Ministry of Agriculture and Agrarian Reform

NAPC

National Agricultural Policy Center

TECHNICAL REPORT

Income Distribution and Poverty: Impact of Selected Policies in Syria

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Executive Summary

The study presented in this report has been carried out within the FAO Project GCP/SYR/006/ITA – Phase III Sustainable Capacity Consolidation of the National Agricultural Policy Center in the second half of 2007. The Poverty and Migration study (P&M) had been included in the work-programme of Rural Development Division (RDD) of NAPC for 2007. The general aim was to strengthen the capacity of NAPC staff in addressing policy issues for rural areas, as poverty alleviation and internal rural to urban migration, using quantitative tools of analysis.

A detailed Social Accounting Matrix (SAM) of Syrian economy was built for 2004. The matrix includes accounts for 51 commodities, 41 production activities, 2 factors of production and 22 institutions. A high degree of disaggregation has been included for agriculture (31 commodities and 28 activities) and food sector (15 commodities and 8 activities). The households sector has been disaggregated by income level (deciles of equivalent per capita expenditure) and by regional location (urban vs. rural).

The estimated SAM has been used to carry out an analysis of income distribution and poverty in Syria. A SAM based "fixed price" model grounded a structural analysis of distributive features of Syrian economy. Results highlights the existence of structural asymmetries in income distribution. On the whole richer and urban households are favoured by multiplier effects, improving their relative position in income distribution in presence of exogenous increases in final demand.

The model has been also used to simulate the impact of selected policy options for agriculture and food industry. Nine policy scenarios were defined combining in different ways the suppression of three current policies for food and agriculture (subsidies to agricultural production activities, price support for strategic crops, support of food consumption though the Price Stabilization Fund) with alternative uses of financial resources set free for the Government budget (deficit reduction, Government expenditure increase, transfer to households increase).

Both the elimination of subsidies to production activities and the cut of prices for strategic crops show a potential positive effect on Syrian economy. All alternative uses of resources previously allocated in the considered policies generate a multiplicative effect exceeding the negative direct impacts on household incomes due to the elimination of policies. Above all the elimination of subsidies to production activities seems able to produce the largest increases of output and income. These general impacts result in a small reduction in poverty (holding the population constant). The multiplier effect is larger for Government 'budget strategies' corresponding to the deficit reduction and to the increase of transfers to households.

The impacts simulated for the third policy option(elimination of PSF) are more controversial. The elimination of subsidies to food consumptions generates an increase of poverty whatever the 'budget strategy' adopted. Only the exclusive destination of financial resources set free to the increase of transfers to households seems able to maintain substantially unchanged the level of poverty. In fact, the direct (monetary) support to households' income generates an expenditure increase large enough to counterbalance, through the multiplier effect in the whole economy, the initial cut of real incomes due to the elimination of food subsidies.

The redistributive profiles of alternative policy option quite different. The cut of prices for strategic crops shows the most desirable profile on an equity ground, with an improvement in the relative position of poorer households and of rural ones. On the contrary, the elimination of subsidies to agricultural activities and of PSF negatively affect the relative position of rural households in income distribution. Not surprisingly the worst distributive profile is shown by the elimination of PSF. In this case, the redistribution as a transfers to households of financial re-

sources set free by the suppressed policy, although improving the outcomes for urban poor, appears inadequate to counterbalance the losses for rural households. The results clearly show that payments to households substitutive of suppressed policies should be carefully designed to overcome these undesirable distributive outcomes.

Many policy lessons can be derived from the study: the influence of overall strategies for Government budget on the outcomes of sectoral policies; the fundamental importance of output growth for poverty reduction; the existence of structural asymmetries in income distribution. Of particular interest for the issues of poverty and migration is the relative position of rural households in income distribution. The analysis highlighted a different position of rural households with respect to policy outcomes. Rural households seems less affected by positive multiplier effects on incomes and more exposed to poverty.

Introduction

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The (P&M) study can be considered as complementary with the Non Agricultural Rural Activities (NARA) one, developed at the same time by RDD. As a matter of fact an increasing emphasis on livelihood strategies of households as a key concept to understand rural economy can be found in the economic literature. In their critical review of studies on developing countries, Ellis and Biggs (2001) highlight an emerging vein that may be characterized by the theme of "livelihood strategies" in studying rural development. In these studies the identification of small farmers with "rural poor", characterizing most of the literature from 60ties to 80ties, is questioned against the increasing evidence of livelihood strategies based on part-time farming supplemented by a variety of alternative sources of income from other activities and transfers. As a consequence "...the cross-sectoral and multi-occupational diversity of rural livelihoods may need to become the cornerstone of rural development policy" (Ellis and Biggs, 2001: 445). On one hand, the vulnerability of households to poverty can be linked to the absence of available opportunities for the differentiation of income sources (Pyatt, 2003); on the other hand migration decisions (both toward domestic and foreign destinations) can be properly studied only considering a wide range of household characteristics, including the composition of household's income (Ellis and Harris, 2004; Waddington and Sabates-Weheler, 2003).

The P&M study hinges on the construction of a Social Accounting Matrix (SAM) for Syrian economy as a basis for quantitative policy analysis. Indeed the SAM approach seems fairly effective in including in models features of rural economies, as the diversification of production activities or the presence of social groups with alternative livelihood strategies. Generally speaking the flexibility of the SAM accounting framework enables the researcher to choose the proper level of disaggregation, according to the research question to be addressed. All the same the construction of a SAM is often an extremely data requiring exercise (Round 2003), especially if regional disaggregation of accounts is attempted (as in the rural-urban case). The experience of RDD staff during the P&M study widely confirmed this difficulty. The major part of work has been devoted to find reliable information on Syrian economy and to build accounts for economic activities and institutions in a coherent accounting framework. Despite these efforts, the final structure of the SAM still shows important limitations, first of all an incomplete rural-urban disaggregation of accounts that reduces its suitability of derived models in studying internal migrations.

Nonetheless, the P&M study should be considered as a positive experience at least from two points of view. First of all, the NAPC staff have gone through an intensive activity of on-job training has been carried out by NAPC's staff. The members of RDD have considerably improved their knowledge on national accounts, social accounting framework and multi-sectoral linear modeling; a remarkable know-how about statistical information on Syrian economy has been developed; the staff can now be considered ready to join with wider projects, involving other institutions of Syrian Government, aiming to build a set of input-output tables, covering the area of agricultural production. A second important result is the SAM in itself: as sections 3 and 4 will show, despite its limitations it represents a valuable tool for policy analysis and a will be a useful benchmark for developing a wider and more reliable table of Syrian economy.

Chapter 1- A Social Accounting Matrix for Syrian Economy

1.1 Analytical purposes and structure of the projected SAM

A widely accepted definition of a Social Accounting Matrix (a concept originally due to Stone) is the following: " ... a comprehensive, flexible and disaggregated framework that elaborates and articulates the generation of income by activities of production and the distribution and redistribution of income between social and institutional group" (Round, 2003).

While *comprehensiveness* assures the full representation of transactions within the economy in a given period, *disaggregation* allows the researcher to inquire on technical and institutional interdependencies working within the economic system and likely to affect its performances as well as the outcomes of policy. The latter feature of the SAM approach is especially appealing for *sector* policy analysis, allowing the researcher to model within a coherent macroeconomic framework even though his focus is on a specific component (an industry, an institutional sector) of the system.

A peculiar feature of the SAM as an accounting system is the representation of flows as single entries in a square matrix. This is really an effective way of displaying information, highlighting structural interdependence both at the macro and the meso level (Round, 2003). Moreover, the accounting constraints, expressed in the SAM by the equality between rows and columns totals, is a powerful tool to detect lacks and errors in the independent estimates of disaggregated accounts during their integration in a common framework.

Table 2.1 shows a schematic social accounting matrix. It is easy to recognize the connection with input-output tables. Indeed a SAM can be considered as an input-output table integrated by disaggregated accounts for value added formation, distribution and redistribution (rows/columns for factors, institutions and capital formation).

Table 1.1: A schematic Social Accounting Matrix

	Commodities	**Activities**	**Factors**	**Insititutions**	**Capital**	**Rest of the world**	**Total**
Commodities		Intermediate consumptions		Final consumptions	Investments	Export	Total demand for product
Activities	Domestic supply						Total output
Factors		Value added				Factor income from abroad	Total factor income receipts
Institutions	Taxes less subsidies	Taxes less subsidies	Factors income to institutions	Inter insititutional transfers		Non factor income receipts	Total institutional receipts
Capital				Savings		Capital transfers from abroad	Total in-flows of capital ac-count
Rest of the world	import		Factor payments to abbroad	Current tranfers to abroad	Capital transfers to abroad		Total inflows from ROW
Total	Total supply of products	Total output	Total factor income payments	Total institutional outlays	Total out-flows of capital ac-count	Total outflows to ROW	

A feature of the SAM approach that it is worth to stress here is its *flexibility*. The adoption of specific criteria in the disaggregation of accounts (commodities, activities, factors, institutions) give to the researcher several, alternative ways to adapt the general framework to specific analytical goals. The design of a SAM to be used in modeling policy for poverty and internal migration, the original goals of this study, requires extending the general framework in two directions.

- The representation of poverty and the analysis of poverty reduction requires an appropriate disaggregation of the institutional sector of households. The criteria that could be followed are several: income level is widely adopted and could be proper to study *equity* issues; the source and composition of households' income (by sector, by occupation type) could give a valuable support in the analysis of *livelihood* strategies (Round, 2003).
- The phenomenon of internal migration could be properly addressed in a SAM framework through a regional *urban-rural* disaggregation of accounts (Roberts, 1998), suitable for the analysis of interdependencies and spillovers between the two regions.

The broadening of analytical goals has to be confronted with the required statistical burden. Indeed the trade-off between the adaptation of a SAM to specific research questions and the feasibility from a statistical point of view (availability of relevant and reliable information) is likely to be experienced in SAM building. This is also the experience of the NAPC staff in the poverty and migration study. Indeed, the final structure of the SAM is fairly different from the first projected structure. In carrying out the study several reasons, the most important being the lack of reliable (and official) input-output tables of Syrian economy, suggested a simplification of the adopted framework.

Though the produced SAM doesn't completely fit with the initial analytical goals, it is all the same a valuable tool for policy analysis including accounts for:

- 51 commodities;
- 41 production activities;
- 2 factors of production;
- 22 institutions.

A high degree of disaggregation has been included for agriculture (31 commodities and 28 activities) and food sector (15 commodities and 8 activities). The households sector has been disaggregated by income level (deciles of equivalent per capita expenditure) and by regional location (urban vs. rural). The complete list of accounts can be found in the Appendix I to this report. All these features make the SAM produced by NAPC staff suitable for insightful analysis on income distribution and poverty: in section 2 and 3 some preliminary results grounded on the estimated SAM will be proposed to the reader.

The construction of the SAM followed three fundamental steps:

i) construction of a reference aggregated framework grounded on national accounts figures (national accounting matrix);

ii) independent estimates of disaggregated accounts for production (commodities and activities accounts) and income distribution (current households accounts);

iii) integration of the disaggregated accounts in the reference framework and balancing of the table.

In the following paragraph the three phases will be described in detail.

1.2 General framework: a National Accounting Matrix of Syria, 2004

Source of information

The presentation of national accounts in a matrix form has a long tradition in the field of economic studies. The last revision of the System of National Accounts (UN et al, 1993) includes a specific chapter of social accounting matrix defined as "... the presentation of SNA accounts in a matrix which elaborates the linkages between the supply use table and institutional sector accounts" (UN et al 1993: chapter 20); the strong relationship between SAM framework and SNA has been frequently stressed in the literature (Round 2003).

The main source of information for the construction of a reference national accounting matrix (NAM) for Syria have been found in the Statistical Abstract published by the Central Bureau of Statistics (CBS, 2005). Additional information have been found in the International Monetary Fund country report for Syria (IMF, 2007) and in the final report of the FEMISE Research Program Study on fiscal impact of trade reform in Syria (Lucke, 2001).

The schematic SAM presented in the previous paragraph can be used as an outline in the presentation of the NAM for Syria. The first couple row/column headed to *commodities* essentially corresponds to an aggregate *goods and services account*. Table 1.2 shows the goods and services accounts for Syria in the reference year (2004); values are expressed in millions of Syrian Pounds.

Table 1.2: Goods and services account 2004 MSP – Current prices

Gross output at producer's price	2 130 533
Import	477 186
Total resources	2 607 719
Intermediate Consumption	876 590
Gross Fixed Capital Formation	301 010
Government final consumption	174 052
Private final consumption	810 037
Changes in inventories	-66 414
Export	512 445
Total uses	2 607 720

Source: (CBS, 2005: table 16.45)

Total resources for Syrian economy amounted to 2 607 719 millions of SP; 82% of them were domestically produced. The sum of uses for intermediate and final consumption, capital formation and export exceeded resources for 66414 MSP, accounted as negative changes in inventories; as a consequence the net investment were equal to 234596 MSP.

