Social Accounting Matrices and Sectoral Analysis: The Case of Agricultural Sector Investments in Zambia

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Abstract. A recent trend in development aid coordination has been the concept of sector-wide strategy. Ideally, this represents the government-driven effort to coordinate scarce resources allocated to a given sector in a most efficient way. The sector investments can be seen as a narrow approach to, since they are focusing on a sector, neglecting the development of other sectors. However, the linkages between institutions and sectors of production may lead to considerable effects on other economy, not always foreseen in the planning of a sector program. This paper discusses the implementation of Zambian agricultural sector investment program (ASIP). By using a Social Accounting Matrix (SAM), this study shows the negative income effects in Zambia as a consequence of poor program implementation in the period 1996-1997. Four different scenarios are chosen to illustrate the outcomes of different policy choices. In the case of ASIP the problems relating to implementation and management of the sector-wide approach have had serious effects on the rural household income.

1. Introduction

In the economics, the key of economic analysis has been the ability to measure the economic impact of a change in the economic surroundings of a given actor. The quantitative techniques are depending on the data available. In the national level, the national accounts often form the data for analysis. This data is often reproduced or used in partial equilibrium or econometric analysis to obtain results for policy studies. A social accounting matrix is a convenient way to utilise national accounts and derive multisector results from sector policy studies. In this study, a social accounting matrix for Zambia is applied for analysis of agricultural sector policies in Zambia.

This paper focuses on the Agricultural Sector Investment Programme (ASIP) in Zambia. Sector investments are by definition sector-wide programmes aimed at using scarce financial resources in the most efficient way. The approach has been particularly popular in the developing countries, where different donor practices have led to a mixed practise of aid administration. Sector programmes in their ideal case would abandon earmarking and operate on the basket funding basis. Sector investments have been popular in the social and health sectors, in productive sectors examples have been more rare.

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The second chapter presents a short introduction to social accounting matrices. The third chapter introduces ASIP. Scenarios of the implementation and results of the scenario simulations are presented in chapter four. Finally, the concluding remarks are presented in chapter 5.

2. A social accounting matrix for Zambia

2.1. Social accounting matrices

Economic accounting is based on a fundamental principle of economics: For every income there exists a corresponding expenditure. In a social accounting matrix the approach is single-entry accounting. The basic idea of a SAM is that it identifies the linkages within an economic system. In this sense it is very similar to input-output tables. The transactions or the accounts constitute the dimension of the square matrix. Traditionally, incomes are shown in the rows of a SAM and the expenditures are shown in the columns. (Reinert and Roland-Holst 1997, 95). Also the structure of a SAM can be very difficult from one SAM to another. Accounts in a social accounting matrix state the entries in a matrix by rows and columns. Typically, these accounts consist of production, goods and services, factors of production, institutions and the rest of the world accounts. Production accounts are compiled using data from national accounts and input-output tables.

There is no restriction on which activities or areas of an economy could be included in a SAM but the data requirements set some limitations. For example, areas of economy subject to study using SAMs or Computable General Equilibrium (CGE) models include fiscal policies (Adam and Bevan 1998) and trade and environment (Berghin et al. 1998). Also, the need for value measurement sets some limitations to the matrix construction, especially in the case of stocks of natural resources.

The general method presented is an approach adapted by Pyatt and Round in 1979 and Stone in 1978. Three types of SAM accounts were taken as endogenously determined: production, factors and institutions. Other accounts, consisting of the government, the capital and the rest of the world accounts, were considered exogenous. The matrix of multipliers is decomposed into four additive components:

1) initial injection
2) net contribution of transfer multiplier effects as a result from direct transfers with endogenous accounts
3) net contribution of open-loop effects capturing the interactions among and between the three endogenous accounts, and

4) net contribution of circular closed-loop effects insuring that the circular flow of income is completed among endogenous accounts. (Pyatt and Round 1979, 860-861).

Pyatt and Round (1979) discuss in their paper accounting and fixed price multipliers in a SAM framework. The accounting multipliers can be obtained from the SAM using matrix algebra. The accounting multipliers show the impact of an exogenous change to the endogenous accounts of the SAM. The fixed price multipliers refer to studying the way that economic agents respond to the impacts of policy changes.

Following partitioning of the SAM into endogenous and exogenous accounts allows us to approach the different scenarios through the scenario insertion technique. The endogenous account used could be the Government account, if the funds are first at the disposal of the Government and then transferred to different activities according to the programme. It could also be the Rest of the World account, if the funds are received directly from the foreign donors and allocated according to the programme implementation plan.

