of 5,6 million people living in Zambia, - nearly 90 % is under 45 years old, 40 % live in urban areas and 60 % live in rural areas. Of the 60 % living in rural areas, - only 10 % live close to the line of rail or road, while 50 % live more than 10 km from roads or are in remote areas with no roads. Hence no necessities of life can reach them easily. Extension services and other government services cannot either reach them. Thus people have limited access to schools, medicine, water supplies and such amenities. This means therefore that at least 85 % of those living in rural areas live below basic standard of living. (FAO 1978 Country Review) (2)

This widely scattered rural population can therefore benefit greatly from the development of rural transport networks. It is in fact the government policy to ensure that all farmers wherever located, can sell their crops at uniform process and be able to obtain inputs. But this goal cannot be met without rural road network.

Today, transportation tends to be seasonal due to the poor quality of existing rural roads. And since the production in the far off areas tends to be low, those who have transport, only make it available when they are assured of returning back with full loads. Transport uncertainties discourages production. No farmer would be encouraged to produce anything if he is not sure of how to transport it to the nearest market depot.

The improvement of rural road networks is further motivated by the fact that Zambia has still got a lot of unexploited land resources.

Of the 42 million hectares of available agricultural land, - 29 million are uncultivated, - 7 million are under shifting cultivation. That is to say leaving only 6 million or 14 % of total under effective use. (3) This should be related to the fact that Zambia today heavily relies on food imports. Besides, in order to keep the food prices down, the government pays a lot of subsidies. Put together, this is a very huge bill for the country. It should be better then to think of promoting and subsidising local activities which would lead to raised domestic output. As soon as the local production replaces imports, it could then be expanded to utilize the export capacity. There is in fact a general feeling that agricultural exports in Zambia could be promoted at almost no additional transport cost.

6.2 Main Objectives

Feeder roads, form an important and indispensable link in the chain of agricultural production and marketing processes. Therefore deficient feeder road network, can hamper the development in the rural areas. Although Zambia has a relatively high developed road structure, of the total 34 500 km of roads, - 60 % is unclassified district roads (about 5,5 meters wide); - 20 % gravel rural roads (with formation greater than 5,5 meters); - 15 % branch paved roads (over 7,5 meters wide).

In 1978, N Province had about 3 000 km of roads (government statistics).

- Unclassified roads 1 003 km or 34 %
- Gravel rural roads 1 202 km or 40 %
- Paved roads 795 km or 26 % (4)

The maintenance of unclassified roads has always been the responsibility of Rural Councils instead of the Roads Department. That means that the quality of maintenance is not that high, and that the maintenance of rural roads still remains a problem. Maintenance activities therefore require improvement.

All along, the government has put emphasis on upgrading of the major roads instead of expanding the rural road network. But now, the government is shifting emphasis to improving/widening and/or upgrading/opening up new local lower-class rural roads. This is a positive step if implemented.

In view of the serious food situation in Zambia, many experts have recommended that the government should, to the extent possible put emphasis on the production of food crops. It has been further recommended that the agricultural programmes, should be designed to promote an active participation by the small-scale farmers.

In an effective food policy which is to tackle all the aspects of food production, processing, distribution and consumption, and those of income distribution and nutrition, the role of feeder road networks cannot be over emphasized. Besides, without them, the gap between urban and rural areas becomes even greater. This has already been established empirically in Zambia.

It is known that the majority of the population in rural areas have no access to feeder roads within a distance of 0-8 km. Since most of the social services are allocated along roads, these people are too far away. If no citizen is to be not more than 5 km from the nearest road, more feeder roads are required.

It is also government policy that great efforts should be made so that agricultural extension staff can reach the small scale cultivator. But since these cultivators are widely scattered, this goal cannot be reached unless there is a sound feeder road network.

Some of the serious constraints to small scale holders have been - lack of market centers and the inadequate supply of requisites and credits. Again, only if there was an efficient feeder road network, could these services be provided. This way also, the objective of promoting Community Development programmes such as: - functional literacy programmes, - women clubs formation, - self-help projects of water supply, dam making, and fishing, is attained.

In the N Province the work of IRDP - Intensive Rural Dev Program is going on. This IRD-Program cannot succeed without the development of feeder roads. The main objectives contained in the IRDP very closely intertwined with those of feeder road development are: - The improvement of standard of living in rural areas by increasing the rural people's incomes, - the improvement of political and social awareness in the rural areas, - development of methodology for small farmer development, - and decentralization efforts.

6.3 Policy Instruments

Policy Instruments, are the measures required to be taken in order to achieve the objectives set out. This is the outline of things which must be done before any gain or increase in production is to be expected.

Given good political approach, there are certainly possibilities for economic progress in the rural areas. But this must be accompanied by an efficient system of feeder roads. This is so because as we have pointed out before, focus should be put on small scale farmers. Small scale farmers, use low cost production methods and they happen to be producing the bulk of the country's grain requirements.