The production account for domestic industries is the basis for the compilation of the second row/column couple of the NAM. The Statistical Abstract includes in the chapter on national accounts several tables showing production accounts by industry classified according to the International Standard Industrial Classification (ISIC) at the category level. A synthesis of data used in the compilation of the NAM is presented in table 1.3.

Table 1.3: Production account by industry 2004 MSL– Current prices

	ISIC cat	**Gross output**	**Intermediate consumptions**	**GDP at market prices**	**Consumption of fixed capital**	**NDP at market price**	**NDP at factors cost**	**Subsidies less taxes**
Agriculture	A, B	419 428	126 161	293 267	6 289	286 978	296 405	9 427
Mining and manufacturing	C, D, E	805 689	482 283	323 406	26 152	297 254	377 396	80 142
Building and construction	F	98 957	62 795	36 162	499	35 663	33 814	-1 849
Wholesale and retail trade	G, H	258 107	48 550	209 557	2 921	206 636	185 082	-21 554
Transports and communications	I	218 237	63 652	154 585	9 165	145 420	142 818	-2 602
Finance and insurance	J	56 787	6 271	50 516	1 131	49 385	45 901	-3 484
Social and personal services	K, O	64 619	33 198	31 421	1 096	30 325	29 997	-328
Government services	L, M, N	176 935	42 220	134 715	2 046	132 669	132 358	-311
Private non-profit services	P, Q	943	237	706		706	706	0
Custom duties		30 831		30 831		30 831		-30 831
Value of imputed monetary services			11 223	11 223		11 223	11 223	0
TOTAL		2 130 533	876 590	1 253 943	49 299	1 204 644	1 233 254	28 610

Source: (CBS, 2005: tables 16.24, 16.26, 16.28, 16.30, 16.32)

Values are gross of imputed monetary services, separately accounted as a corrective figure (second last row). The twofold valuation at factor costs and at market prices allowed the calculation of net subsidies for each industry (last column).

The rows and columns headed to factors and institutions of the schematic SAM correspond to the accounts of income primary and secondary distribution. The formation of disposable income is summarized in the following table from Statistical Abstract.

Table 1.4: Disposable income account 2004 MSL – Current prices

Resources	
Domestic Factors Income (NDPfc)	1 233 254
Compensation of employee from ROW, net	8 992
Property and enterprise. income from ROW, net	-46 557
Net Indirect Taxes	-28 610
Other current transfer ROW, net	35 774
Total Disposable Income	1 202 853
Uses	
Government final consumption	174 052
Private final consumption	810 037
Changes in inventories	-66 414
Savings	285 178
Total Disposable Income	1 202 853

Source: (CBS, 2005: table 16.50)

It is worth noticing that values for value added (NDP) are included at factor costs and net of imputed monetary values (see table 2 above). To account for secondary distribution of income (inter-institutional transfers) an aggregate figure was extracted by the summary of fiscal operation included in the last IMF Country Report for Syria (IMF, 2007) and reproduced in the table 1.5 below.

Table 1.5: Summary of fiscal operations 2004 BSL

Revenue	343.9
Oil related proceeds	141.2
Profit tax on Syrian Petroleum Corp	62.4
Royalties	25.4
Surplus from SPC	53.3
Non-oil tax revenues	145.4
Income and profits	59.1
International trade	31.3
Other	55.0
Non-oil non-trade revenues	55.9
Public enterprises surpluses	48.0
Other non-tax revenue	7.8
PSF revenue	1.5
Expenditure	396.9
Current expenditure	240.3
Defense	74.7
Wages and salaries	69.5
Goods and services	19.3
Interest payments	11.0
Subsidies	29.8
PSF subsidies	27.0
Other subsidies	2.8
Transfers	36.0
Pensions and social assistance	14.4
Transfers to public enterprieses	21.6
Development expenditure	156.6
Overall balance	-53.0

Source: (IMF, 2007)

The aggregate figure for transfers among institution in the NAM was set equal to the sum of profit taxes on Syrian Petroleum Corporation (62.4 BSP), taxes on income and profits (59.1BSP),

pensions and social assistance (14.4BSP) and transfers to public enterprises (21.6 BSP) for a total of 157.5 BSP.

The entries of the capital account can be partially derived from tables already shown (changes in inventories, savings). Further detailed information on investments was extracted again from National Accounts published in the Statistical Abstract and presented in the following table 1.6.

Table 1.6: Gross fixed investments by owning and producing industry 2004 BSL

	ISIC cat	Gross Fixed Capital Formation	Net Capital Formation	Apparent Consumption of Fixed Capital
Owning industry				
Agriculture, forestry and fisheries	A, B	41 240	40 085	1 155
Mining and manufacturing	C, D, E	81 500	77 181	4 319
Transport and communications	I	48 569	46 748	1 821
Dwellings	K	45 253	44 348	905
Other sectors	F, G, H, J, L M, N, O, P, Q	84 448	81 830	2 618
TOTAL		301 010	290 192	10 818
Producing industry				
Dwellings	F	45 253		
Industrial and commercial building	F	33 949		
Constructions	F	67 919		
Transport equipment	D	45 018		
Machinery and other equipment	D	108 871		
TOTAL		301 010		

Source: (CBS, 2005: table 16.40, 16.41)

An apparent consumption of fixed capital in each owning industry was computed by difference (last column).

Finally the accounting framework was completed using figures from balance of payments accounts, as published in the Statistical Abstract (table 1.7).

Table 1.7: Balance of payments 2004 MSL – current prices

	Balance	Debit	Credit
Current account	18 640	455 462	474 102
Goods and services	23 864	397 594	421 458
Goods	-5 940	297 069	291 129
Services	29 804	100 525	130 329
Income	-37 844	57 048	19 204
Compensation of employees	5 838	2 100	7 938
Investment income	-43 682	54 948	11 266
Direct investment	-47 676	47 676	0
Dividend and distributed profits	0	0	0
Income on debt	3 994	7 272	11 266
Current transfers	32 621	819	33 440
General government	-512	768	256
Other sectors	33 133	51	33 184
Workers remittances	33 133	51	33 184
Capital and Financial Account	-1 997	110 306	108 309
Capital Account	922	102	1 024
Financial Account	-2 919	110 204	107 285
Direct investment	14 083	0	14 083
Portfolio Investment	0	0	0
Other investment	-17 002	110 204	93 202
Assets	0	0	0
Loans	0	0	0
Liabilities	-17 002	110 204	93 202
Total current, capital and financial	**16 643**	**565 768**	**582 411**
Errors and omissions	**16 851**	**0**	**16 851**

Source: (CBS, 2005: table 15.2)

Balancing figures

In a matrix presentation of the full sequence of accounts of the economy, the overall balance of accounts is guaranteed by a sequence of balancing figures (UN et al, 1993). Some of them are already included in the tables presented above (for instance value added, the balancing item of production account, is included in the resources section of the disposable income formation account, see table 2). To complete the sequence of accounts for the reference NAM of Syria the following balancing items were calculated.

- Net Generated Income =	+ Net Domestic Product at factor costs
	+ factors income from ROW
	- factors income to ROW
- Savings =	+ Net Generated Income
	+ indirect taxes
	+ current transfers from ROW
	- final consumptions
	- current transfers to ROW
Net Fixed Capital Formation=	+ Savings
	+ capital transfers from ROW
	- capital transfers to ROW
External Trade Balance	+ Export

	- Import
Net Lending/Borrowing	+ Net Fixed Capital Formation
	- External Trade Balance

A NAM of Syria, 2004

Table 1.8 displays the National Accounting Matrix of Syrian economy used as a reference framework in the construction of the SAM. Two features of the NAM have to be stressed here:

- figures for production accounts are net of imputed monetary values, given that the latter are costs that don't correspond to a real purchase of commodities within the production account, but account only for a rent earned by the sector of financial services;
- savings and investments are net of changes in inventories;
- savings calculated as a balancing item for institutions account show a discrepancy of 3424 MSP from the correspondent figure included in the National Accounts (table 4 above).

For the year 2004 Syrian economy shows a net borrowing for 7221 MSP from the rest of the world.

Table 1.8: National Accounting Matrix of Syrian Economy 2004 – Million SL

		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	TOTAL
1	**Goods and services**		126 161	482 283	62 795	48 550	63 652	6 271	33 198	42 220	237			984 089	234 596		512 445		2 596 497
2	**Agriculture**	417 792																	417 792
3	**Mining and manufacturing**	799 434																	799 434
4	**Building and construction**	98 143																	98 143
5	**Wholesale and retail trade**	257 477																	257 477
6	**Transports and communications**	217 411																	217 411
7	**Finance and insurance**	56 706																	56 706
8	**Social and personal services**	64 188																	64 188
9	**Government services**	176 387																	176 387
10	**Private non-profit services**	940																	940
11	**Factors**		294 769	371 141	33 000	184 452	141 992	45 820	29 566	131 810	703							7 938	1 241 192
12	**Taxes less subsidies**	30 831	-9 427	-80 142	1 849	21 554	2 602	3 484	328	311	0								-28 610
13	**Institutions**											1 239 092	-28 610	157 500				44 706	1 412 688
14	**Capital**		6 289	26 152	499	2 921	9 165	1 131	1 096	2 046	0			215 332				108 309	372 940
15	**Net lending/borrowing**														28 038				28 038
16	**Rest of the World G&S**	477 186														35 259			512 445
17	**Rest of the World FF**											2 100		55 767	110 306	-7 221			160 952
	TOTAL	2 596 496	417 792	799 434	98 143	257 477	217 411	56 706	64 188	176 387	940	1 241 192	-28 610	1 412 688	372 940	28 038	512 445	160 953	8 384 621

Source: own results based on official data

From NAM to SAM: an extended accounting framework

The NAM presented in Table 1.8 was used as a general framework in the construction of SAM. Its figures are completely compatible with official data from national accounts; indeed table 8 is simply a representation in matrix form of the main figures of national accounts for Syria.

However the integration of independent estimates of disaggregated accounts for commodities, production activities and institutions needed a preliminary adaptation of the accounting framework, in order to obtain reference figure also for:

- aggregate categories of *commodities*;
- aggregate categories of *factors* (labor, other factors);
- different types of *institutions* (households, enterprises, government).

The adaptation of the general accounting framework is a first step toward a true *social* accounting matrix.

The disaggregation of the commodities account in the NAM, whatever the classification adopted, implies the construction of an input-output table. More precisely:

- dividing intermediate consumptions of production activities (cells from 1.2 to 1.10 in the NAM) by commodities correspond to the compilation of a *use* table;
- dividing the output of production activities (cells from 2.1 to 10.1 in the NAM) by commodity type correspond to the compilation of a *supply* table.

The lack of official input-output tables of Syrian economy, with totals coherent with the figures published in the National Accounts, was the major constraint to face in building of the SAM. The building of disaggregated accounts for agriculture and food industry would have been more complete and reliable where grounded on a complete mapping of supply chains extracted from a consistent input-output framework. Moreover, given the expertise of NAPC, the estimation of disaggregated accounts was carried out only for agricultural and for the strictly related activities (as agricultural products processing and basic food industries). As a consequence a relevant part of the productive system resulted necessarily represented in the final table with a high degree of aggregation.

To include a basic supply-use table in the reference NAM were applied input-output coefficients derived from the SAM published in the final report of the FEMISE study on trade reform (Lucke, 2001). The input-output structure used in the cited study had been derived from an input-output table of Jordan, properly adapted to reflect specific features of Syrian economy. The input-output coefficients derived form the FEMISE study were used as a starting point in the disaggregation of commodity accounts, leaving to additional information gathered from other sources and to the balancing procedure, the final adaptation of resulting accounts to the aggregate figures for Syrian economy.

Further information for the extension of the NAM were extracted from:

- CBS Statistical Abstract for figures on wages in the public-owned activities and for transfers between government and other institutions (consolidated account of Public Administration);
- IMF summary of fiscal operations for Government transfers to public enterprises and for profits of mining and quarrying activity (set equal to profit of Syrian Petroleum Corporation);
- CBS survey on households budgets for shares of different groups of commodities in the final private consumptions.

Secondary 'ad hoc' hypotheses were also necessary to complete the disaggregation of flows. The most important of them, due to the lack of information, is the assumption that Government con-

sumptions do not directly include any manufactured good but only utilities, building and constructions, services and public administration services[1].

The extended NAM was finally balanced using the Stone-Byron procedure (Round, 2003). The extended NAM is included as an Excel file in the CD attached to this report ('nam8.xls').

1.3 Disaggregating accounts of Syrian economy: activities

A set of disaggregated accounts for production activities in agriculture and in the food industry was estimated. The NAPC staff worked on two different estimates:

a) accounts for agricultural and agricultural processing production activities, using official data from CBS;

b) accounts for agricultural production activities disaggregated by region and by process type, using data gathered with the survey on Farming Systems in Syria.