In order to carry out the multiplier analysis in the SAM framework, we must have certain conditions to hold. First, there exists excess capacity, which would allow prices to remain constant. Second, the expenditure propensities of endogenous account remain also constant. Third, the production technology and resource endowment are given. Under these three assumptions the SAMs can be used to estimate the effects of exogenous changes and injections, such as increases or decreases in demand for specific products on the whole economic system.

Consider the following schematic version of a SAM (adapted from Thorbecke and Jung 1996) which corresponds with the accounts of the Zambian SAM. Following the classification of endogenous and exogenous accounts, the exogenous accounts are combined in row and column 4 and the sum of exogenous injections is also consolidated into a single vector. Focusing on the endogenous accounts, we have T_{11} to represent the intermediate input requirements in production (e.g., the input-output data of production). T_{21} the matrix, which shows how the value added, generated in the production, is allocated to the factors of production. T_{32} reflects the factorial income distribution into household income distribution. T_{13} shows the expenditure pattern of various institutions including the household groups and their purchases of commodities. Finally, T_{33} shows the inter-institutional transactions among different types of households or between firms and households.

Table 1. A schematic social accounting matrix. (Adapted from Thorbecke and Jung 1996).

		Expenditures				
		Endogenous accounts			Exogenous Accounts	Totals
Receipts		Production	Factors	Institutions	Sum of other	
		1	2	3	accounts 4	5
Production	1	T_{11}	0	T_{13}	x_1	y_1
Factors	2	T_{21}	0	0	x_2	y_2
Institutions	3	0	T_{32}	T_{33}	x_3	y_3
Sum of other accounts	4	l'_1	l'_2	l'_3	t	y_x
Totals	5	y'_1	y'_2	y'_3	y'_x	

The logic in table is that the exogenous changes (denoted by x) determine the incomes of the endogenous accounts through their interaction within the SAM matrix. The incomes of the production activities are y_1, the factor incomes are y_2 and the household and firm incomes are y_3. In the analysis to follow, the endogenous part of the transaction matrix in the table 1 is converted to a corresponding matrix showing the average expenditure propensities.

The matrix of average expenditure propensities has two parts, A_n and A_l, where A_n shown is the square matrix of average expenditure propensities of endogenous accounts and A_l shows the leakages of endogenous accounts to any of the three exogenous accounts. Whereas the transaction matrix is expressed in monetary value, the matrix of average expenditure propensities shows the values as the ratio of each particular element of the endogenous accounts with respect to the total of the column in which the element is situated. From the table 4.1, A_n would be partitioned as

$$A_n = \begin{bmatrix} A_{11}.0.A_{13} \\ A_{21}.0.0 \\ 0.A_{32}.A_{33} \end{bmatrix}$$

Following from the definition of A_n, in the transaction matrix each endogenous total income y_n is given as

$$y_n = A_n y_n + x$$

which shows that row sums of the endogenous accounts can be obtained by multiplying the average expenditure propensities for each row by the corresponding column sum and adding the exogenous income x. The above can be rewritten as

$$y_n = (I - A_n)^{-1} x = M_a x.$$

Endogenous incomes y_n can be derived by premultiplying the injection x by a multiplier matrix M_a. This matrix has been called the accounting multiplier matrix because it explains the results obtained in a SAM, not the process by which the results are actually generated. However, one should keep in mind one serious limitation of the accounting multiplier matrix M_a, namely that it implies unitary expenditure elasticities. This means that the average expenditure propensities A_n are assumed to apply to any injection. This may be plausible for most elements of the SAM but the expenditure patterns of the household groups this is not likely to be the case. Since this study assumes a one single shock as a consequence of agricultural sector policy change, the analysis are based on the accounting multipliers rather than the fixed price approach.

A more realistic approach for cases where it is not assumed that the economy will remain unchanged after a shock is to specify a matrix of marginal expenditure propensities. Such a matrix would correspond to the observed income and expenditure elasticities of the economic agents, assuming that the prices remain fixed. However, it has been a customary practise that when no relevant data on marginal expenditure propensities has not been available some universal data has been applied. This means that empirically tested elasticities have been applied. In the case of marginal propensities, the matrix of marginal expenditure propensities, C_n, would differ from the matrix of average expenditure propensities, A_n, in the following way: $C_{11} = A_{11}$, $C_{21} = A_{21}$, $C_{32} = A_{32}$, $C_{33} = A_{33}$, but $C_{13} \neq A_{13}$. Now the changes in incomes (dy_n), resulting from changes in injections (dx), can be expressed as

$$dy_n = C_n\, dy_n + dx = (I - C)^{-1}\, dx = M_c\, dx.$$

M_c is also a fixed price multiplier matrix, with the advantage of allowing any nonnegative income and expenditure elasticities to be reflected in M_c. Considering the real life cases, this is a more convenient approach, with the limitation of data requirements on the elasticities.