By improving rural road transport facilities, agricultural production, benefits through: - the reduction in road use cost, - and the direct increase in total produce output. High transport costs, is the biggest hindrance to the smooth running of the marketing system. For this reason alone, most transporters doing business in the rural areas, are unwilling to undertake haulage on lower-class roads. The aim therefore, should be to try and lower degradation of vehicles and other operating costs.

The reduction in operation costs, can be achieved through: - use of improved roads, - and more efficient use of vehicles. The reduction made in operating costs due to the change in the quality of roads, can be clearly demonstrated if one looks at the following figures.

For the year 1978, operating costs for different organisations in Zambia were:

- Zambia Transport Road Services (ZTRS): 2,5 ngwee/ton - km
- Contract Haulage Co (CH): 1,2 - 4,6 ngwee/ton - km
- NAMBoard Marketing Organisation (NAMB): 6,00 ngwee/ton - km
- N Province: 13,18 ngwee/ton-km, one way (general costs) or 6,6 ngwee/running ton - km (vehicles loaded both ways).

- E Province: 11,00 ngwee/ton - km, one way (general costs) or 5,5 ngwee/running ton - km
- S Province: 13,00 ngwee/ton - km, one way (general costs) or 6,45 ngwee/running ton - km.

It is also relevant to examine the costs in terms of time consumed, for instance the time consumed to haul maize from Mporokoso to Kasama, a distance of 200 km one way was - 9,5 hrs or approximately 20 km/hr. (5)

From these figures, it can be easily seen that - E Province which happens to have a slightly better developed rural roads structure, than N Province, had lower running costs. The picture is even clearer when one compares NAMB and C Haulage running costs.

Since NAMBoard's operations were mostly in rural areas, its costs were remarkably higher than those of C Haulage whose activities were mainly concentrated on asphalt roads. This implies then that - any betterment made to the rural roads, would definitely result in the lowering of running costs. Consequently, the ton-km run per truck, and per year increases, let alone the smooth running of other services. The case for the improvement of rural roads, could also be expressed in another way. When transport and other diverse costs are rising, such as high fuel and spares costs, in this situation, even if a farmer is provided with subsidies, he always tries to seek for the lowest cost means of transport possible. This, tends to encourage competition amongst transporters available and thereby promotes more efficiency. This way, the use of many kinds of vehicles will be encouraged.

The other strong measure of increasing production in the rural areas, is to build a strong cooperative movement particularly at grass root level. Only through well organised primary cooperatives can small cultivators benefit. Cooperatives in rural areas, should act as marketing centers for farm commodities and a source of farm requisites. The K1,1 million turnover in 1978 made by NPU (Northern Province Union), could be doubled if:

- There was a rapid expansion of food crops and other traditional crops.
- There was avoidance of unnecessary losses caused by bad management. For example NPU collects produce from widely scattered areas without any proper coordination, and
- The unnecessary haulage of maize forwards and backwards, could be avoided. As discussed already, the freight costs of 6,6 ngwee per ton-km in the province is rather high. On top of this cost, one should not forget handling & storage which was estimated at one ngwee per ton-km or 10-15 ngwee per bag handled (this forms about 15 % of transport costs).

Here again, these objectives could not be achieved where transport communications, are not yet fully developed.

According to the new government policy expressed in TNDP;

- Marketing and supply functions in provinces have to be gradually transferred to the cooperatives. The present NAMB has to cease operations. The success of this lies in the improvement of cooperative managements. It should be ensured that coops are run by qualified managers.
- Since cooperatives are to collect, transport and store all farm produce in future, storage facilities need to be improved. Sheds and concrete tabs have to be built at all prospective market depots.
- Farm requisite and credit distribution, needs to be properly coordinated and administered by the agricultural department. To promote efficiency, a purely private marketing company for requisites should be set up. In fact unless there are plans to see to it that cooperatives in their new roles can operate on sound principles, marketing functions ought to fall in the hands of a private organisation.

This new role of the cooperative movement in agricultural marketing, calls for first and foremost; - improvements in rural road networks, if at all marketing and supply functions are to be performed effectively. Improvements can be in a way of new roads construction or better maintenance of existing roads.

If for some reasons the construction and upgrading of rural network cannot be implemented, then at least the feeder roads linking hinterland farm areas to the main trunk roads, must be improved. This should be accompanied by systematic production programmes of both small scale and commercial farmers along the banks of these big roads. This must be so, less agriculture does not benefit much from the existence of these roads.

The producer price policy, is another constraint which must be looked into. Too low producer prices, discourages production. Producer prices paid for local crops must be deliberately encouraging to the small farmers.

These policy instruments we have raised, can only be useful if from the government side, there is a deliberate policy to build up a strong agricultural sector rather than the hitherto policy of continuous reliance on the mining sector. It is the amount of attention and the level of efforts put into the agricultural sector which determines the success of agricultural development.