The aims of the two estimates were complementary. The accounts based on official data were designed to be integrated within the SAM framework; the second set of accounts was conversely designed as a 'satellite' account (UN et al, 1993) of Syrian agriculture to be used:

- as an independent estimate to assess the coherence and the reliability of accounts based on official data from CBS;
- as a possible basis for a highly disaggregated model of Syrian agriculture, to update in next years and to be used as a tool for sectoral policy analysis.

The first set of accounts was estimated using data gathered from:

- Syrian Agricultural Statistical Database produced by NAPC;
- unpublished data supplied by the Central Bureau of Statistics;
- unitary coefficients from technical handbooks where necessary.

A short summary including the steps followed in the construction of the accounts, the hypotheses made, the sources of information used and an assessment of their reliability, has been prepared by the members of the NAPC staff and is included in the CD attached to this report ('activity report.doc'). The final version of the accounts used in the construction of the final SAM is also included in the CD attached to this report ('national activity accounts.xls').

The second set of estimates is referred only to agricultural production activities represented in the SAM (crops and livestock). Production processes have been disaggregated by:

- region (Southern, Northern, Middle, Coastal, Eastern);
- technology of production (irrigated vs. rain fed).

The Estimates are based both on the Syrian Agriculture Statistical Database produced by NAPC (cultivated areas and bred heads in livestock activities) and on unitary technical coefficients gathered during the survey on Farming Systems (input uses and related costs).

The file 'regional activity accounts.xls' in the attached CD includes activity accounts for agriculture disaggregated by region. The disaggregated accounts included in the first two sheets ("crops" and "livestock") are consolidated at the national level and according to the structure of the final SAM in the third sheet ("SAM") of the Excel folder.

[1] Insofar as this assumption does not allow for a complete representation of the backward linkages for final demand of Government, is likely to lessen the value of SAM multipliers. Further secondary assumption adopted in the estimation were: wages paid by private activities were estimated applying the wage rate of the public sector activities resulting from CBS Statistical Abstract figures on employment; net taxes were divided among commodities proportionally to relevant import shares; changes in inventories by commodity were calculated as balancing items.

1.4 Disaggregating accounts of Syrian Economy: households

Households accounts

Table 1.9 shows in a compact form the current account for Syrian households in the reference year according to the disaggregated NAM (cfr. nam8.xls file in the attached CD). A fundamental feature of SAMs is their focus on *social* features of the economy, reflected by the inclusion of disaggregated accounts for institutions. Households are central in the analysis of the circular flow and a proper classification of them is crucial in making the SAM (and the derived models) a useful tool for the researcher in pursuing his analytical goals.

Table 1.9: Households current account 2004 MSP – Current prices

Receipts		**Outlays**	
wages	499 983	425 725	final consumptions
incomes from enterprises	353 014	7 437	transfers from Government
transfers from Government	14 400	94 323	savings
current trasnfers from row	44 450	51	current trasfers to ROW
TOTAL RECEIPTS	911 848	911 848	TOTAL OUTLAYS

Source: own results

The original aim of the Poverty and Migration study was to supply a new tool for quantitative analysis highlighting the linkages existing between the features of the productive system in the rural areas and income distribution. To the purpose of enhancing the targeting of agricultural and rural policies, a relevant criterion of classification for households was needed to identify socio-economic groups likely to be affected in a different way.

As already seen above, the ideal structure of a SAM for the analysis of poverty and rural-to urban migration issues should include:

- a complete regional, urban-rural disaggregation of accounts;
- a classification of households relevant in the analysis of livelihood strategies.

The lack of official source of information, as well the limitation of resources dedicated to the study, asked for a work-in-progress redefinition of objectives. Despite the impracticability of a complete urban-rural of the SAM, the regional criterion was maintained in the classification of households' accounts. Moreover, the availability of a reliable source of microeconomic information, with desirable statistical features for the reference year (database for the CBS survey on households' budget), revealed as a valuable opportunity to improve the analysis of income distribution and poverty.

The classification of households in the final SAM combines two criteria:

a) Income level. Households have been classified by deciles of per-capita equivalent expenditure.

b) Regional location. Households have been classified as "rural" or "urban" according to their domicile.

It is necessary to stress that the two classification criteria have been applied in a *hierarchic* way: at first households have been assigned to deciles of *total* population; then, they have been classified as urban/rural. As a consequence the 20 groups resulting from the classification do not include the same number of household, the population included in each group depending on the relative importance of rural-urban regions in each deciles of total population.

Source of information

The Survey on Households' Budgets, put at disposal of the NAPC staff by Central Bureau of Statistics is a representative sample of Syrian population. The survey is suitable to be used for *living standard measurement studies* (Grosh and Glewwe, 2000) .

A first explorative analysis of data revealed that for the major part of the observation, recorded incomes were lower than total expenditures, i.e. the households showed *negative savings*. A bias

toward the underestimation of income sources is a typical problem to face in *living standard* surveys. As a consequence the *total expenditure* of the family was considered as a proxy of the income level.

The survey had been used for a research on poverty in Syria jointly carried out by the State Planning Commission of Syria and the United Nation Development Program (El Laithy and Abu-Ismail, 2005). In 2004, 29800 households were asked to fill two questionnaires respectively on the composition of households' expenditure and on the households characteristics (composition by sex and age, education level, occupation, sources of income, owned assets). In the cited study 'individual' poverty lines were estimated for each observed household, according to the household composition (affecting consumption needs) and the region of domicile (affecting the cost of living). Table 1.10 reproduces some results published in the cited study.

Table 1.10: Estimated poverty lines for 2003-2004 SP per month

	Southern		**North-Eastern**		**Middle**		**Coastal**	
	Urban	Rural	Urban	Rural	Urban	Rural	Urban	Rural
1 elderly	1 483	1 470	1 433	1 334	1 302	1 282	1 352	1 362
1 adult male	2 021	2 052	1 919	1 846	1 838	1 739	1 939	1 918
2 adults, male and female	3 813	3 694	3 471	3 285	3 392	3 132	3 566	3 603
2 adults-2 children	5 913	5 515	5 265	4 666	5 254	4 634	5 621	5 444
2 adults-3 children	7 375	6 678	6 491	5 655	6 565	5 648	7 021	6 675
adult female - 3 children	4 912	4 573	4 071	3 959	5 051	4 057	4 633	4 495
2 adults- 5 children	10 023	9 176	8 718	7 654	8 872	7 677	9 346	8 981

Source: (El Laithy and Abu-Ismail, 2005: page 25)

Figures in table 1.10 were used to calculate a set of 'reasoned' equivalence scales, differentiated by region, to be used in the calculation of per-capita expenditure. A value of 1 was assigned to expenditures for an adult male (2nd row of the table) while individual expenditure and equivalence coefficients for the other members (adult female, elderly, child) were deduced by difference. The results of such a calculation are presented in the table 1.11. The coefficients of table 2.11 were used to calculate the weighted number of members for each household.

Table 1.11: Equivalence scales based on poverty lines by regions 2003-2004

	Southern		**North-Eastern**		**Middle**		**Coastal**	
	Urban	**Rural**	**Urban**	**Rural**	**Urban**	**Rural**	**Urban**	**Rural**
Elderly	0.734	0.716	0.747	0.723	0.708	0.737	0.697	0.710
Adult male	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Adult female	0.777	0.787	0.678	0.820	0.934	0.844	0.723	0.810
Child	0.571	0.496	0.504	0.443	0.586	0.497	0.567	0.525

Source: own results based on data from (El Laithy and Abu-Ismail, 2005: page 25)

The households included in the sample, ordered by equivalent per-capita expenditure, were then divided according to deciles of total population2.

In the dataset the households' expenditures are classified according to a list of more than 500 items including daily expenditures, costs for utilities, social expenditures, expenditures for the purchase of durable goods. Some of the recorded expenditures refer to transfers among institutions (different types of direct taxes, transfers to other institutions within Syria) and have been reclassified accordingly3. The other items have been reclassified according to the commodity classification adopted for the structure of the SAM.

Two components of the households account were finally estimated using the CSB sample:

[2] i.e. into ten groups with equal weight on total population (groups for which the sum of weights is equal). The sample is stratified by 14 governorates and by area (city centre, rest of urban, rural). To each observation was assigned a weight equal to the inverse of the sampling ratio in the stratum to which the observation belongs.

[3] And excluded by current expenditure.

- the composition of expenditures for final consumption (according to SAM commodity classification) by household group;
- the composition of income sources (wages, self-employed labor, property and assets, pensions and social transfers, transfers from Syria, transfers from abroad) by household group.

The results of estimates are included as an Excel file ('households account.xls') in the CD attached to this report.

1.5 Balancing the SAM

The independent estimates of disaggregated accounts for activities and households were integrated in the SAM framework in the following way:

- the disaggregated estimates for production activities were directly included in the SAM; the accounts for 'residual' activities (other crops, other livestock, other food and beverage) were calculated by difference from NAM totals;
- the disaggregated estimates for households' expenditures were used to calculate shares to be used in dividing aggregate final consumptions in the NAM according to the SAM commodity classification and across household groups;
- the disaggregated estimates for households' total expenditure were used to calculate shares to be used in allocating wages, incomes from other factors and transfers from enterprises across household groups;
- the disaggregated estimates for income sources were used to calculate shares to be used in allocating transfers from Government to households, other transfers within Syria and current transfers from the rest of the world across household groups;
- accounts for commodities were balanced adjusting changes in inventories;
- accounts for households were balanced adjusting savings.

The resulting SAM was still unbalanced in the accounts for:

- activities;
- factors;
- taxes less subsidies;
- financial flows with the Rest of the World.

Moreover the total of changes in inventories was about two times (in absolute value) the figure recorded in national accounts.

The final reconciliation of accounts was carried out following the Stone-Camperhown-Meade approach and using the algorithm suggested by Byron (1978). This approach to balancing is particularly appropriate when initial multiple estimates to be reconciled are based on information with different degree of reliability (Round, 2003). Indeed, to implement the procedure a matrix of 'tolerance estimates' for estimated figures has to be defined. Through the reliability matrix it is possible to impose constraints on specific figures and/or on the total of figures for specific blocks of the matrix.

The balanced SAM is included as an Excel file (SAM Syria 2004 rel.2) in the CD attached to this report.

The balancing method assured a substantial equality between columns and row totals. Small discrepancies (less than 1.2%) remain only for minor production activities4. In the whole totals for the main aggregates of National Accounts are largely compatible with those published by CBS

[4] The presence of accounts with small figures with respect to the average, typical of highly disaggregated tables, reduces the efficiency of the balancing algorithm. The higher discrepancies is in the account for citrus (1,2%) that represents only the 0.37% of total output

Chapter 2- Structural Features of Syrian Economy: a Multiplier Analysis

2.1 A linear model of Syrian economy

A SAM is basically a representation of the circular flow within an exchange economy in a matrix form. While an input output matrix captures only interdependencies between industries in a disaggregated production account, in a SAM the representation of circular flow is full: the entries o account for all flows generated by the interrelationships production, income distribution, consumption and capital formation.

Each row of the SAM shows the receipts for a generic "sector" of the economy while the corresponding column lists expenditures. We can find several types of accounts in the rows of the matrix: a) production activities, b) factors of production, c) institutions' current accounts, such as households (possibly further disaggregated by type), firms, government, d) a capital formation account, and e) the rest of the world account. A similar structure holds for the columns of the matrix.

Being a double entry accounting system, the totals of corresponding rows and columns must balance. The economic meaning of this general balancing condition, depending on the fact that a SAM is an ex post representation of flows within the economy, can be considered from several point of views: a) costs must be equal to revenues in each production sector; b) expenditure must be equal to income for each institutional actor; c) total savings must be equal to total investments plus financial capital accumulation.

In the following table 2.1 all transactions represented within a SAM are presented in a schematic form. The table extends the schematic description of a national accounting matrix presented in section 2, including separate rows and columns for households and other institutions.

Table 2.1: A schematic representation of the SAM

	Commodities	Activities	Factors	Households	Other endogenous institutions	Exogenous insititutions	Capital	Rest of the world	Total
Commodities		intermediate consumptions		household final consumption expenditures		other final demand	investments	export	total demand for product
Activities	Domestic supply								total output
Factors		value added						factor income from abroad	fotal factor income receipts
Households			factor income to households	inter insititutional transfers	inter insititutional transfers	pensions, other transfers		non factor income receipts	total household incomes
Other endogenous institutions			factor income to other institutions	inter insititutional transfers	inter insititutional transfers	other transfers		current transfers from abroad	total receipts ofnstitutions
Exogenous insititutions	indirect taxes	indirect taxes	other factor payments	taxes, other trasnfers	taxes, other trasnfers	other transfers		current transfers from abroad	total receipts ofnstitutions
Capital				savings				capital transfers from abroad	total receipts of capital account
Rest of the world	import		factor payments to abbroad	current tranfers to abroad	current tranfers to abroad	current tranfers to abroad	capital transfers to abroad		total inflows from ROW
Total	Total supply of products	total output	total factor income payments	total household outlays	total institutions outlays	total institutions outlays	total outflows of capital account	total outflows to ROW	

Depending on available information each group of accounts can be disaggregated in a different extent, according to several classification criteria, leading to representations of the economy with a considerable degree of detail. Nevertheless, to move from the simple accounting representation of flows to a model suitable for policy analysis requires some further steps.