Regarding the usefulness of a SAM in sectoral policy analysis, it becomes evident that the sectoral linkages are an important feature of the SAM. If, for instance, a given sector is experiencing a positive (negative) external injection, this has effects on other sectors in the economy as well. It is clear that in a developing country the linkages between sectors are strong and any injection is likely to have far-reaching consequences. The major advantage of the SAM can be summarised to bring

together the accounts of each of the various economic actors whose behaviour is modelled into a consistent framework. At least for the base year of the SAM, such a data set is required. (Dervis et al. 1982, 161).

2.2. The accounts of Zambian SAM

The structure of the SAM for Zambia follows the ”traditional” composition of a SAM. The SAM, constructed for 1995, has a total of 33 accounts, of which 13 were considered as exogenous and 20 as endogenous. The endogenous accounts in the SAM were:

- 11 sectors of production,
- three categories of labour,
- three types of household accounts,
- two capital accounts and
- a private sector account.

Exogenous accounts were:

- sectors of production for imports,
- the Government and
- the Rest of the World accounts.

By using the multiplying process, the scenarios in the following chapter were inserted into the matrix through a shock vector utilising the decomposition into endogenous and exogenous accounts. However, it is useful to examine the structure of the economy and the linkages between sectors of production and institutions before proceeding to examine the scenarios of ASIP implementation. Using social accounting matrices, it is possible to extend the multiplier analysis from the traditional input-output multipliers (production multipliers) to include the social sectors as well (SAM multipliers). The first of the following sections analyses the production multipliers, the second analyses the SAM multipliers. The final section of this chapter presents the restrictions for this SAM that should be kept in mind when the results of policy experiments are analysed.

As explained earlier, a social accounting matrix has very high data requirements. In many cases proxys regarding transactions must be used in order to construct a SAM with detailed enough disaggregation. Any failure in data will result in missing some of the transactions, which may have more severe effects on the multipliers. In the case of the SAM for Zambia, the construction of a SAM has been especially difficult. The SAM, which was constructed by Christopher Adam at the Oxford University, was used with minor modifications in this study. However, there are some issues in the underlying data that should be pointed out.

In the matrix, the broad national income aggregates have been fitted to the 1995 data provided by the Central Statistical Office of Zambia. However, the input-output production structure has been derived using the RAS routine to the 1980 input-output data. In addition, the labour market and the consumption data are derived from an unpublished Central Statistical Office survey from 1993, with figures adjusted to the 1995 levels. Further assumptions were made to equal the total gross investment to total depreciation and the labour supply growth was assumed zero so that the capital labour ratio k/l was constant. Total private sector savings were considered equal to private investment so that the government deficit was fully aid financed. Despite these restrictions outside the scope of this study the multipliers support the theoretical assumptions of the existing linkages within an economy.

In the case of the SAM for Zambia, some specific issues must be taken into consideration. First of all, the SAM is not based on a coherent data from input-output tables. This means that additional consistency checks have been needed. Second, the SAM is based on a project where the statistical authorities of Zambia participated to compilation process but later withdrew from the project. Third, the SAM has a rather small number of accounts. Therefore, it has set limitations to the level of analysis. This means that although we can identify linkages between different sectors and institutions, there may be specific linkages at a more detailed level of disaggregation that could be of interest. However, these are not captured in the matrix. In any case, the scenarios and their results should be taken as indicative visions of alternative future development paths.

Finally, in the analysis to follow, it should be stressed that the results presented are on the ”other things remain constant” basis. This means that the outcomes of the scenarios, even the one based on actual expenditure under the agricultural sector investment programme, hardly reflect the reality in the end of 1997. This is because no additional measures under the structural adjustment programme, no Government expenditure on other sectors or any technological progress or increase in the volume of exports were taken into account.