6.4. Feeder Road Plan Implementation. - Inputs

Road Development Package Program, consists of four major components (RDPP):

- 1) The construction of new roads - be it be feeder or other larger types.
- 2) The improvement or betterment of the already existing roads. This may be in the form of improving tracks or poor feeder roads; or

Reshaping of Class III and unclassified roads to Class II standard.

- 3) The steady maintenance of feeder roads, and
- 4) Road paving - putting on concrete or asphalt. - We are not very much concerned with this last one.

The implementation program may be a choice between one of these programmes or a combination of them.

- Program 1 - New Feeder Roads Construction
- Program 2 - Improvements or reshaping of feeder roads
- Program 3 - The Maintenance of Feeder Roads only
- Program 4 - Road Paving.

The maintenance of feeder roads may consist of: i) Routine Maintenance:

- clearance and maintenance of ditches, culverts, drifts, any damaged or washed away road,
 - repairing and filling of potholes,
 - draining of stagnant water, and
 - cutting of vegetation and grass.
- ii) Periodic Maintenance - annual or periodic repairs, gravelling etc.
- iii) Emergency Maintenance - to be attending to immediate e g wash outs, landslides, falling trees, or sabotage.

Maintenance is an important component in feeder road development, because as the road traffic volume increases and more use of heavier vehicles come into use, this causes excessive damage particularly to gravel roads. As the surface wears out quickly, this calls for the need to regravell afresh. Regravelling might be necessary once every 3-5 years.

6.4.1 Proposals: Road Maintenance

- A systematic annual plan for maintenance operations, repair teams, and road camps should be prepared, and distributed to all respective stations.
- Lack of preventive maintenance has resulted in otherwise reasonable roads to deteriorate greatly. For this purpose, Provincial Mobile Repair/Maintenance Services should be set up.
- Maintenance operations, should be decentralized as much as resources can allow. But all operations still to be incorporated into the Provincial administration. But each district should maintain at least its own maintenance fleet.

- The maintenance equipment should consist of at least:
 - a motor grader or caterpillar,
 - a tractor plus a trailer,
 - two tippers or loading trucks,
 - a mobile fuel tank,
 - sufficient spare parts to avoid break downs and work stoppages,
 - sufficient number of hoes, axes, picks, shovels or any other implement required for levelling, loading, slashing, root uprooting stone crushing etc,
 - and other necessary items such as battery chargers,
- At each of these equipment stations, there must be a simple workshop under the supervision of an all-round mechanic (some one who knows a little bit about everything - plumbing, welding, electricity etc).
- If Rural Councils should continue to play a dominant role in the maintenance and repair of feeder roads, they should have access to sufficient amount of financial resources.
- For these maintenance programmes, the government should mobilize rural resources. The idea is to encourage labour intensive techniques, as opposed to capital intensive ones. L Karlsson's study conducted in 1979, shows that even rural road construction, has a foreign exchange component of 80-90 %. (6) Labour intensive techniques in form of self-help projects, does not only save foreign exchange, but is also a form of employment creation. Road betterment and maintenance schemes must be supported as much as possible by indigenous resources and planned to go in line with the socio-economic, technical, and administrative conditions of rural areas.
- Attached to the maintenance packages, should be - Personnel Training Program. Training is required for - Roads supervisors, Roads foremen, Grader operators, Tractor drivers and other helpers.
- Control of operations should be done at least once a month, by the Provincial Roads Engineer. Quarterly reports on progress, damages, or road deteriorations needing attention, should be submitted regularly. A simple review of road impacts on people, should be done at least once a year.

6.5. Justification of investments - outputs

Although the physical outputs such as feeder roads can be measured in physical terms, relevant to agriculture, the costs and benefits of these structures useful, is often expressed in form of the increased production these might cause. - Although there arises problems in calculating this value, true and easy to see, are the services which accrue after the improvement of these works. - Also easy to see, are the changes imposed upon the social structure in the areas of influence - These changes, do contribute greatly to the people's standard of living.

The establishment of a strong feeder road system strengthens the output planning process. The benefits gained with road improvement as a matter of stress, are:

- 1) Average hectarages for cash crops - per house hold rises. This leads to overall crop output. A rise of over 30 % for a period of 10 years in some Tanzanian regions with feeder road programmes, was recorded. (7)
- 2) As the roads improve, the quality of transported produce improves. - This is reflected in price effects, which in return improves gross incomes earned from cash crops. - This induces more use of farm inputs, such as fertilizers. - The use of fertilizers leads to bigger crop outputs. - The income flows to rural areas, improve the standards of living.
- 3) Credit supervision improves.
- 4) There is a betterment of extension machinery. More personnel and the quality of extension services, improve. Better extension services is related to cropping patterns, land uses and farm management. As a consequence:
 - agriculture, gets more intensified,
 - one gets new developments of land,
 - new farming opportunities, are created, and
 - the speeded up flow of innovations, benefits small holders.
- 5) Improvements in land services in form of surveys and farm regristration, also facilitates the introduction and servicing of electrical power lines and telephone lines.
- 6) The cooperative system, is reinforced. This encourages planning of local production and local processing. The transformation of primary co-ops from mere buying depots to effective marketing organisations, owes much from feeder road improvements.
- 7) Lowering of vehicle operating costs. Savings are made also on storage and handling costs. This does not only induce traffic generation, but it brings into play other economic activities.