The calibration of a model on a SAM (whatever the theoretical nature of it was) implies the assumption that recorded flows reveal some fundamental features of the socio-economic structure. Within the framework of input-output analysis the entries of the SAM can be used to depict the relationships between production activities and income distribution through the computation of column shares and the matrix of multipliers. The implicit theoretical assumption are the usual of input output models. For production a Leontief technology is assumed[5], even if the extension of the model to distributive and redistributive flows allows the researcher to calculate 'keneysian-type' multipliers, inclusive of induced effects through the income-expenditure linkage. Also for transactions of and among institutions a linear response to changes is assumed.

The first step for the solution of the model is the identification of endogenous and exogenous accounts. The choice should be driven by the aim of the analysis and has to be coherent with the research question. Usually, for small economies and for the purposes of policy analysis, the government and the rest of the world are considered as exogenous to the model, i.e. their behaviour is not explained by the model itself. The former, because its behaviour is essentially determined by those policy the model aims to assess; the latter, because the external sector is rarely under domestic control. The process of capital formation should be considered as endogenous when dynamic effects are important in answering to the research question, so that investments need to be endogenously-determined.

In the proposed model accounts for government, capital formation and rest of the world have been considered as exogenous. In table 2.2, the relevant rows and columns are properly shaded.

[5] i.e. a production function with constant return to scale and fixed input output coefficients (no substitution among the different inputs)..

Table 2.2: Endogenous and exogenous accounts in a SAM model

	Commodities	Activities	Factors	Households	Other endogenous institutions	Exogenous insititutions	Capital	Rest of the world	Total
Commodities		intermediate consumptions		household final consumption expenditures		other final demand	investments	export	total demand for product
Activities	Domestic supply								total output
Factors		value added						factor income from abroad	fotal factor income receipts
Households			factor income to households	inter insititutional transfers	inter insititutional transfers	pensions, other transfers		non factor income receipts	total household incomes
Other endogenous institutions			factor income to other institutions	inter insititutional transfers	inter insititutional transfers	other transfers		current transfers from abroad	total receipts ofnstitutions
Exogenous insititutions	indirect taxes	indirect taxes	other factor payments	taxes, other trasnfers	taxes, other trasnfers	other transfers		current transfers from abroad	total receipts ofnstitutions
Capital				savings				capital transfers from abroad	total receipts of capital account
Rest of the world	import		factor payments to abbroad	current tranfers to abroad	current tranfers to abroad	current tranfers to abroad	capital transfers to abroad		total inflows from ROW
Total	Total supply of products	total output	total factor income payments	total household outlays	total institutions outlays	total institutions outlays	total outflows of capital account	total outflows to ROW	

The flows recorded in the table can be now be represented in a compact form using matrix notation. In table 2.3 the flows recorded in the SAM are summarized in the following matrices/vectors:

Table 2.3: Matrix representation of SAM flows

	Commodities	Activities	Factors	Households	Other endogenous institutions	Exogenous accounts	Total
Commodities	**T**					**X**	**y**
Activities							
Factors							
Households							
Other endogenous institutions							
Exogenous accounts	**L**					**F**	**z**
Total	**y'**					**z'**	

T is the (nxn) matrix of endogenous transaction, where n is the number of endogenous accounts;

X is the (nxm) matrix of exogenous injections (demand for good and services and other receipts of endogenous institutions from government, capital and ROW accounts), where m is the number of exogenous accounts;

L is the (mxn) matrix of leakages including outlays of endogenous towards exogenous accounts;

F is the (mxm) of transaction among exogenous accounts that collectively represent the flow of funds of the considered economy;

y is the (nx1) vector of totals for endogenous accounts;

z is the (mx1) vector of totals for the exogenous accounts.

To solve the model the matrix **T** has to be used to derive the matrix **A** of direct coefficient (column shares), by diving each element of **T** by the relevant element of vector **y.** Each element of matrix **A** is given by the following expression:

$$a_{ij} = \frac{t_{ij}}{y_j}$$

$i, j = 1, \ldots, n$.

In matrix notation:

$$\mathbf{A} = \hat{\mathbf{y}}^{-1}\mathbf{T} \tag{1}$$

where $\hat{\mathbf{y}}^{-1}$ denotes the diagonal matrix with the inverses of the elements of vector **y** on its main diagonal.

From equation (1) follows that the accounting identities for endogenous accounts can now be represented in terms of matrix **A** and vectors **y** and **x,** the latter including the row sums of elements of matrix **X**, (i.e. $\mathbf{x} = \mathbf{Xi}$ where **i** is a column vector of ones of the proper dimension):

$$\mathbf{y} = \mathbf{Ay} + \mathbf{x} \tag{2}$$

The system of linear identities can be solved in **y** in the usual way:

$$\mathbf{y} = (\mathbf{I} - \mathbf{A})^{-1}\mathbf{x} = \mathbf{M_a}\mathbf{x} \tag{3}$$

where **I** is an identity matrix of proper dimension and $\mathbf{M_a}$ is the matrix of SAM "accounting" multipliers. Each entry $m_{i,j}$ of the $\mathbf{M_a}$ quantifies the increase of totals for account *i* due to a unitary exogenous emission on account *j*. Multipliers account for all direct and indirect linkages within the economy. So, for example, an exogenous, policy driven increase in final demand for a commodity (e.g. increase in public expenditure) will be satisfied partially by domestic production and partially by an increase in imports. While the latter will not produce any further effects on the economy (leakages), the former will generate a second round of effects via the inter-industry interdependencies, leading to an increase of production also in the other domestic activities of production. Moreover, the general increase of output will in turn generates an increase in the income earned by factors and, consequently, in the income accruing to institutions supplying factors themselves. A further round of effects will be so generated by the increase induced in institutions' expenditure, leading to a further round of impacts on demand for commodities; and so on.

The matrix $\mathbf{M_a}$ from the solution of system (3) has been defined as "accounting" according to the fact that column shares for endogenous accounts of the SAM have been assumed as able to well represent the behaviour of components of the economy. As stressed by Pyatt and Round (1979), a "linear" response to exogenous shocks is questionable for many of endogenous flows. When the suitable information was available, the model could be improved by substituting **A** with a matrix of marginal propensities **C** where each element is calculated as follows:

$c_{ij} = \quad _{ij}a_{ij}$

where $_{ij}$ is the elasticity of *i* with respect to *j*. Above all, in the case of expenditures for final consumptions, the average propensities included in matrix **A** seem unlikely to properly represent households' behaviour, even in "fixed price" worlds as those defined by SAM-based linear models. In the model presented in this study the marginal propensities have been considered for households' final consumption expenditures, while for all other flows marginal propensities have been set equal to average ones, i.e. relevant elasticity have been assumed equal to 1. Using micro-data from the Survey on Households' Budgets, the expenditure elasticity for different groups of goods have been estimated for deciles of total populations. The following table 2.4 displays the estimated values used to transform matrix **A**.

Table 2.4: Expenditure elasticity for groups of goods and deciles of total population Syria, 2004

	Food	**Beverages and tobacco**	**Other manufactured goods**	**Building and construction, services**
Decile 1	0.890	0.799	1.873	0.942
Decile 2	0.896	0.790	1.738	0.939
Decile 3	0.892	0.768	1.634	0.939
Decile 4	0.890	0.742	1.565	0.940
Decile 5	0.887	0.732	1.524	0.940
Decile 6	0.882	0.720	1.471	0.940
Decile 7	0.877	0.695	1.440	0.941
Decile 8	0.872	0.674	1.397	0.940
Decile 9	0.860	0.643	1.354	0.942
Decile 10	0.837	0.516	1.308	0.945

Source: own results

The model has been then calibrated using the modified matrix of propensities **C**:

$$\mathbf{y} = (\mathbf{I} - \mathbf{C})^{-1}\mathbf{x} = \mathbf{M_c x} \qquad (4)$$

where $\mathbf{M_c}$ is the matrix of 'fixed price' multipliers (Pyatt and Round, 1979). The system in equation (4) is a basis for simulations for policy analysis purposes, according to the following equation:

$$d\mathbf{y} = \mathbf{M_c} d\mathbf{x} \qquad (5)$$

where $d\mathbf{x}$ is a vector of changes in exogenous injections, representing different policy scenarios. In section 4 the impact of selected policies will be assessed using equation (5). However, useful insights on features of Syrian economy, as depicted by the estimated SAM, can be obtained carrying out a structural analysis of $\mathbf{M_c}$ matrix. The following paragraph presents such an analysis of multipliers.

2.2 SAM output and income multipliers

In table 2.5 are shown the output multipliers for an unitary exogenous increase in demand for different groups of *commodities*. For simplicity, values for goods produced by agriculture and food industries have been averaged, given the high level of disaggregation of these commodities in the estimated SAM[6]. For instance, given the inter-industry linkages represented by the input-output area of the SAM, 1 SP of demand for goods produced by agriculture generates on average an increase in total output of 2.298 SP. The total increase accrues for more than 50% to agriculture, for 6.6% to food industry and for the remaining part to other production activities. Water, electricity and gas show the higher power of 'activation' of the productive system, asking for an

[6] The complete set of output and income multipliers can be found in the Appendix.

increase of total output more than 200% greater than the initial stimulus on final demand. Not surprisingly a relevant share of output increase generated by demand for food takes place in agricultural activities. Agriculture activates production both within agriculture itself, using agricultural products as an input (seeds, fodder crops, by products), and in the other production activities, purchasing inputs (fertilizers, pesticides, water, fuels etc.).

Table 2.5: Output multipliers for increase in final demand of selected commodities Total value and % shares

	Total	%shares		
		Agriculture	Food industry	Other activities
Agriculture*	2.30	50.3	6.6	43.1
Food, beverages and tabacco*	2.79	27.6	33.4	39.0
Other manufactured goods	1.73	9.3	7.6	83.1
Water, electricity, gas	3.12	6.6	5.1	88.3
Building and construction	2.77	6.2	4.8	88.9
Services	2.34	7.6	5.7	86.7
Public administration	2.46	8.5	6.4	85.1

* Average.
Source: own results

In table 2.6 are shown output multipliers for exogenous shocks on demand directed towards production activities. Also in this case values for agriculture and food industries are averages of figures of the relevant entries of the multiplier matrix. Multipliers are quite similar to those for commodities. Differences are due to the fact that demand directed towards one production activity is the weighted average of demand for each commodity produced by the activity itself, net of leakages (imports and connected taxes).

Table 2.6: Output multipliers for increase in final demand of selected industries Total value and % shares

	Total	%shares		
		agriculture	food industry	other activities
Agriculture*	2.50	51.4	5.6	43.1
Food beverages and tabacco*	4.06	16.4	44.6	39.0
Other manufactures	2.89	9.3	7.6	83.1
Utilities	3.12	6.6	5.1	88.3
Building and construction	2.77	6.2	4.8	88.9
Services	2.32	7.6	5.6	86.8
Public administration	2.46	8.5	6.4	85.1

* Average
Source: own results

Output multipliers can be considered a good representation of 'growth' potential intrinsic to the structure of Syrian economy and suggest the importance of economic policies directed to increase final demand. Another important feature of the economy can be assessed looking at the income multipliers, i.e. multipliers accounting for increases in incomes received by institutions and generated by increases in final demand. Tables 2.7 and 2.8 display multipliers for exogenous shocks in demand respectively for commodities and production activities.

Table 2.7: Income multipliers for increase in final demand of selected commodities Total value and % shares

	Total Syria	Urban			Rural		
		all hholds	1st decile	10th decile	all hholds	1st decile	10th decile
Agriculture*	0.779	0.465	0.012	0.141	0.314	0.014	0.061
Food beverages and tabacco*	0.946	0.565	0.015	0.172	0.381	0.017	0.074
Other manufactured goods	0.723	0.432	0.011	0.131	0.292	0.013	0.057
Water, electricity, gas	1.014	0.605	0.016	0.184	0.409	0.019	0.079
Building and construction	0.849	0.507	0.013	0.154	0.342	0.016	0.066
Services	0.956	0.570	0.015	0.174	0.385	0.018	0.075
Public administration	1.130	0.675	0.018	0.205	0.456	0.021	0.088

* Average. Source: own results

Table 2.8: Income multipliers for increase in final demand of selected industries Total value and % shares

	Total Syria	Urban			Rural		
		all hholds	1st decile	10th decile	all hholds	1st decile	10th decile
Agriculture*	0.880	0.525	0.014	0.160	0.355	0.016	0.069
Food beverages and tabacco*	1.330	0.794	0.021	0.242	0.536	0.024	0.104
Other manufactures	1.209	0.722	0.019	0.220	0.488	0.022	0.094
Utilities	1.014	0.605	0.016	0.184	0.409	0.019	0.079
Building and construction	0.849	0.507	0.013	0.154	0.342	0.016	0.066
Services	0.949	0.566	0.015	0.172	0.383	0.017	0.074
Public administration	1.130	0.675	0.018	0.205	0.456	0.021	0.088

* Average. Source: own results

In the first column of the two tables the reader can find the value of income multipliers for the total of Syrian households. Values are quite different for agriculture and manufactures, according to whether demand for commodities or industry output is considered; conversely income multipliers for building and services are identical in the two tables. Manufacturing activities (both food and non food) typically show a higher capacity to increase incomes.