3. Agricultural Sector Investment Program (ASIP) in Zambia

The first efforts to create an integrated Agricultural Sector Investment Program (ASIP) in Zambia started in 1992. The progress of the program has been hindered by a number of factors. For instance, the responsible minister for agriculture changed four times between 1992 and 1998. Permanent Secretaries have also changed a number of times during this period. In the initial approval stage of the ASIP there were 183 individual projects running in the agricultural sector, most of which also had their individual monitoring and evaluation practices. An agricultural sector task force was founded with consultations involving most of the

stakeholders, MAFF staff, farmers, donors, NGOs and traders. The delays in planning process led to withdrawals and lack of interest by some of the stakeholders, finally limiting the task force participation to MAFF staff. (Gould 1998, 57).

The national policy framework for agriculture has been weak or missing in Zambia, hindering the development of the sector. The problem has been to determine the priorities between raising export earnings and food security. Partly the problems steam from the fact that the liberalisation of the agricultural markets has left the role of the Ministry ill defined. Until 1991, the agricultural service provision was nearly a state monopoly, including pricing, research, extension, input supply, credit and marketing. After 1991, the Government has fully supported free market policy, which has lead to discussions of its role in this new environment. (Gould 1998, 54.).

The problems with the diminishing role of the government in the agricultural sector are mainly a result of the dualistic economy of Zambia. Most of the country's agricultural exports derive from the large commercial farms. The majority of these farms is run by settlers. Most of the small farms, totalling 600.000, are less than one or two hectares. These farms are situated in the marginal areas of the country, which means that they have limited chances to participate in the market activities. As a result, the rapid change has lead to a situation where the majority of farmers lack access to agricultural services and only few private agents have taken control of the services formerly provided by state. It has been very difficult to justify the full withdrawal of the government from providing these services to the marginal areas. (Gould 1998, 54-55).

It is useful to study the priorities and objectives of the programme well. At the design stage, main goals of ASIP were determined to be (IESR 1998, 2):

- To ensure the national and household food security
- To maintain and improve the existing agricultural resource base
- To generate income and employment by fulfilling domestic and export market potential
- To contribute to sustainable industrial development, and
- To expand agriculture's contribution to the national balance of payments.

Immediately, it can be seen that the policies were two-fold: National and household food security would mean policies towards food crops, the export market potential and balance of payments contributions would imply that cash crops were considered a priority. In other words, both directions of the sector strategy were included in the main goals of the program.

In order to meet the targets, three main components of ASIP were formulated, each of them having numerous sub-programs, totalling 14 sub-programs. The main components were (IESR 1998, 2):

- Policy and institutional reforms,
- Support for private sector investments, and
- Rehabilitation and strengthening the public sector agricultural services.

In addition, agricultural and rural finance were considered as a pilot investment. These were directed to establish sustainable rural finance system to improve small-holder access to credit and other financial services. (Gould 1998, 59) There were two sub-programs in the pilot project, the rural investment fund and a state farm subdivision and privatisation program. (IESR 1998, 18). This policy package would be one with considerable impact on the noncommercial agricultural production. The policy and institutional improvements would have two sub-programs, policy and planning and marketing and trade.

Activities under ASIP can be public or private sector oriented. In the public sector investments, the six sub-programs were defined as follows: Agricultural research, extension and information, animal production and health, irrigation, fisheries, farm power mechanisation, agricultural training and land use administration. For private sector development, the three sub-programs were: seed multiplication and distribution, development of new products and marketing and trade (rural finance). (Gould 1998, 59). Additionally, a credit fund channelled through the commercial banks would be set to support product and input marketing (IESR 1998, 18).

Looking at the main components and their sub-programs, the first notation will be that the targets are broad-based, both institutionally but also regarding the areas covered. The second observation is that there are number of new mechanisms to be created in order to produce the required results. Among others, these new organisations would include an autonomous Food Security Reserve Agency, District Development Committees, the Golden Valley Agricultural Research Trust, numerous financial support institutions etc. In short, the existing organisations seemed inadequate to carry out the ASIP curriculum. These issues were shown in the ASIP review as well.

How has the Ministry performed in implementing different sub-programs? According to the mid-term review (IESR 1998, 46-47), all of the sub-programs have been forced to scale down their activities due to the lack of planned inputs. The exception has been the Rural Investment Fund, which has in its turn suffered from weaknesses in the financial management and inability to agree on the regional distribution of the projects. The lack of inputs is no surprise, as the scenarios in the next section are based on both actual and optimal expenditure levels, which differ from each other considerably. The review states that the choice of the sub-programs

has been irrational, leading to a number of revised structures of sub-programs. The aim to bring all agriculture related activities under the ASIP framework has led to a complex program, which has been difficult to manage. The difference between the units of implementation and the sub-programs has lead to confusion. It has been unclear should an activity be run by the MAFF or some other agency and some activities have been shifted from the other agencies under the MAFF organisation. This has made it even more difficult to state if ASIP equals the MAFF activities.