6.5.1 Recommendations

Based on what we have just discussed, if productivity is to be boosted in rural areas:

- 1) Improved extension services accompanied by a sound geeder road network, is required.
- 2) Tractor hire services must be well organised.
- 3) Establish land clearing services as a forerunner to rural mechanization.

- 4) Set up village workshops, where minor repairs and maintenance of farm machinery could be done.
- 5) Oxen training in areas with oxen like Mbala and Mbezuma are to be encouraged.

Development resources must be mobilized if these programmes are to succeed. Emphasis should be placed on labour-intensive oriented techniques. Other issues to bear in mind are:

- Making investments in the development of feeder road network, is a step forward for any country.
- The prohibitive cost of making 1 km of paved road, estimated at K100 000 (1978), should act as a good argument for feeder roads, - costing only K200 per km. (Davidsson & Robertsson - Transport Study) (8)
- Financing of these projects should be done by both private and government sources. GRZ provides funds through its Ministry of Finance and the Para-Statal organisations such as AFC - Agriculture Finance Company, ZADB - Zambia Agricultural Development Bank, when and as it gets into operation. Co-operative organisations and Agricultural Marketing Boards, are still dependent on government for capital. The future policy should be that of letting these organisations be standing on their own footing. In the immediate future, as long as these still remain under government, some kind of REVOLVING FUND should be established to assist them.
- Other sources to be mobilized, are the Bilateral and Multi-lateral grants or aid from international organisations such as: UN Agencies, IMF, World Bank and State Bodies such as SIDA. Loans obtained from the international money markets, must carry low interest rates - otherwise it would be more preferable to pull together domestic resources. Projects with high foreign exchange components, end up in delays.

6.6. Selected case studies

CASE 1: Ikumbi coffee scheme - Isoka

Remarks - Coffee has been grown in this area for over 20 years. But production has always remained low, because of: - inadequate extension services, and poor marketing services.

Future Plans: - to be based on four measures:

- Improved extension service,
- Improved marketing system,
- Improved dry land coffee seedlings, and
- Introduction of irrigated coffee.

Investments/year: 1981/82 Estimates - Roads Package Program.

- Road construction/upgrading	- 20 km at K225/km	4 500	
- Maintenance (earth roads)	- 35 km at K50/km	1 750	
- Other costs		2 000	
		<hr/>	
<u>Total investments</u>		8 250	(9)

Benefits:

- Increased production of coffee per year,
- Smooth flow of inputs,
- Efficient marketing system,
- Better quality of extension advisor services, and
- Maintenance of good yields.

6.6.1 CASE 2: Mulema rice scheme - Kasama East

Remarks:

- The Chambeshi flats gives excellent natural conditions for rice growing. The potential rice area, is estimated to be about 30 000 hectares.
- The main hindrance is that there is no accessibility to about 95 % of this potential area. In this area, there are no feeder roads at all.
- Another difficulty is that, the rice area gets fooded during rain seasons, and transportation becomes very complicated.
- Little population in the area.

Future Objectives:

- To improve both the quality and quantity of rice production in the area.
- Measures needed:
 - Use of improved technology, better implements, better seed, fertilizers etc,
 - Intensive infra-structure development: - feeder roads, drainage, boat services, irrigation structures,
 - More population settlements
 - Improved credit, marketing and input supply system,
 - Increased extension advisory services, and
 - Rice milling facilities.

Minimum Investments in Rural Structures/Year: 1981/82 Estimates- Infra-structure Program

- Intensive infrastructure, (boat services, irrigation structures, drainage etc), K60 000
- Feeder Roads construction/upgrading, 450 km at K267/km, K120 000
- Feeder Road Maintenance 1 000 km at K60/km, K60 000
- Other costs, (settlement programmes, storage, bicycle loans etc), K30 000

Total investments K270 000 (10)

Benefits:

- Incentives to growers and thereby increased production of rice per year.
- Incentives to new population settlements.
- Better quality of extension advisory services.
- Already, 20-30 % of Zambias' total rice needs is being produced in this area. Only if there could be more investments in feeder roads and better marketing, the scheme is capable of producing all of Zambia's rice needs.

Comments on Cases 1 and 2

- (i) It is empirically possible (through the use of statistics and such), to show the justification of these minimum investments suggested.
- (ii) There are however, other more clearly seen real values or benefits of new or improved rural physical structures extensively covered earlier, such as:
 - the spread of know-how necessary for making life easier in remote areas,
 - the efficiency in the flow of basic services to the people which leads to an improved standards of living, and
 - the long-run benefits which accrues so long as the road remains useful to the people.