Considering the remaining columns, asymmetries in income distribution can be evidenced. Noticeably, in all production activities the multiplier effect on incomes of urban households is larger than that for rural (about 50% above). Also, comparing multipliers for households of 1st and 10th deciles, both in the urban and the rural context, it can be noticed that there is a larger impact of demand on incomes for richer households. Indeed, the income multipliers for richer households in urban areas are more than ten times those of poorer ones. The same asymmetry in income distribution is also observed in rural areas, although to a minor extent (about 4 times).

Further insights on structural relationships between production activities and income distribution can be gathered looking at table 2.9, where multipliers for the ten industries showing the highest impact on incomes are displayed for the twenty groups of households represented in the estimated SAM. The largest impact on households' income is shown by 'sugar refinery', and 'milling', but the reader should bear in mind that these are two industries mainly public owned and/or heavily subsidized, as seen in the presentation of the estimated SAM. As a consequence the ratio between income distributed to factors and the value of output is artificially increased. On the whole a trade-off between output increase and equity in income distribution seems to emerge, with more than 50% of total multiplier effect accruing to the three higher deciles of total population. The same asymmetric effect on households' income can be observed in table 3.10, displaying 'households-to-households' income multipliers: the entries of the matrix show the total effect of exogenous increase in the income of household groups listed in the column headings, on the income of households groups represented in the rows. Though the major part of

multiplier effect goes to the groups affected by the direct impact (multipliers larger than 1 on the main diagonal), the demand induced via the circular flow within the economy leads to an increase in the income of other group that is typically higher for richer deciles of population.

Table 2.9: Income multipliers for increase in final demand of selected industries Absolute values

	Sugar refinery	**Milling**	**Other industries**	**Cotton Ginning**	**Public administration**	**Cotton crop**	**Tobacco**	**Utilities**	**Potato**	**Services**
Urb dec 1	0.067	0.030	0.019	0.019	0.018	0.017	0.017	0.016	0.016	0.015
Urb dec 2	0.106	0.047	0.030	0.030	0.028	0.026	0.026	0.025	0.025	0.024
Urb dec 3	0.132	0.058	0.038	0.037	0.035	0.033	0.033	0.032	0.031	0.030
Urb dec 4	0.148	0.066	0.042	0.042	0.040	0.037	0.037	0.036	0.035	0.033
Urb dec 5	0.172	0.076	0.049	0.048	0.046	0.043	0.043	0.041	0.041	0.039
Urb dec 6	0.204	0.090	0.058	0.057	0.054	0.051	0.051	0.049	0.048	0.046
Urb dec 7	0.243	0.108	0.069	0.068	0.065	0.060	0.060	0.058	0.058	0.055
Urb dec 8	0.292	0.129	0.083	0.082	0.078	0.073	0.072	0.070	0.069	0.065
Urb dec 9	0.393	0.174	0.112	0.111	0.105	0.098	0.098	0.094	0.093	0.088
Urb dec 10	0.768	0.340	0.220	0.216	0.205	0.191	0.191	0.184	0.182	0.172
Rur dec 1	0.078	0.034	0.022	0.022	0.021	0.019	0.019	0.019	0.018	0.017
Rur dec 2	0.109	0.048	0.031	0.031	0.029	0.027	0.027	0.026	0.026	0.024
Rur dec 3	0.124	0.055	0.035	0.035	0.033	0.031	0.031	0.030	0.029	0.028
Rur dec 4	0.139	0.062	0.040	0.039	0.037	0.035	0.035	0.033	0.033	0.031
Rur dec 5	0.157	0.069	0.045	0.044	0.042	0.039	0.039	0.038	0.037	0.035
Rur dec 6	0.164	0.073	0.047	0.046	0.044	0.041	0.041	0.039	0.039	0.037
Rur dec 7	0.173	0.076	0.049	0.049	0.046	0.043	0.043	0.041	0.041	0.039
Rur dec 8	0.208	0.092	0.059	0.058	0.055	0.052	0.052	0.050	0.049	0.047
Rur dec 9	0.224	0.099	0.064	0.063	0.060	0.056	0.056	0.054	0.053	0.050
Rur dec 10	0.330	0.146	0.094	0.093	0.088	0.082	0.082	0.079	0.078	0.074
TOTAL	4.229	1.870	1.209	1.191	1.130	1.052	1.051	1.014	1.002	0.949

Source: own results

Table 2.10: Income multipliers for increase in households' incomes Absolute value

	Urb dec 1	Urb dec 2	Urb dec 3	Urb dec 4	Urb dec 5	Urb dec 6	Urb dec 7	Urb dec 8	Urb dec 9	Urb dec 10	Rur dec 1	Rur dec 2	Rur dec 3	Rur dec 4	Rur dec 5	Rur dec 6	Rur dec 7	Rur dec 8	Rur dec 9	Rur dec 10
Urb dec 1	1.012	0.011	0.011	0.011	0.011	0.012	0.012	0.012	0.013	0.014	0.010	0.010	0.010	0.011	0.011	0.011	0.011	0.011	0.011	0.012
Urb dec 2	0.018	1.017	0.018	0.018	0.018	0.018	0.019	0.019	0.020	0.021	0.015	0.016	0.016	0.016	0.017	0.017	0.017	0.017	0.017	0.018
Urb dec 3	0.022	0.022	1.022	0.022	0.022	0.022	0.023	0.024	0.025	0.026	0.019	0.020	0.020	0.020	0.021	0.021	0.021	0.021	0.021	0.022
Urb dec 4	0.025	0.024	0.025	1.025	0.025	0.025	0.026	0.027	0.028	0.029	0.021	0.022	0.023	0.023	0.023	0.023	0.023	0.024	0.024	0.025
Urb dec 5	0.029	0.028	0.029	0.029	1.029	0.029	0.030	0.031	0.032	0.034	0.025	0.026	0.026	0.027	0.027	0.027	0.027	0.028	0.028	0.029
Urb dec 6	0.035	0.033	0.034	0.034	0.034	1.034	0.036	0.036	0.038	0.040	0.029	0.030	0.031	0.031	0.032	0.032	0.032	0.033	0.033	0.034
Urb dec 7	0.041	0.039	0.041	0.040	0.041	0.041	1.043	0.043	0.045	0.048	0.035	0.036	0.037	0.037	0.038	0.038	0.038	0.039	0.039	0.041
Urb dec 8	0.049	0.047	0.049	0.049	0.049	0.049	0.051	1.052	0.054	0.057	0.042	0.043	0.044	0.045	0.045	0.046	0.045	0.047	0.047	0.049
Urb dec 9	0.066	0.064	0.066	0.065	0.065	0.066	0.068	0.070	1.072	0.077	0.056	0.058	0.059	0.060	0.061	0.061	0.061	0.063	0.063	0.066
Urb dec 10	0.129	0.124	0.128	0.127	0.127	0.128	0.133	0.136	0.140	1.149	0.109	0.113	0.115	0.117	0.118	0.119	0.118	0.123	0.123	0.129
Rur dec 1	0.013	0.013	0.013	0.013	0.013	0.013	0.014	0.014	0.015	0.016	1.011	0.012	0.012	0.012	0.012	0.012	0.012	0.013	0.013	0.013
Rur dec 2	0.019	0.018	0.018	0.018	0.018	0.018	0.019	0.020	0.020	0.022	0.016	1.016	0.017	0.017	0.017	0.017	0.017	0.018	0.018	0.018
Rur dec 3	0.021	0.020	0.021	0.021	0.021	0.021	0.022	0.022	0.023	0.024	0.018	0.018	1.019	0.019	0.019	0.019	0.019	0.020	0.020	0.021
Rur dec 4	0.024	0.023	0.023	0.023	0.023	0.024	0.024	0.025	0.026	0.027	0.020	0.021	0.021	1.021	0.022	0.022	0.022	0.022	0.023	0.024
Rur dec 5	0.027	0.026	0.026	0.026	0.026	0.027	0.028	0.028	0.029	0.031	0.023	0.023	0.024	0.024	1.024	0.025	0.024	0.025	0.025	0.026
Rur dec 6	0.028	0.027	0.028	0.027	0.027	0.028	0.029	0.029	0.030	0.032	0.024	0.024	0.025	0.025	0.025	1.026	0.025	0.026	0.026	0.028
Rur dec 7	0.029	0.028	0.029	0.029	0.029	0.029	0.030	0.031	0.032	0.034	0.025	0.026	0.026	0.026	0.027	0.027	1.027	0.028	0.028	0.029
Rur dec 8	0.035	0.034	0.035	0.034	0.035	0.035	0.036	0.037	0.038	0.041	0.030	0.031	0.031	0.032	0.032	0.032	0.032	1.033	0.033	0.035
Rur dec 9	0.038	0.036	0.037	0.037	0.037	0.038	0.039	0.040	0.041	0.044	0.032	0.033	0.034	0.034	0.035	0.035	0.034	0.036	1.036	0.038
Rur dec 10	0.055	0.053	0.055	0.055	0.055	0.055	0.057	0.058	0.061	0.064	0.047	0.049	0.050	0.050	0.051	0.051	0.051	0.053	0.053	1.055
TOTAL	1.714	1.686	1.708	1.703	1.706	1.712	1.740	1.753	1.780	1.830	1.607	1.628	1.640	1.649	1.656	1.661	1.654	1.681	1.682	1.712

Source: own results

2.3 Multiplier decomposition

The structure of interdependencies among production activities, factor earnings and households' incomes can be properly analysed performing a decomposition of multipliers. The matrix **C** of 'fixed price' direct coefficients of equation (4) can be worthily considered as composed by sub-matrices, according to a classification of accounts into three groups: production (commodities and activities), factors (accounts for value added) and income distribution (endogenous institutions). Using matrix notation:

$$\mathbf{C} = \begin{bmatrix} \mathbf{C}_{11} & & \mathbf{C}_{13} \\ \mathbf{C}_{21} & & \\ & \mathbf{C}_{32} & \mathbf{C}_{33} \end{bmatrix} \tag{6}$$

Given the structure of the original SAM only $\mathbf{C}_{ij}$ blocks show values while the other are by definition zero blocks. According to (6) holds:

$$\mathbf{C} = \begin{bmatrix} \mathbf{C}_{11} & & \\ & & \\ & & \mathbf{C}_{33} \end{bmatrix} + \begin{bmatrix} & & \mathbf{C}_{13} \\ \mathbf{C}_{21} & & \\ & \mathbf{C}_{32} & \end{bmatrix} = \mathbf{C}_T + \mathbf{C}_C \tag{7}$$

where $\mathbf{C}_T$ includes the elements of **C** representing transfers among accounts of the same groups (input-output and inter-institutional flows) while $\mathbf{C}_C$ includes coefficients generating the circular flow of income, i.e. linkages among accounts of different categories (respectively: production-to-factors, factors-to-institutions and institutions-to-production). Starting from this partition of the **C** matrix, Pyatt and Round show (1979) that the **M** matrix can be decomposed into three multiplicative components such as:

$$\mathbf{M} = \mathbf{M}_3\mathbf{M}_2\mathbf{M}_1 \tag{8}$$

where $\mathbf{M}_1$ is a matrix of transfer effect multipliers, $\mathbf{M}_2$ is the matrix of the 'open-loop multipliers' explaining "... why and how the stimulation of one part of the system has repercussions for all others" and $\mathbf{M}_3$ is the matrix of closed-loop multipliers representing "...the consequences of change in **x** traveling around the entire system to reinforce the initial injection" (Pyatt and Round, 2006: 238-239)[7].

The decomposition proposed by Pyatt and Round has been performed on the multipliers matrix for Syrian economy using to the additive transformation proposed by Stone (1985):

$$\mathbf{M} = (\mathbf{M}_3 - \mathbf{I})\mathbf{M}_2\mathbf{M}_1 + (\mathbf{M}_2\text{-}\mathbf{I})\mathbf{M}_1 + (\mathbf{M}_1\text{-}\mathbf{I}) + \mathbf{I} \tag{9}.$$

[7] The reader can find details on the decomposition procedure in the cited articles.