As a whole, there have been a number of strategy issues which have not been dealt with in much detail. As will be shown, these will have an impact on the economy of Zambia, not only on the agricultural sector. In the next section the scenarios of different ASIP implementation schemes are introduced.

4. Scenarios and results

4.1. The actual implementation of ASIP funds

In this chapter four alternatives expenditure patterns of agricultural sector investment funds are presented. Each specification is presented as a scenario or a policy experiment. The four scenarios to be specified and analysed are:

- the actual implementation scenario
- the optimal implementation scenario
- the full expenditure on Noncommercial agriculture scenario and
- the half expenditure on Commercial agriculture and half on Noncommercial agriculture scenario

The starting point for the policy experiments will be the situation in the end of 1995, the year of which economic situation is shown in the Social Accounting Matrix for Zambia. The actual implementation could represent a base line scenario for analyses of the alternatives to what actually occurred in the period 1996-97. In other words, this could be the point of comparison for other development strategies, such as the optimal implementation scenario. Again, it may be questionable to call the optimal implementation of ASIP “other development strategy” but as it turned out such expenditure never took place, thus it represents this expenditure as a “what if…” scenario.

The assumption in this scenario is that the funds were directed more towards the commercial farms of Zambia, which in fact have been the ones benefiting from the export-oriented policies. Although it is clear that small scale farmers have also gained some of the support, it is likely that these farms also have access to market

services. It is against this background the scenario is based on the insertion of the funds to the Commercial agriculture.

For the actual implementation scenario, the expenditure in US dollars was given by the real expenditure under the ASIP framework. According to Gould (1998, 63), the following insertions of current price USD was used:

Table 2. The ASIP expenditure in actual implementation scenario, USD million. (Gould 1998, 63).

	Government funds	Donor funds	Total funds	Exchange rate	Total (K billion)
1996	19,7	11,8	31,5	1100	34,650
1997	30*	55*	85	1200	93,500
Total	49,7	66,8	116,5		128,150

*= estimates based on project documents

These figures were further converted to 1995 prices using a composite index of the retail prices in Zambia as a deflator (IMF 1999, 11). This gave a total impact of K 88 billion as a the actual ASIP implementation over the two years.

In the first scenario, the actual expenditure of ASIP in 1996 and 1997 was inserted into the SAM for Zambia as a single exogenous shock. The scenario shows that the value of commercial agricultural production grew by 18,8 per cent during the 1996-97 period. In the noncommercial agriculture the growth was 7,0 per cent, showing that investments in the commercial agriculture had spillover effects on the noncommercial agriculture as well.

The results show that there should have been a considerably high growth in the value of the commercial agricultural production accompanied with a less encouraging development of the noncommercial agricultural production. Basically, this approach would seem to benefit the large scale farming activities. Moreover, in terms of the policy orientation, the focus could be on the high value added export crops, as it would be less likely that these were produced in the noncommercial agriculture.

Table 3. Effects of the actual expenditure scenario on agricultural production and household income.

Sector	Base year total (K billion)	Increase as a consequence of policy change (K billion)	Percentage change
Noncommercial agriculture	989,46	68,9	7,0
Commercial agriculture	755,09	141,5	18,8
Total agriculture	1744,55	210,4	12,1
Rural unskilled households	776,48	52,7	6,8
Urban unskilled households	721,07	22,8	3,2
Urban skilled household	2680,01	139,5	5,2
Total household income	4177,56	215,0	5,1

In terms of household income, the income of unskilled rural labour increased by 6,8 per cent. For unskilled urban labour the increase was 3,2 per cent and for skilled urban labour the increase was 5,2 per cent. These results support the view that investments in agriculture benefit the rural population, which in the case of Zambia can be classified as the group with lowest income. The total increase in the value of both commercial and noncommercial agriculture would have been some K210 billion over the two years. In addition, the total increase of income for all the household groups would just have exceeded K210 billion. The next scenarios will show what the difference between the actual and planned implementation of ASIP has been in terms of agricultural production and labour income.

4.2. The commercial agriculture implementation

This scenario represents the optimal use of ASIP program funds if they had been subject to disbursements according to the original implementation plan. Thus, this means the insertion of the funds proposed in the ASIP documents in full. The difference in magnitude is considerable if contrasted with the actual implementation scenario. In this scenario, we can assume that the government has been interested in increasing the agricultural production rather than focusing on the social problems. The expenditure data is presented in table 4.