6.6.2 CASE 3: Double transport problem

Marketing/Distribution Costs - as reported by IRDP office, N Province.

Costs to the line of rail	Transport costs ¹⁾ K/ton	Handling/Storage ²⁾ costs K/ton	Ferti- lizer price K/ton	Maize (price K55/ton)	G-Nuts (price K213/ton)
Mbala	48,60	7,30	61	88 %	23 %
Kasama	38,70	5,80	48	70 %	18 %

Source: Transport and agricultural survey report, Annex 12, GRZ, Lusaka 1977 (11).

Notes: 1) General freight rates as recorded by NAMBoard for the year 1977 - 13,18 ngwee per ton-km or 6,6 ngwee per running ton-km.

2) The handling and storage costs have been estimated to form about 15 % of transport costs.

Since there are no grinding mills in most rural areas, maize for example, is hauled backwards and forwards. First, all maize is hauled to the provincial capital and the main depot for NPU - Kasama, and then the same maize is transported back to the rural districts as milled maize. Due to the very high transport costs set above, this is very uneconomic indeed.

In order to cut down on this cost, it is proposed that small roller mills and feed stuff mixers, be set up in rural districts such as Isoka. The estimates made by ASSP - Agricultural Sector Support Program of SIDA of one such mill being erected at say Isoka itself, would cost - K213 000.

We have to remember that, in rural districts, the rural consumer is forced to pay for transport costs to and from Kasama, Copper Belt, or Lusaka for sending out his produce and receiving the essentials he needs, such as - mealie meal, seeds, fertilizers, stock feeds, and other items.

The total cost of this unnecessary movement of maize from Isoka and then back was estimated at some K300 000 per year. Assuming a 30 % local consumption of produce and 68 % maize extraction rate, the estimated savings to be made when one has a local plant was - K126 640 per year. Similar plants varying only in size, and cost, could be set up in other districts such as - Chinsali, Nakonde, Kayambi, Mbala, Mporokoso and Luwingu. Which ever way we look at this problem, we must all admit that - to a person dwelling in far off places, transport costs remain his main concern.

6.7 Nutrition promotion

There are about seven different food-groups forming the so-called "Food Circle". A healthy body requires these different food-stuffs in varying amounts for its nutrition and energy needs. If the nutrition standards of the people living in N Province are to be raised, these food-stuffs ought to be available.

Below, we have attempted to make a group by group list of those food-stuffs which have great growth potentials in the province. To expand the production of these crops, there needs to be either, the intensification or hectarage expansion. Then one needs good management techniques. Production could come from either peasant, small-scale, or commercial farmers.

Group 1: Vegetables - (needed for iron, A- and C-vitamins) Green maize, green beans, dried beans, soya beans, sunflower, tomatoes, onions, egg plant, cabbage, rape, lettuce, spinach and cauliflower.

Group 2: Fruits and Bears - (needed for C-vitamins) Oranges, mandarines, mangoes, pawpaws, lemons, bananas and wild fruits.

Group 3: Potatoes and Root Crops - (needed for carbo-hydrates A- and C-vitamins). Iris-potatoes, sweet potatoes, carrots, cassava and "Umumbu".

Group 4: Milk and Cheese - (needed for proteins, calcium). Cow milk, goat milk, cow or goat cheese.

Group 5: Meat, Fish and Egg - (needed for proteins, iron and B-vitamins). Cow meat, goat meat, sheep meat, poultry meat, wild game meat, fresh/dried fish, "Kapenta", and eggs.

Group 6: Bread, Meal, Grains - (needed for carbo-hydrates, iron and B-vitamins). Maize, wheat, cassava, finger millet, sorhum and rice.

Group 7: Butter, Margarine and Oil - (needed for A- and D-vitamins). Butter, margarine, cooking oil (from ground nuts, soyabeans, cotton, sunflowers and maize).

Crop production planning should be done in such a way that there is sufficient amount of commodities from each group, in order to maintain the nutrition balance.

6.8 Summary of policy instruments required

1. Pricing policy must aim at encouraging small scale farmers.
2. Provision of the supply of inputs, must be efficient.
3. The policy must aim at introducing a market system that can be efficient in all areas.
4. There must be a rational extension and credit service.
5. Decentralization of administrative organs, must be effective.

6. Although the Chinese railway line traverses over most parts of N Province, this railway line will continue on having a limited impact on agriculture, unless there is road transport which can act as access linkages to the remote parts.
7. The development of efficient feeder road net work is thus necessary. This facilitates rapid agricultural development and promotes the efficient flow of accessory services.
8. Rural Development, needs pragmatic government policy instruments, whose main goals should be:
 - generation of innovations for rural development,
 - having a clear focus on small scale farmers,
 - the focus on the backward rural areas where poverty is greatest. With a view to improve the nutrition needs and the general standard of living of people living there.
9. All major factors of agricultural development, should form a framework for surveys and empirical studies. When it comes to transport surveys, these should be based on estimates of traffic volume and other related side effects.
10. If due to the limitation of resources it is not possible to expand feeder road system, then the scattered rural populations could be settled along the main district, gravel or paved roads. It is along these lines, where resources are attracted.
11. The budget for feeder roads construction, improvement or maintenance, should be expanded considerably. Rural councils should have access to capital funds for their feeder road programmes. As much as possible, larger roads, should continue to remain the responsibility of Roads Department.