According to (9) each multiplier can be decomposed into 4 addends (reading equation from right to left): the initial unitary exogenous stimulus, an 'intra-group' element accounting for multiplier effect generated by linkages among accounts of the same group, an 'inter-group' element accounting for multiplier effects that, travelling around the economic system, affect the group of accounts where the initial injection had been generated, and an 'extra-group' element, accounting for multiplier effects that an exogenous injection on a given group of accounts generates on accounts included in the other groups. In table 2.11 results of decomposition for Syrian multiplier matrix are summarised.

Table 2.11: SAM multipliers decomposition for exogenous shocks on production activities Absolute values

	Direct Effect	Intragroup Effect	Intergroup Effect	Extragroup Effect	Total
Agriculture	**1.000**	**0.184**	**0.156**	**0.000**	**1.340**
Food Industry	0.000	0.066	0.110	0.000	0.177
Other Activities	0.000	0.502	0.667	0.000	1.169
Factors Income	0.000	0.000	0.000	1.371	1.371
Households Urban	0.000	0.000	0.000	0.517	0.517
Households Rural	0.000	0.000	0.000	0.349	0.349
Enterprises	0.000	0.000	0.000	0.563	0.563
Transfers Within Syria	0.000	0.000	0.000	0.010	0.010
Total	1.000	0.753	0.933	2.810	5.496
Agriculture	0.000	0.312	0.155	0.000	0.467
Food Industry	**1.000**	**0.097**	**0.110**	**0.000**	**1.206**
Other Activities	0.000	0.461	0.664	0.000	1.125
Factors Income	0.000	0.000	0.000	1.328	1.328
Households Urban	0.000	0.000	0.000	0.515	0.515
Households Rural	0.000	0.000	0.000	0.348	0.348
Enterprises	0.000	0.000	0.000	0.521	0.521
Transfers Within Syria	0.000	0.000	0.000	0.010	0.010
Total	1.000	0.869	0.929	2.722	5.520
Agriculture	0.000	0.026	0.190	0.000	0.216
Food Industry	0.000	0.035	0.135	0.000	0.170
Other Activities	**1.000**	**0.437**	**0.815**	**0.000**	**2.252**
Factors Income	0.000	0.000	0.000	1.477	1.477
Households Urban	0.000	0.000	0.000	0.632	0.632
Households Rural	0.000	0.000	0.000	0.427	0.427
Enterprises	0.000	0.000	0.000	0.470	0.470
Transfers Within Syria	0.000	0.000	0.000	0.012	0.012
Total	1.000	0.498	1.141	3.019	5.657

Source: own results

The table shows the decomposition of SAM multipliers for exogenous increase in demand for production activities. The sector towards which the initial stimulus is directed is highlighted with bold types. For example, one SP of increase in demand for products of agriculture generates further 0.184 SP of agricultural output, due to the interdependencies within the productive system and 0.156 SP due to the new consumptions induced, via the circular flow, by the increase in distributed incomes. Intra-group and inter-group effects further increase the output in the other productive sectors, for a total of 1.346 SP (total of the second and third rows). The total increase of output is 2.686 SP. This figure can be considered as a "keneysian-type" output multiplier. Finally, the extra-group component increases the outlays of accounts included in the other groups (factors and institutions) for a total of 2.810 SP.

It is worth to stress two features of these results. First, the inter-group linkages are likely to increase in a relevant extent the multiplier effect on production: for example in the case of 'other production activities', induced demand increases by 75% the multiplier effect caused by the inter-industry linkages alone. This result clearly shows the relevance of social accounting approach for modelling, with the extension of input-output tables to accounts for income formation and distribution. Second, the higher effect on incomes of urban households is confirmed again by the decomposition. This second point can be further highlighted looking at the decomposition of SAM multipliers for exogenous increases in the incomes of households (Table 2.12).

Table 2.12: SAM multipliers decomposition for exogenous shocks on households' income Absolute values

	DIRECT	INTRAGROUP	INTERGROUP	EXTRAGROUP	TOTAL
Agriculture	0.000	0.000	0.000	0.314	0.314
Food Industry	0.000	0.000	0.000	0.218	0.218
Other Activities	0.000	0.000	0.000	1.412	1.412
Factors Income	0.000	0.000	0.000	1.099	1.099
Households Urban	**1.000**	**0.007**	**0.449**	**0.000**	**1.456**
Households Rural	0.000	0.004	0.303	0.000	0.308
Enterprises	0.000	0.000	0.390	0.000	0.390
Transfers Within Syria	0.000	0.012	0.008	0.000	0.020
Total	1.000	0.024	1.150	3.043	5.216
Agriculture	0.000	0.000	0.000	0.305	0.305
Food Industry	0.000	0.000	0.000	0.223	0.223
Other Activities	0.000	0.000	0.000	1.198	1.198
Factors Income	0.000	0.000	0.000	0.954	0.954
Households Urban	0.000	0.007	0.392	0.000	0.399
Households Rural	**1.000**	**0.004**	**0.265**	**0.000**	**1.269**
Enterprises	0.000	0.000	0.334	0.000	0.334
Transfers Within Syria	0.000	0.011	0.007	0.000	0.018
Total	1.000	0.022	0.998	2.681	4.700

Source: own results

On the average the total 'self-multiplier' is lower for rural households (1.269 vs. 1.456 for urban). Moreover, one SP of increase in the income of households generates a higher intra and inter-group effect on urban incomes whether or not the initial shock was directed towards an urban or a rural household.

2.4 Multiplier effects and redistribution of incomes

Data presented till now clearly attest that the structure of the economy underlying the matrix of multipliers affects the way the income produced in the economy is distributed among different households. This result could be relevant for properly addressing the problem of poverty reduction in the context of a sectoral policy analysis. A further insight on distributive features of the Syrian economy can be obtained starting again from the analysis of multipliers matrix and following the approach proposed by Roland-Holst and Sancho (1992).

This further analysis focuses on *redistributive* impacts, i.e. changes in the *relative* position of household groups in income distribution generated by a generic exogenous shock. A normalized measure $\tilde{\mathbf{y}}$ of income shares is considered:

$$\tilde{\mathbf{y}} = \mathbf{y}(\mathbf{i}'\mathbf{y})^{-1} \qquad (10)$$

where **y** is the vector of incomes distributed among households groups and **i** is the unit vector. Following Roland Holst and Sancho (1992) the change in $\tilde{\mathbf{y}}$ induced by an exogenous injection $d\mathbf{x}$ is given by

$$d\,\tilde{\mathbf{y}} = [\mathbf{i'y}]^{-1}[\mathbf{I} - \hat{\mathbf{y}}\mathbf{i'}]\square\ \mathbf{M}^{inst}\,d\mathbf{x} = \mathbf{R}d\mathbf{x} \tag{11}$$

where $\mathbf{M}^{inst}$ $(n \times m)$ is the submatrix of **M** corresponding to income multipliers of the n institutions considered for m different exogenous shocks[8] (on sectors, factors and institutions). It can be shown that the expression for a generic element of matrix **R** is the following:

$$R_{ij} = \frac{\mathbf{i}'M_{.j}^{inst}}{\mathbf{i}'\mathbf{y}}\left[\frac{M_{ij}^{inst}}{\mathbf{i}'M_{.j}^{inst}} - \tilde{y}_i\right] \tag{12}$$

where $_{ij}$ denotes a generic element of matrix $\mathbf{M}^{inst}$. The sign of the elements of matrix **R** is affected by the elements in square brackets on the right side of equation (12). The relative position of institution i in income distribution (measured in terms of income share $\tilde{y}_i$) is improved when the share of total multiplier effect of an exogenous inflow towards the group j (first element in bracket) is greater than the initial share in income distribution.

According to (11) the matrix of absolute (non normalized) values of redistributive effects is given by

$$\mathbf{R}^* = \mathbf{I'yR} = [\mathbf{I} - \tilde{\mathbf{y}}\mathbf{i'}]\square\ \mathbf{M}^{inst}$$

Equation (13) yields the value of the redistribution induced by an additional unit of exogenous inflow while total income is held constant at its initial level. $\mathbf{R}^*$ is a sign-preserving transformation of **R** and the elements of each column sum to zero, as in the case of the original matrix, since only redistributive effects are accounted for. The sum of the positive elements of each column shows the overall extent of income redistribution, while the sign of each element indicates the direction of the change.

In table 2.13 results of redistribution analysis are shown for a set of exogenous unitary shocks. The table shows summary figures for groups of accounts. The redistributive effects for 51 production activities represented in the original SAM have been averaged for three aggregated groups of industries (agriculture, food industry and other activities). To obtain these figures the disaggregated redistribution matrices for the activities included in the three macro-industries have been multiplied by the vector of relevant output shares. Redistributive impacts for exogenous increase in households' income have been calculated in an analogous way.

([8]) That is, exogenous injection on a given account.

Table 2.13: Redistribution matrix for selected exogenous impacts Absolute values and % shares

	Agiculture	Food Industry	Other Activities	Factors Income	Hholds Urban	Hholds Rural	Hholds Total	Enterprises	Transfers Syria
Urb dec 1	**-0.001**	**-0.001**	**-0.001**	**-0.001**	0.011	**-0.017**	**0.000**	**-0.001**	0.028
Urb dec 2	0.000	0.000	0.000	0.000	0.017	**-0.025**	0.000	0.000	0.010
Urb dec 3	0.001	0.001	0.001	0.001	0.021	**-0.030**	0.001	0.001	0.020
Urb dec 4	**0.000**	**0.000**	**0.000**	**0.000**	0.024	**-0.035**	**0.000**	**0.000**	0.011
Urb dec 5	0.000	0.000	0.000	0.000	0.028	**-0.040**	0.000	0.000	0.031
Urb dec 6	**-0.001**	**-0.001**	**-0.001**	**-0.001**	0.033	**-0.049**	**0.000**	**-0.001**	0.015
Urb dec 7	**0.000**	**0.000**	**-0.001**	**-0.001**	0.039	**-0.058**	**0.000**	**-0.001**	0.008
Urb dec 8	**0.000**	**0.000**	**0.000**	**0.000**	0.047	**-0.069**	0.000	**0.000**	0.014
Urb dec 9	0.000	0.000	0.000	0.000	0.063	**-0.093**	**0.000**	0.000	**-0.021**
Urb dec 10	0.002	0.002	0.002	0.003	0.122	**-0.179**	0.000	0.003	**-0.091**
Rur dec 1	**0.000**	**0.000**	**0.000**	**0.000**	**-0.018**	0.027	0.000	**0.000**	0.022
Rur dec 2	**0.000**	**0.000**	**0.000**	**0.000**	**-0.026**	0.038	**0.000**	**0.000**	0.013
Rur dec 3	**-0.001**	**-0.001**	**-0.001**	**-0.001**	**-0.031**	0.044	**-0.001**	**-0.001**	0.003
Rur dec 4	0.000	0.000	0.000	0.000	**-0.033**	0.048	0.000	0.000	0.003
Rur dec 5	**0.000**	**0.000**	**0.000**	**0.000**	**-0.037**	0.055	**0.000**	**0.000**	0.006
Rur dec 6	**0.000**	**0.000**	**0.000**	**0.000**	**-0.039**	0.057	**0.000**	**0.000**	0.001
Rur dec 7	**0.000**	**0.000**	**-0.001**	**-0.001**	**-0.042**	0.061	**0.000**	**-0.001**	**-0.007**
Rur dec 8	**0.000**	**0.000**	**0.000**	**0.000**	**-0.050**	0.072	**0.000**	**0.000**	**-0.012**
Rur dec 9	**0.000**	**0.000**	**-0.001**	**-0.001**	**-0.054**	0.078	**-0.001**	**-0.001**	**-0.025**
Rur dec 10	0.001	0.001	0.002	0.002	**-0.076**	0.113	0.001	0.002	**-0.030**
TOTAL*	0.005	0.005	0.006	0.006	0.405	0.595	0.003	0.007	0.186
Urb dec 1	**-14.6%**	**-14.6%**	**-14.6%**	**-14.6%**	2.7%	**-2.8%**	**-7.5%**	**-14.6%**	14.8%
Urb dec 2	3.5%	3.5%	3.5%	3.5%	4.2%	**-4.1%**	7.9%	3.5%	5.6%
Urb dec 3	14.1%	14.1%	14.1%	14.2%	5.3%	**-5.0%**	24.1%	14.0%	10.7%
Urb dec 4	**-3.9%**	**-3.9%**	**-3.9%**	**-3.8%**	5.9%	**-5.9%**	**-0.2%**	**-3.8%**	6.1%
Urb dec 5	1.6%	1.6%	1.6%	1.6%	6.9%	**-6.8%**	13.5%	1.6%	17.0%
Urb dec 6	**-14.3%**	**-14.4%**	**-14.3%**	**-14.4%**	8.1%	**-8.3%**	**-12.4%**	**-14.3%**	8.2%
Urb dec 7	**-10.1%**	**-10.1%**	**-10.2%**	**-10.1%**	9.6%	**-9.8%**	**-8.2%**	**-10.1%**	4.5%
Urb dec 8	**-2.6%**	**-2.7%**	**-2.7%**	**-2.8%**	11.6%	**-11.6%**	1.8%	**-2.7%**	7.3%
Urb dec 9	3.7%	3.8%	3.9%	3.8%	15.5%	**-15.6%**	**-3.0%**	3.4%	**-11.2%**
Urb dec 10	41.5%	41.5%	41.2%	41.3%	30.2%	**-30.1%**	15.6%	41.9%	**-49.1%**
Rur dec 1	**-2.1%**	**-2.0%**	**-2.1%**	**-2.1%**	**-4.5%**	4.6%	5.0%	**-2.1%**	11.6%
Rur dec 2	**-5.2%**	**-5.1%**	**-5.2%**	**-5.2%**	**-6.4%**	6.4%	**-1.6%**	**-5.1%**	7.2%
Rur dec 3	**-16.2%**	**-16.2%**	**-16.1%**	**-16.1%**	**-7.6%**	7.4%	**-17.9%**	**-16.1%**	1.8%
Rur dec 4	4.0%	3.9%	4.0%	4.1%	**-8.0%**	8.1%	5.5%	4.0%	1.5%
Rur dec 5	**-4.3%**	**-4.3%**	**-4.3%**	**-4.3%**	**-9.2%**	9.2%	**-3.6%**	**-4.4%**	3.0%
Rur dec 6	**-4.3%**	**-4.4%**	**-4.4%**	**-4.3%**	**-9.7%**	9.7%	**-4.1%**	**-4.4%**	0.8%
Rur dec 7	**-9.1%**	**-9.1%**	**-9.1%**	**-9.0%**	**-10.3%**	10.2%	**-12.7%**	**-9.2%**	**-3.5%**
Rur dec 8	**-3.5%**	**-3.4%**	**-3.5%**	**-3.5%**	**-12.2%**	12.2%	**-8.8%**	**-3.5%**	**-6.5%**
Rur dec 9	**-9.7%**	**-9.7%**	**-9.7%**	**-9.7%**	**-13.4%**	13.2%	**-20.0%**	**-9.7%**	**-13.3%**
Rur dec 10	31.7%	31.5%	31.6%	31.6%	**-18.6%**	19.1%	26.7%	31.5%	**-16.4%**