Table 4. The level of expenditure according to the original ASIP plan, USD million. (Gould 1998, 63)

	Government funds	Donor funds	Total funds	Exchange rate	Total (K billion)
1996	29,6	69,2	98,8	1100	108,680
1997	35	100	135	1200	162,000
Total	64,4	169,2	233,6		270,680

Again, the USD amounts were converted to 1995 Kwacha using the same deflator as in the case of the actual implementation scenario. This resulted in the expenditure of K173 billion over the two years.

It is very easy to see that this level of expenditure will produce results that are quite different from the previous scenario. Although the expenditure pattern is the same as in the actual implementation scenario, the absolute amount of expenditure is much higher in this scenario, the total difference was K85 billion. With the fixed multipliers this automatically means that the effects will be proportional to the expenditure levels.

It is evident that the results of this scenario are in line with the actual implementation scenario. The main difference is that the level of expenditure in this

and in the other scenarios is considerably higher than in the first scenario. In the case of fixed multipliers, it is therefore very clear that the results will create substantial difference when contrasted with the actual implementation experiment. This holds true especially when the actual and optimal implementation scenarios are contrasted, since the only difference is the amount of expenditure, other things remain constant.

According to the commercial agriculture implementation scenario, the value of noncommercial agricultural production would have increased by over 13 per cent over the period 1996-1997. For commercial agriculture, the increase would have been nearly 37 per cent. In terms of labour income, the increase in income for rural unskilled labour would have been over 13 per cent and for the unskilled and skilled urban labour the corresponding increase would have been 6 per cent and 10 per cent, respectively.

Table 5. Effects of the commercial agriculture implementation on agricultural production and household income.

Sector	Base year total (K billion)	Increase as a consequence of policy change (K billion)	Percentage change
Noncommercial agriculture	989,46	135,5	13,7
Commercial agriculture	755,09	278,3	36,9
Total agriculture	1744,55	413,8	23,7
Rural unskilled households	776,48	103,7	13,4
Urban unskilled households	721,07	44,8	6,2
Urban skilled household	2680,01	274,2	10,2
Total household income	4177,56	422,7	10,1

Clearly, the results support the view that considerable losses to the economy of Zambia have taken place as a consequence of poor programme implementation. For the noncommercial agriculture, the difference in the value of production between the two scenarios is over 6 per cent. However, the difference is over 18 per cent in the case of commercial agriculture, indicating the loss simply due to delays in the programme implementation. For rural unskilled households, the difference in income is 6,6 per cent, considerably higher than the difference for urban unskilled (3,0) or urban skilled (5,0).

Contrasting the increase in the value of agricultural production and household income between the two scenarios, it can be seen that the increase in both would have been directly proportional with the change in investment. The total value of agricultural production would have increased by K413 billion and the household income by K421 billion, of which the rural unskilled households would have accounted for K103 billion.

The purpose of this scenario was to make a distinction between the reality and the optimal state. Since there was no exact information available regarding the

allocation of total ASIP funds, two alternative scenarios are presented next. These scenarios utilise the information of total funds available but use two different expenditure patterns.

4.3. The noncommercial agriculture implementation

Having followed the most likely expenditure patterns of the ASIP funding in the first two scenarios, the third scenario has a different starting point. This scenario represents an alternative, according to which the total program expenditure in ASIP would be directed to the noncommercial agriculture. As the multipliers have shown, this would mean higher increase in the income of the Unskilled Rural Households.

Here, the agricultural policy is used as a policy instrument in a sense that it would be aimed at alleviating rural poverty. The policy would focus both at income distribution and the development of small-scale farming activities, which were previously undermined in the agricultural policy. Basically, the concern of the government would be the food security through increased production of food crops as opposed to the starting point of the actual and optimal implementation strategies. This is an unlikely expenditure pattern because of its political infeasibility.

However, it would represent the governments' efforts to develop rural regions and to direct concrete transfers to the poorest share of the population, the rural households working in noncommercial agricultural production. The figures for full disbursement in 1996-97, USD 153,8 million, were allocated to the noncommercial agriculture to illustrate the effects of a full scale program focusing on rural income generation. However, it should be kept in mind that such a program may also generate more economic activity in the marginal areas. This would increase demand for extension and input services. This type of a policy package would clearly aim at solving some of the problems in income distribution and net migration from the rural areas. Otherwise, it is very unlikely that the government of Zambia could suddenly promote the rural areas through such a comprehensive support package.