NOTES AND REFERENCES VI

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2. Ibid.
3. Ibid, p 2.
4. Zambia co-operative storage and transport study. Dec 5, 1978 by J Davidsson and T Robertsson. Se also GRZ, Transport and Agricultural Survey, Annex 12, Lusaka, 1977.
5. Ibid, above. This time length, is reduced by road improvement.
6. Roads and technology - Zambia, by Lars Karlsson, Dec 1979, Lusaka.
7. Road Feasibility studies, Ministry of communication works, Dar-er-Salaam, Tanzania.
8. J Davidsson and T Robertsson, Storage and transport study, Dec 5, 1978.
9. Estimates based on the judgement of the author.
10. Ibid above.
11. Transport and agricultural survey report, Annex 12, GRZ, Lusaka 1977.

VII CHAPTER SEVEN

7. SUMMARY AND CONCLUSIONS

In the previous chapters, we have been able to show that two major parts and interrelated effects of road transport improvements, on agricultural development are: (i) a communication effect, (ii) cost effect impact.

The first effect refers to the fact that information (about technology, innovations, prices etc) appears to be more rapidly and accurately passed along when there is a good and reliable road than when there is none. This may result in people taking advantage of opportunities otherwise foregone, the importation of know-how into the region, which results in changes in agricultural production and technology. Also by better mobility, the people living in this area can better utilize or create social institutions like hospitals, schools etc.

The second effect consists of savings in time and money cost. The savings to the existing users, rise. By improving the road, wear and tear of vehicles will be reduced and vehicles will be able to travel faster, thereby reducing travel time and spoilage of perishable goods. The vehicles will carry more loads at a time, thereby promoting economic use of both roads and the vehicles.

The other part of road improvements, consists of the development impact of the road (as far as road use is concerned, it is measured by induced or generated traffic). We have shown that the development in the area of influence, of the road, will take place because the lower transport costs make it profitable for local producers to buy more inputs and produce/sell more outputs.

If we were to raise farm production in any rural area such as the Northern Province, one of the things we must go through is:

"Rural Transformation". But this structural transformation is constrained by the "Transport Problem". In fact we began our discussion by stating that: - Transport problem in the N Province is bottleneck, No 1 to agricultural development. And that: Our contention from the beginning was that, lack of, or poor condition of the road system - in particular the feeder road system, impedes the agricultural development. How then can these things be substantiated? What have we been able to find in our study? How does improved transport influence rural development as we have claimed?

Well, based on the evidences and the facts catalogued earlier mainly in our chapters IV, V and VI, it has been proved beyond doubt that transport is an essential to rural development. Improvement of roads - in particular the rural roads, has a direct and immediate impact on rural development. Instead of regarding the importance of transport in the usual more general terms, after the survey of different studies and literature, we have been able to give sufficient number of specific cases demonstrating its importance. Coupled with the author's own experience and familiarity with the province, we have provided ample evidences to support the hypothesis raised.

In our study, we have tried to emphasize the fact that - transport facilities must be improved IF we are to off-set or dislodge the gravity of problems such as: - lack of inputs, - land shortage/use, - lack of markets or access to them for certain farm produce, - and transport costs problems.

We have tried to show that as road transport is improved, forces of structural transformation are IGNITED, resulting in changes that would lead to increases in farm productivity. In this endeavour, we have made attempts to try and establish inverse relationships (practical or otherwise) and causal connections between the road transport system and the agricultural production factors. All in all, aiming at trying to point out, that economic progress cannot be easily attained in an area where there is lack of efficient transport communications. This, underlines the "impact of transportation" on the rural development we are referring to.

- Among the many evidences quoted to support our case, you have:
- The studies conducted by Healey in India referred to by Clark and Haswell. Healey found out that, better roads lead to the reduction in operating costs.
 - The case of Chambeshi plains we quoted, where food supplies from areas with surpluses could not reach these plains because there are no roads at all. Many other areas in the province experience the same problem.
 - There are also good proofs, that expanding urban settlements in Zambia, depend as everyone can see on reliable transport. If supplies cannot come from rural areas, they have to, just the same, be transported from outside Zambia. Any complication with transport routes, thus gets felt almost immediately. There are many cases in point, to illustrate this.

In ILO Report quoted, it is found out that in Zambia, today, many villages are still isolated from any form of modern life, not for any other reason other than due to lack of transport. Another FAO-UNDP Report, has also found out that the cottage industries in rural areas so much required, have not developed, due to transport considerations.

FAO has also produced evidence that most of the produce in the rural areas of Zambia, is sometimes not collected at all, and that in very many cases, perishable produce gets spoiled before reaching towns because poor roads hinder efficient transportation.