*Only for values >0
Source: own results

Reading the table by columns gives the redistributive effects of exogenous increase in demand for products of agriculture, food industry and other production activities; in the income of rural, urban and total Syria households; in the receipts of Syrian enterprises; in the transfers among (endogenous) institutions within Syria. To ease the interpretation of results negative values have

been highlighted in bold. The first part of the table display the absolute redistributive effects. The redistribution process is presented as a zero-sum game, given that equation (13) accounts only for *redistribution* (changes in *relative* position), excluding the income increase due to multiplier effect. As a consequence the absolute redistributive effects sum to zero. The total of positive values accounts for the *magnitude* of the redistribution implied by each exogenous injection. Not surprisingly the higher values are observed for asymmetric increase of household incomes (only urban or only rural), an exogenous shock that could represent an hypothetical redistribution of Government transfers. Also the increase of transfers among households (last column) leads to a relevant redistributive effect, given the asymmetric structure of these flows in the original SAM.

The signs of figures identify *winners and losers* in the redistributive game, while percentage shares help to assess in which extent redistribution affects different household groups. Increases in the output of production activities show similar redistributive profiles. Small absolute values say that, given the current structure of Syrian economy, it is unlikely to change income distribution through an increase of GDP. In any case households in the highest urban deciles obtain the highest share of positive redistributive effects, i.e. improve in the largest extent their relative position in income distribution; moreover the largest share of positive effects is directed towards urban households. As expected only an hypothetical selective support to rural incomes overcomes the urban-rural trade-off in income distribution. Interestingly, also a homogeneous exogenous increase of households' income generates, via the multiplier effect, asymmetric changes in the relative position of household groups. Finally, the transfers among institution show the most desirable distributive profile from an equity point of view, with richest (and for the major part urban) households affected by the highest shares of negative effects.

3.5 Multiplier effects and poverty reduction

The structural description of Syrian economy through the analysis of SAM multipliers matrix can be properly completed addressing the problem of poverty reduction. In a recently published paper Pyatt and Round (2006) propose an extension of 'fixed-price' multiplier analysis suitable for this purpose. An application to Syrian economy of such an approach is presented in this paragraph9.

Given a measure of poverty Q based on the definition of a poverty line we can assume that the measure itself is additively decomposable across groups of households. As a consequence

$$Q = \sum_i Q_i \qquad (14)$$

where i denotes a generic household group. Defining ni the number of people included in a socio-economic group and Pi the proportion of poor in the same group we can write:

$$Qi = niPi \qquad (15)$$

so that the change in the poverty measure for each group is given by

[9] The presentation of the proposed analysis strictly follows the cited paper to which the reader should refer for further details.

dQi = nidPi + Pidni (16)

Excluding for the moment the effect of population growth (the second term in the right side of equation 16) the variation in the proportion Pi of people that are poor will depend both on changes in the average income and on changes in prices able to move poverty lines differentially across socio-economic groups. As changes in prices cannot be addressed in a 'fixed-price' analysis, the results that will be proposed below account only for the effect on poverty of changes in the scale of incomes within each household group. The cited authors show (Pyatt and Round, 2006) that the change in the number of poor in a generic socio economic group is given by

$$\frac{dQ_i}{Q} = (1+|\varepsilon_i|)\frac{dn_i}{n_i} - \frac{|\varepsilon_i|}{y_i}\mathbf{d}'_i\,\mathbf{M_I}\,d\mathbf{x} \quad (17)$$

where

εi is the partial elasticity of Pi with respect to changes in the average income within the i^{th} group (poverty elasticity);

yi is the total income of household in the i-th group;

di is a vector with the i-th element equal to 1 with all the other elements equal to 0;

MI is the sub-matrix (mxn) of income multipliers for households groups with m = number of households groups and n = number of row/columns of multiplier matrix;

x is the vector of exogenous emissions of the original SAM.

The expression in (17) implies that the number of poor in a socioeconomic group decreases only if the increase in the average income stimulated by the growth of the economy (second term of the right side of the equation) is able to counterbalance the negative effect of population growth on poverty.

To perform the analysis the poverty lines estimated for Syria (El Laithy and Abu-Ismail, 2005) have been considered. In the cited work, individual poverty lines according to household composition and regional location were estimated for a representative sample of Syrian households. The estimated poverty lines for different regions and for households with different composition have been already shown in the table 2.10 above.

From those figures expenditure level corresponding to 'personal' poverty lines for various components (elderly, adult male and female and child) and for each region have been calculated. Then, according with household composition, all the households included in the sample from the CBS Survey on Households' Budgets have been reclassified as poor or non poor. Finally the data set has been used to estimate poverty elasticity for each household groups represented in the SAM. In table 2.14 results from such an analysis are presented.

Table 2.14: Poor quotas and poverty elasticity's SL per month

	%poor within groups	% poor of total population	poverty elasticity
Urb dec 1	97.28	28.56	-0.25
Urb dec 2	67.12	19.87	-4.34
Urb dec 3	11.36	3.52	-8.19
Urb dec 4	0.04	0.01	-10.00
Rur dec 1	93.21	28.17	-0.56
Rur dec 2	57.79	17.34	-4.57
Rur dec 3	8.80	2.52	-8.48

Source: own results

Poor are concentrated in the first four deciles and, for the major part in the first two. As expected, poverty elasticity increases moving from the first to higher deciles.

Figures in table 2.14 have been used to carry out the analysis calculating the second term of the right side of the equation (17), i.e. the effect of economic changes on poverty independently from population growth. Table 2.15 displays the results for an exemplificative simulation of an exogenous 1% increase of final demand and government transfers to household groups.

Table 2.15: % change in number of poor people arising from different exogenous shocks

	1% Increase In Exogenous Emissions On		
	Final demand	**Households' income**	**Total**
Urb dec 1	-0.30	-0.06	-0.36
Urb dec 2	-5.23	-0.62	-5.84
Urb dec 3	-9.84	-0.97	-10.82
Urb dec 4	-11.96	-1.60	-13.56
Rur dec 1	-0.68	-0.09	-0.77
Rur dec 2	-5.48	-0.76	-6.24
Rur dec 3	-10.13	-1.63	-11.76
Total Syria	-2.87	-0.37	-3.24

Source: own results

The growth of the economy generated by the increase of final demand seem the most effective way to reduce the level of poverty: 1% of increase in final demand yield to a 2.87% of decrease in the share of poor on total population for Syria10. The effect is differentiated among deciles and seems to be slightly higher for rural poor. One percent of exogenous (i.e. policy driven) increase of households' income shows an impact on poverty fairly lower. A clear indication toward policies able to stimulate economic growth as more effective in addressing the poverty problem seems to emerge.

In the following section the tools for structural analysis presented in this part of the report will be used to assess a set of alternative policy mixes related to agriculture and food sector.

[10] The total effect of poverty for Syria shown in the last row of the table is the average of figures in the row above, weighted for the share on total poverty of each household group: see (Pyatt and Round, 2006).

Chapter 3-The Impact of Selected Policies on Income Distribution: Result form a SAM Model of Syrian Economy

3.1 Definition of policy scenarios

The model of Syrian economy grounded on the SAM estimated by the NAPC staff can be the basis for further quantitative policy analysis. In this section of the report a first, exemplificative simulation will be presented with the twofold aim of proposing some preliminary policy lessons and highlighting the potentiality of SAM approach in policy modeling.

In the previous part the multipliers matrix has been analyzed highlighting the structural relationships between production activities and income distribution. But equation (5) can ground also simulation exercises for the assessment of alternative policies.

The definition of a vector dx of exogenous shocks is the first step necessary to carry out simulations for policy analysis. Changes in three policies connected with agriculture and food sector was considered:

a) subsidies to agricultural and food production activities;

b) price support for strategic crops;

c) support to food consumption through the Price Stabilization Fund.

In the analysis alternative scenarios deriving from the elimination of these policies was defined. In the following headings the reader can find details about the construction of the vector $d\mathbf{x}$ used in the simulation exercise.

a) The suppression of subsidies to production activities[11] can be represented as an increase in production costs for the activities previously supported. For the purpose of policy simulation these 'direct' impacts on production sectors were transformed in a decrease of real incomes of households caused by a general increase in prices of commodities due to the elimination of support. Indeed, the interpretation of the multiplier matrix as a Leontief model in prices allows transforming increases of *output costs* into equivalent increases of *commodity prices* (Roland Holst and Sancho, 1995; Dietzenbacher, 2002). The estimated vector of price increases was then multiplied by the matrix of expenditure shares of households to obtain an 'equivalent' decrease of income in real terms, to be used as an exogenous shock in the policy simulation.

[11] In the analysis have been considered subsidies to agriculture recorded in the SAM. Subsidised activities are: soft wheat, cotton ginning, milling, sugar industry and sugar refinery.

b) A 20% reduction of supported price for cotton, tobacco and sugar beet was simulated. Assuming intermediate costs and wages as fixed in the short-run, the reduction of output prices can be represented by an equivalent decrease of incomes accruing to 'other factors' (capital, self employed labor). A first component of the vector of exogenous shocks was then defined as a reduction of incomes distributed by 'other factors' to households, according to shares accruing to each household group. At the same time a counterbalancing increase of real incomes, due to the general reduction of prices generated via the input-output linkages by the reduction of supported ones, was included. This second component has been calculated following the same approach used for the scenario *a*.

c) A hypothetical elimination of PSF can be represented again as a decrease in real income of households. The balance of PSF revenues and expenditures was derived applying shares from the SAM included in the FEMISE study on fiscal effects of trade liberalization in Syria for 1999 (Lucke, 2001)to the total value of PSF expenditures projected for 2007 (IMF, 2007). The direct effect of the elimination of food subsidies was distributed among households groups as a 'real' income decrease, according to shares in expenditures for subsidized products resulting from the CBS sample of households budgets.

Each of these (extreme) policy options was considered in conjunction with different 'closure rule' with regard to the effects on Government budget, following the approach proposed by Rose et al. (2001). Indeed the simulation, within an input-output framework, of policy options implying changes in the Government budget and with relevant distributive consequences, can be remarkably improved including in the $d\mathbf{x}$ vector also the effect of alternative budget strategies. Generally speaking the removal of the selected policies would result in a decrease of public expenditure. The financial resources set free could be used by Government in alternative ways and with different distributive effects.