As a result of this type of a policy package, the value of noncommercial agricultural production would increase by 31,8 per cent. In addition, the value of commercial agricultural production would increase by 10,5 per cent. In terms of the total value of the agricultural production, the increase would have been 22,6 per cent, where the increase in the noncommercial agriculture would have been nearly four times of that of the commercial agriculture, if measured in the monetary value.

However, the increase in unskilled rural household income would have been 18,3 per cent, the highest among all the scenarios. The income of unskilled urban

households would have increased by 4,4 per cent and the income of skilled urban households would have increased by 10,3 per cent.

Table 6. Effects of the noncommercial agriculture implementation on agricultural production and household income.

Sector	Base year total (K billion)	Increase as a consequence of policy change (K billion)	Percentage change
Noncommercial agriculture	989,46	314,7	31,8
Commercial agriculture	755,09	79,0	10,5
Total agriculture	1744,55	393,7	22,6
Rural unskilled households	776,48	142,4	18,3
Urban unskilled households	721,07	31,7	4,4
Urban skilled household	2680,01	277,1	10,3
Total household income	4177,56	451,2	10,8

This expenditure pattern focuses on the rural development issues in a more concrete way than what was assumed in the actual and optimal implementation scenarios. If such an investment was targeted to noncommercial agriculture, it would present a government expenditure which would have a positive impact on the rural small scale farming activities. More precisely, it would mean input or production subsidies or lowering the costs of establishing a farming unit.

A programme of this type would be most likely to face strong resistance, since it is mainly aimed at improving the situation of the rural poor, an approach often unsuitable for the urban middle class with political power. However, it could well be the case that by improving the conditions in the rural areas the government could create more purchasing power. This would increase the demand for manufactured goods which could then improve the condition of the urban workers. It is difficult to assess whether the allocations under ASIP would actually have been sufficiently large to succeed in promoting this kind of development.

4.4. The half-half implementation

This last scenario represents a division of the total program expenditure between noncommercial agriculture and Commercial agriculture on equal basis. This means that the respective expenditures on the Commercial and the noncommercial agriculture would be USD 176,9 million, equivalent to the totals in the two previous scenarios. This means that a shock equivalent to USD 88,45 million was inserted as a single shock to both sectors.

This scenario would represent a strategy focusing on income distribution, preventing the migration to urban areas and an increase in the productivity. This scenario may also include some real life elements, as it seems like a plausible assumption that at least some of the ASIP expenditure would have been directed to

the noncommercial agriculture. This was already explained earlier when the two-fold strategies for agriculture were discussed. However, the scenario has no features of the real expenditure since there were no basis to determine which portion of the funds should go to the noncommercial agriculture in these scenarios.

According to ASIP planning documents, there has been a focus both on the public and private sector projects with roughly equal expenditure of the donor funds. This is not directly indicating a relationship between the expenditure on the Commercial or on the noncommercial agriculture. As it turns out, the public sector projects have been financed through the multilateral donor institutions whereas the private sector activities have been financed by the bilateral donors. This also inherited from the project-based funding era, when the cooperation partnerships were established through NGOs and private institutions. It could be interpreted in the context that the activities focusing on the broad development of the rural areas would be financed from the public sector finance scheme. However, due to the political nature of ASIP funding, such a conclusion cannot be binding.

Here, the approach of the policy experiment is to distribute equal amount of funds to both commercial and noncommercial agriculture. As opposed to the previous two scenarios, each focusing on the full expenditure on commercial or noncommercial agriculture, this scenario is a more plausible one, as it would hardly be the case that the full expenditure would fall entirely on a single sector of production.

The value of commercial agriculture would have increased by 23,8 per cent as a consequence of this type of programme. For noncommercial agriculture, the increase would have been 22,9 per cent. Thus, the effects would have been very positive for both commercial and non-commercial agriculture. The effects on rural unskilled household income would also be very encouraging, the increase would be almost 16 per cent over the two years.

Table 7. Effects of the half-commercial and half-noncommercial agriculture expenditure scenario on agricultural production and household income.

Sector	Base year total (K billion)	Increase as a consequence of policy change (K billion)	Percentage change
Noncommercial agriculture	989,46	226,4	22,9
Commercial agriculture	755,09	179,7	23,8
Total agriculture	1744,55	406,1	23,3
Rural unskilled households	776,48	123,7	15,9
Urban unskilled households	721,07	38,5	5,3
Urban skilled household	2680,01	277,2	10,3
Total household income	4177,56	439,4	10,5

Results obtained from this type of a programme are expected to increase the value of production in both the noncommercial and the commercial agriculture in a more

balanced way than a programme with focus on one of the two only. It may well be that the total effect on agricultural production remains lower than in the case of focusing only on one of the two sectors, especially since the commercial agriculture has higher own multiplier and multiplier on the noncommercial agriculture than the corresponding multipliers on the noncommercial agriculture. The ASIP sub-programmes would support the view that some part of the programme expenditure has actually been directed to non-commercial agriculture, for instance in the form of rural development funds.