Clark and Haswell have also shown that in Tanzania before the world wars, due to long distances, it was not possible to grow any crop for export. Only Ivory could be exported. Due to the burden of transport costs, Clark and Haswell also point out that many East African cultivators, have a preference for high-value crops such as tobacco and coffee. In Zambia as well, the majority of commercial farmers, have also been interested mainly in high-value crops such as tobacco and cotton. Low-value crops like maize, have only been grown commercially along the line of rail.

As if it is an accident, due to transport considerations, nearly all European commercial farmers in Zambia, have in the past been concentrated along the 10-12 km radius along the railway. This kind of belt has not yet developed along the "Chinese" railway to Tanzania. Why? Poor feeder roads, is one of the reasons.

Another interesting report from the University of Zambia, Z E D of 1979, provides evidence to show that - due to lack of transport in the rural areas, inputs (such as fertilizers and seeds and other necessities), are NOT reaching the peasants. When they do, in some way or another (by porters or bicycles), these goods are sold at exorbitant prices. This is made worse even by black marketing. More so, the necessary knowledge required to be able to use these inputs correctly, does not reach the village growers. In addition to this, rural health centers, schools, and community development centers, cannot have access to medicine, food, salaries and expert advice. Only when there are feeder roads can it be possible for the buses, government land rovers, vanettes and goods-lorries to reach these places. Only then, can the service improve. When farm machinery and water pumps break down, spare parts and service need to reach farmers, otherwise farm production would come to a halt. Again, according to an FAO survey conducted in Zambia, - an average Zambian farmer has to travel about 180 km to go and get spare parts, and another 140 km to reach workshops for minor repairs.

Usher, as mentioned by Clark and Haswell, - has found out that, due to what he calls "transport bias", any country with high internal transport costs and if at all it exports to the world market, the domestic prices on its commodities will tend to be lower than those on the world market. Earlier we gave an example of Ghana where the price of a ton maize cost only 112 pence, compared to about seven pounds on the world market. Zambia today imports a bag of maize at about K20:-, (K35) but only offers to pay about K12:- (K13,50) to its local producers. If transport communications are improved both within and to the outside, this precarious situation would be made better. Domestic prices of commodities would tend to rise. Is'nt this a crucial element to agricultural development?

Clark and Haswell again also mentioned that - in many parts of Africa (including Zambia) where there are no roads at all, even up to today, produce can only be transported by porters on their backs for distances of over 40 km to the markets. Even if porters were not asking for any pay, is'nt this costly in terms of time? In this situation, would surely peasants staying 100 km away from the markets be expected to grow for sale?

Further on, FAO has also found out that - due to poor transportation, vegetable supplies for provincial towns like Kasama, can only be grown within 10 km radius, even then, on a limited scale.

In our study, we have also mentioned FAO reports which state that - in Zambia, agricultural production is declining for a major reason partly because the rural peasants are not producing as they should, due to lack of inputs and advisory help. This is caused by transport difficulties. The report reiterates that -

the major complaint by rural farmers in Zambia is that: - "everything arrives late". Seeds, fertilizers, hoes, loans, essential spare parts, and even advice - all come when the farmer does not need them or when he is fed up. This upsets production activities. There can never be rational production activities in such a case no matter what happens there after. It was concluded in the report therefore - that unless there is proper marketing system, efficient and consistent supply of inputs, and agricultural finance; agricultural production will keep on being hampered.

Reports from RUCOM's Mwinilunga pineapple factory in N Western Province, (also a rural province), show that sometimes the factory operates below capacity because small pineapple growers cannot be reached by buyers due to impassable condition of roads.

All these findings seem to confirm the assumption we made earlier: - that rural development cannot be separated from "transport". Thus lack of it directly constrains rural development.

If we take another closer look at the impact of transport on development, we find even more revelations. According to the 'catching - up - process' (discussed earlier in Chapter 3), - which process is necessary if at all the rural areas are to be expected to catch-up in development with say urban areas; certain things would have to be fulfilled. One way of removing poverty from the rural areas, is by adopting adaptable modern techniques. Agricultural production cannot expand all by itself. Something - needs to be done about it. As we have found out earlier on, modernisation is a progressive increase in productivity of land and labour, plus the replacement of traditional inputs in order to get growth in output.

Again as expressed earlier: - the growth in productivity plus growth in output, is related to advances in technical and managerial efficiency, and the availability of several supporting services OR the greater adoption of innovations. At this juncture, we immediately return to the fact that WITHOUT transport, these requirements cannot be met.

How then can transport improvement change or affect these factors? To get these answers we must go back to the diagram of 'principle productivity factors' presented in Chapter 3. From this self-explanatory figure, we can see that:

- Transport improvements, changes farm costs. Better transportation results in cost minimization, as well as in technical and managerial efficiency. If the cost of transporting produce to the markets is reduced, this encourages production. Transport improvement also tends to raise the prices of commodities. Chisholm quotes a case in Zaire where the transportation costs of manioc (cassava - which is also widely grown in N Province), in Kasai region, were cheaper the nearer the fields were to mining areas. Here, the economic advantage of improving roads is that even on smaller and more isolated roads, costs were brought down as soon as the roads got improved. This has been found to be the case in many African countries.

- As road transport improves, - there is more inducement to invest in power and equipment. As better roads encourages more use of mechanical transport, this in return encourages more use of farm machinery, irrigation equipment etc. This way, cultivators are able to handle larger hectarages, more efficiently.
- Improved transport also promotes, - the spread of biochemical innovations and other yield potentials. These inputs are able to reach rural areas more readily. Pesticides, herbicides etc, reach the farmers. Consequently the yields get increased.
- As transport gets improved, - this encourages the purchases of fertilizers and other yield-increasing inputs. This again contributes to yield increases.
- Improved transport also affects the relative price of land and land saving inputs (fertilizers, improved seeds etc). There is ample evidence to show that, - the economic effects of high transport costs are also reflected in the price of land. According to the studies conducted in the Philippines, (quoted earlier), it was shown that - near the markets, a hectare of land sold at the equivalent of 3,3 tons of rice; at distances of 6 km or over from the markets, sold only at 1,9 tons of rice much further away.

When it comes to fertilizers, we already know about UNZA-ZED (1979) report, which points out that in villages where there are no proper roads, fertilizers and other necessities are subject to abnormal pricing.

Transport improvement does also affect - capital/labour price ratios, as well as product/fertilizer price ratios. In one way or another, changes in these relative price ratios, affect hectare expansion and/or yield expansion.

- Another important element to note is that - transport improvement, improves the quality and quantity of farmer training. Extension officers and other agricultural experts can easily reach the farmers. With easy transport, farmers can be brought to farm training centers to attend practical short courses, such as in the application of chemical insecticides, the correct use of fertilizers etc. If reasonable transportation can be found even in the rural areas, this would make the application of "A Unimodal Strategy" - which we favour, easier and more practical.
- Finally, but not the least, transport improvement - induces investments in infra-structure. This way, the movement of people, equipment, building materials and technology can be made possible or efficient.

From all these indications and evidences, it stands clear that good and reliable transport communications, BOOSTS development, since we have been able to show that:

Improved road network system:

- (i) Causes an impact on development, in that an effective road system lowers the cost of transportation;

- (ii) causes a direct impact on agricultural development, in that an effective road system, stimulates the agricultural development in a way of - (a) intensifying agricultural production within the existing land uses, - (b) attracting settlements and provoking population moves which can also change land and labour uses, and (c) improving access to the markets, thereby setting in motion crop/farm price relations; and
- (iii) causes the marketing system to function more efficiently, so that the collection of even the very little agricultural produce in remote areas, becomes possible; - The only simple conclusion which can emerge out of this, is the fact that: - without improved transport facilities, the agricultural production and indeed the entire Rural Development, can get very critically constrained.

In this study, we have been struggling to show that some of the very crucial factors of the agricultural development such as marketing, distribution and storage centers, government extension services, information flows, human development, social development, participation, etc, are all having a very strong link with road transport system. Some of these are so much dependant on the transport situation for their improvements, that without it development is serverely hampered.

Since our study is mainly based on 'desk research', in order to test the validity of these relationships and get a complete clarification of the relationship between road transport improvement and agricultural output, field analysis, and collection of data, would have to be conducted. This calls for more work.

For these reasons, some parts of our analysis might be regarded by some readers as being merely - statements rather than facts. Indeed, but our aim in this a "non-field-work-study", has been only to try and draw up a theoretical documentation of important agricultural variables having strong linkages with road transportation system. We have then examined which or how these have/can be impeded, the mission which we hope we have achieved.

The factors we have discussed are quite universal. That is why we have been able to rely on the evidences and experiences already gained in other Third World countries.

According to the arguments raised and discussed, it appears as if much remains to be done, in a way of improving feeder roads. Since this is an essential part of rural transportation, more attention needs to be devoted to this problem. From the material available to us, it has not been possible to know - exactly how much investment is devoted to the improvement of feeder roads in N.P. This has been partly complicated by the inter-locking nature of the operations of government ministries. There is an integration of functions between them. The Ministry of Works, Department of Agriculture, Provincial Administrations, Rural Councils, Chiefs and indeed the villages, are all involved in road improvement of some kind. Thus, one can never be able to solve

rural transportation problem single handed. The solution to this problem does not lie only with the Ministry of Agriculture. The proper solution, can only be obtained through the co-ordination and liaison between the different Ministries and relevant organizations. Well defined government policies, in this case, facilitates this co-ordination. The Operation Plan presented in our study, might be of some assistance in this respect.

It is our conviction that - if rural transportation problems are not solved, particularly if the feeder road system is not improved, definitely agricultural development - of particularly rural areas, is bound to be impeded.

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