There are also other aspects to be considered. Given the political economy of changes in agricultural policy, a policy reform with less changes in the commercial agriculture would not be feasible. Instead, the domestic market prices for agricultural products could increase in the short run, since the commercial farmers would receive less support. On the other hand, an increase in support to non-commercial agriculture would induce a shift towards more commerce-oriented production in smaller farms, thus leading to an increase in the commercial agriculture production in the long run.

5. Conclusions from the policy experiments

Starting from the ASIPs direct economic effects with respect to agricultural production, the results of all four experiments are summarised in the table 8. The highest result in terms of increasing the value of total agricultural production is the case of optimal implementation through the commercial agriculture. However, this may not be the optimal implementation scheme with respect to rural household income. The comparison of only the percentage change would not be a good indicator as the values of production are different for the two sectors.

Table 8. A comparison of the policy experiment effects on the agricultural production.

Policy experiment	Effect on Commercial agriculture, %	Effect on Noncommercial agriculture, %	Total difference from the best outcome, %
Actual	18,8	7,0	11,1
Optimal	36,9	13,7	-
Noncommercial	10,5	31,8	1,1
Half-half	23,8	22,9	0,4

There really is no significant difference between the three scenarios using the amounts subject to full implementation of the ASIP. This suggests that any of the three alternative patterns would have created positive increase in the agricultural production. The difference would have been created as a consequence of choosing

between the targets in commercial and noncommercial production. If promoting growth in agriculture as a whole was the main concern, investments in the commercial production would generate the highest increase. If the focus was on equal development, more funds should be directed to the noncommercial production.

Moving to income distribution policies, the scenarios are now compared with respect to the income effects on the unskilled rural households. Table 9 shows the effects of the four policy experiments on the unskilled rural households. The difference between the best outcome of scenarios and any other given scenario is also shown in the last column of the table. Not surprisingly, the difference is greatest in the case of the actual implementation scenario which has the smallest expenditure as opposed to the other scenarios which utilise a greater amount of funds.

Table 9. A comparison of policy experiment effects on the rural unskilled household income.

Policy experiment	Effect on Unskilled Rural Households, %	Effect on the Unskilled Rural Households, K billion	Difference with the best outcome, %
Actual	6,8	52,74	11,5
Optimal	13,4	103,68	4,9
Noncommercial	18,3	142,35	-
Half-half	15,9	123,73	2,4

It can be seen that the difference between the actual implementation and the full expenditure on noncommercial agriculture is over ten per cent in the total value of the increase in unskilled rural household income. If measured in Kwacha billion, the actual implementation scenario produces less than one fourth of the increase provided by the noncommercial agriculture scenario. Regarding the possible case in which the full implementation would have led to allocating some of the funds to noncommercial agriculture, the results are not too different between the three scenarios using the planned expenditure figures. The difference between the optimal implementation scenario and the mixed expenditure scenario would have been only less than two per cent, as would have been the difference between the mixed strategy and the noncommercial agriculture.

The main conclusion from the policy experiments is clearly that there has been a serious failure to execute the programme expenditure. As the experiments have shown, not only the agricultural production has suffered from the poor implementation of ASIP but, in addition, the social costs have been considerable. This is indicated in all of the ASIP scenarios, which have used the actual expenditure figures. There is also a difference between the targeting of the funds, because a full investment in the noncommercial agriculture would have yielded

higher income increase to the rural poor compared to the investment in the commercial agriculture.

These results, although they are based on a case study, have a more global meaning. The linkages between agricultural production and rural household income are strong, which is also indicated in this study. In countries like Zambia, with a large share of the population in the rural and informal sector economies, the linkages are likely to be even stronger than in the industrialised countries. In these countries the role of noncommercial agriculture should not be underestimated in the political decision-making. The reason for this is, of course, that the political decision-making is seldom in touch with the rural realities. This is connected with the fact that the political atmosphere in Sub-Saharan Africa is far from the pure democracy where the ideological foundations lie. This gap is not only causing political restlessness but also sets limitations to economic growth.

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