Three alternative uses of budget savings have been hypothesized in the analysis:

i) Deficit reduction. The reduction of government deficit increases private investments previously crowded-out (Rose et al, 2001). This alternative was represented as an exogenous injection in final demand for investment goods (according to shares of the original SAM) for the same amount of money previously allocated in the policy.

ii) Homogeneous increase in government expenditure. The same amount of money allocated in the selected policy was transformed in exogenous inflows on SAM accounts according to Government expenditure shares in the original SAM (both for public final consumptions and for transfers to institutions).

iii) Increase of transfers to households. The new resources was allocated to inflate only transfers to households, according to shares in the original SAM.

The combination of the three policy options for agriculture and food and the three 'closure rules' for Government budget results in 9 different scenarios summarized below:

a) Elimination of subsidies to agriculture and food industry

i) with reduction of deficit

ii) with homogeneous increase of public expenditure

iii) with increase of transfers to households

b) Price reduction for strategic crops

i) with reduction of deficit

ii) with homogeneous increase of public expenditure

iii) with increase of transfers to households

c) Elimination of PSF

i) with reduction of deficit

ii) with homogeneous increase of public expenditure

iii) with increase of transfers to households

3.2 Simulation results

Table 3.1 displays the results of simulations carried out according to policy scenarios defined in the previous paragraph. Impacts are presented as percentage variation in the value of output, income and in the level of poverty.

Table 3.1: Impacts of selected policies

	% impact on		
	output	**income**	**poverty**
Elimination of subsidies to agriculture and food industry			
Deficit reduction	3.79	2.45	-0.08
Publ exp increse	2.03	1.43	-0.05
Transf to hhold increase	3.06	7.13	-0.30
Price reduction for strategic crops			
Deficit reduction	0.55	0.47	-0.02
Publ exp increse	0.33	0.34	-0.01
Transf to hhold increase	0.46	1.07	-0.05
Elimination of PSF			
Deficit reduction	0.43	-2.10	0.17
Publ exp increse	-0.40	-2.58	0.18
Transf to hhold increase	0.09	0.10	0.06

Source: own results

Both the elimination of subsidies to production activities and the cut of prices for strategic crops show a potential positive effect on Syrian economy. All alternative uses of resources previously allocated in the considered policies generate a multiplicative effect exceeding the negative direct impacts on household incomes included in the vector of exogenous shocks (decrease of incomes in real terms for changes in prices and for reductions in the income accruing to factors). Above all the elimination of subsidies to production activities seems able to produce the largest increases of output and income. These general impacts result in a small reduction in poverty (holding the population constant). The multiplier effect is larger for 'closure rules' corresponding to deficit reduction and to increase of transfers to households, even if the impact on the structure of the economy caused by the two alternatives would likely be completely different in the long run.

The effects simulated for the third policy scenario (elimination of PSF) are more controversial. The elimination of subsidies to food consumptions generates an *increase* of poverty whatever the 'closure rule' adopted. Only the exclusive destination of financial resources set free to the increase of transfers to households seems able to maintain substantially unchanged the level of poverty. In fact, the direct (monetary) support to households' income generates an expenditure increase large enough to counterbalance, through the multiplier effect in the whole economy, the initial cut of real incomes due to the elimination of food subsidies. And this is true notwithstanding the vector of initial shocks (increase of transfers less real income reduction due to the elimination of food subsidies) resulted in negative figures for about the half of family groups (mainly in the rural area).

Tables 3.2 and 4.3 display more detailed figures of the impact on output and incomes.

Table 3.2: Impacts on output of selected policies % change

	% impact on output in			
	Agriculture	**Food industry**	**Other activities**	**Total**
Elimination of subsidies to agriculture and food industry				
Deficit reduction	1.19	2.16	4.67	3.79
Publ exp increase	0.59	0.99	2.52	2.03
Transf to hhold increase	2.79	4.16	3.00	3.06
Price reduction for strategic crops				
Deficit reduction	0.21	0.37	0.67	0.55
Publ exp increase	0.14	0.22	0.39	0.33
Transf to hhold increase	0.42	0.63	0.45	0.46
Elimination of PSF				
Deficit reduction	-0.80	-1.02	0.92	0.43
Publ exp increase	-1.57	-0.09	-1.87	-0.40
Transf to hhold increase	-0.04	-0.07	0.14	0.09

Source: own results

Table 3.3: Impacts on incomes of selected policies % change

	% impact on incomes of					
	urban	**urban 1st dec**	**urban 10th dec**	**rural**	**rural 1st dec**	**rural 10th dec**
elimination of subsidies to agriculture and food industry						
deficit reduction	2.52	2.29	2.61	2.35	2.28	2.55
publ exp increase	1.55	1.67	1.56	1.26	1.26	1.36
transf to hhold increase	8.35	14.96	6.92	5.32	6.85	3.87
price reduction for strategic crops						
deficit reduction	0.46	0.47	0.45	0.48	0.52	0.45
publ exp increase	0.34	0.39	0.31	0.34	0.38	0.29
transf to hhold increase	1.22	2.11	1.01	0.86	1.11	0.62
elimination of PSF						
deficit reduction	-1.41	-5.24	0.10	-3.12	-6.84	-0.39
publ exp increase	-1.87	-5.54	-0.40	-3.64	-7.32	-0.95
transf to hhold increase	1.34	0.74	2.13	-1.72	-4.68	0.23

Source: own results

The redistributive effects implied by alternative policy scenarios can be assessed looking at figures in table 3.4.

Table 3.4: Redistributive impacts of selected policies % shares and total absolute values

	Elimination Of Subsidies To Agriculture And Food Industry			Price Reduction For Strategic Crops			Elimination Of Psf		
	Deficit Reduction	**Public Exp Increase**	**Transf To Hhold Increase**	**Deficit Reduction**	**Public Exp Increase**	**Transf To Hhold Increase**	**Deficit Reduction**	**Public Exp Increase**	**Transf To Hhold Increase**
Urb dec 1	**-5.16**	5.57	16.97	1.12	9.09	17.08	**-6.69**	**-6.35**	1.37
Urb dec 2	0.55	5.67	12.02	6.67	9.47	12.25	**-7.35**	**-7.20**	**-1.84**
Urb dec 3	4.69	8.76	14.31	9.07	11.19	14.40	**-4.69**	**-4.51**	1.84
Urb dec 4	**-0.11**	7.58	15.65	2.26	8.35	15.53	**-3.98**	**-3.69**	3.36
Urb dec 5	1.72	12.07	23.60	4.73	12.87	23.39	**-2.91**	**-2.48**	8.18
Urb dec 6	**-1.50**	3.17	6.27	**-2.48**	1.94	6.06	1.18	1.37	4.23
Urb dec 7	2.82	3.70	1.52	**-3.78**	**-1.39**	1.02	1.69	1.78	2.37
Urb dec 8	7.64	6.31	1.11	**-6.59**	**-4.37**	0.08	6.94	7.04	7.39
Urb dec 9	15.22	14.65	8.48	**-13.38**	**-7.05**	6.29	18.17	18.50	22.16
Urb dec 10	53.47	32.53	**-4.88**	**-44.21**	**-39.26**	**-11.70**	50.58	50.77	47.78
Rur dec 1	**-5.98**	**-4.46**	**-0.67**	11.55	8.51	0.61	**-11.21**	**-11.33**	**-11.62**
Rur dec 2	**-8.49**	**-5.62**	0.06	12.55	9.89	1.57	**-12.00**	**-12.09**	**-12.00**
Rur dec 3	**-12.43**	**-7.49**	**-0.06**	6.92	6.74	1.30	**-12.80**	**-12.86**	**-12.75**
Rur dec 4	**-6.64**	**-5.71**	**-1.16**	14.58	10.07	0.41	**-12.48**	**-12.64**	**-13.13**
Rur dec 5	**-10.58**	**-9.82**	**-5.50**	9.87	5.63	**-3.94**	**-10.26**	**-10.44**	**-12.78**
Rur dec 6	**-16.28**	**-16.16**	**-10.22**	11.25	4.87	**-8.08**	**-8.42**	**-8.67**	**-12.95**
Rur dec 7	**-13.65**	**-13.55**	**-9.74**	5.74	1.38	**-8.20**	**-4.80**	**-4.99**	**-9.11**
Rur dec 8	**-10.55**	**-15.16**	**-16.85**	3.69	**-3.57**	**-15.54**	**-2.40**	**-2.73**	**-10.12**
Rur dec 9	**-8.62**	**-13.92**	**-18.41**	**-7.77**	**-12.16**	**-18.06**	4.65	4.38	**-3.70**
Rur dec 10	13.89	**-8.11**	**-32.52**	**-21.79**	**-32.20**	**-34.47**	16.78	16.17	1.30
Total abs. value	486	643	7 068	70	95	931	7 195	7 122	7 019

Source: own results

The magnitude of the total absolute value (last row) obviously depends of the different resources allocated in the three policies. The choice of different budget strategies seems able to modify to a remarkable extent the 'redistributive power' of each policy. As expected, the redistribution of financial resources set free by the suppressed policies into direct payments to households sharply increases the total redistributive effect both in conjunction with the elimination of subsidies to production and with price reduction for strategic crops (policy options *a* and *b*).

Also the redistributive profiles are changed by different policy scenarios. The cut of prices for strategic crops shows the most desirable profile on an equity ground, with an improvement in the relative position of poorer households and of rural ones. On the contrary, the first and the

third policy options (*a* and *c*), whatever the 'closure rule' adopted, negatively affect the relative position of rural households in income distribution. Not surprisingly the worst distributive profile is shown by the elimination of PSF. In this case, the redistribution as a transfers to households of financial resources set free by the suppressed policy, although improving the outcomes for urban poor, appears inadequate to counterbalance the losses for rural households. The results clearly show that substitutive payments to households should be carefully designed to overcome these undesirable outcomes.

The evaluation of alternative scenarios can be properly completed by a more detailed analysis of impacts on poverty. For this purpose figures displayed in table 3.5 can be used.

Table 3.5: Impacts on poverty of selected policies % changes

	Elimination Of Subsidies To Agriculture			**Price Reduction For Strategic Crops**			**Elimination Of Psf**		
	Deficit Reduction	**Public Exp Increase**	**Transf To Hhold Increase**	**Deficit Reduction**	**Public Exp Increase**	**Transf To Hhold Increase**	**Deficit Reduction**	**Public Exp Increase**	**Transf To Hhold Increase**
Urb dec 1	-0.01	-0.01	-0.05	0.00	0.00	-0.01	0.02	0.02	0.00
Urb dec 2	-0.15	-0.10	-0.65	-0.03	-0.02	-0.09	0.26	0.29	0.03
Urb dec 3	-0.28	-0.18	-1.19	-0.05	-0.04	-0.17	0.37	0.41	-0.06
Urb dec 4	-0.34	-0.22	-1.46	-0.07	-0.05	-0.21	0.41	0.47	-0.12
Rur dec 1	-0.02	-0.01	-0.05	0.00	0.00	-0.01	0.05	0.06	0.04
Rur dec 2	-0.15	-0.08	-0.46	-0.03	-0.02	-0.07	0.36	0.39	0.22
Rur dec 3	-0.27	-0.15	-0.86	-0.06	-0.04	-0.13	0.65	0.71	0.38
Total	-0.08	-0.05	-0.30	-0.02	-0.01	-0.05	0.17	0.18	0.06

Source: own results

On the whole the effects on poverty are small. The first two policy options reduce poverty whatever the closure rule adopted for Government budget. The elimination of production subsidies with an equivalent increase in transfers to households is the alternative with the best performance in term of poverty reduction (-0,3%). Conversely the elimination of food subsidies results in increase of poverty. The transformation of PSF resources into direct (monetary) payments to households globally counterbalances this negative effect but with variable outcomes for different household groups. Indeed, poverty is reduced only in the urban context and in deciles including households with an expenditure level close to the individual poverty line. For poor in rural areas the poverty trap seems to be in any case working.

Chapter 4- Concluding Remarks and Possible Extensions of the Study

Some final remarks on simulations presented in section 4 are necessary. The exercise has been carried out hypothesizing policy options extreme and unlikely to be directly implemented. The aim of such an approach was to emphasize the fundamental directions towards which the impacts of discussed policies would spread. When considering the results the reader should bear in mind that the proposed model (and generally speaking all SAM based linear models) was designed to show the short-run impacts of the simulated policies. Its main ability is to highlight the structural asymmetries, as well as the unexpected counter-intuitive impacts of policy driven shocks on the economy.

Many policy lessons can be derived from such an analysis:

- the influence of overall strategies for Government budget on the outcomes of *sectoral* policies;
- the fundamental importance of output growth for poverty reduction;
- the existence of structural asymmetries in income distribution.

Of particular interest for the issues of poverty and migration is the relative position of rural households in income distribution. Despite the impossibility to built a SAM with a complete regional disaggregation of accounts into a urban-rural scheme, the proposed analysis highlighted a different position of rural households with respect to policy outcomes. Generally speaking rural households seems less affected by multiplier effects on incomes and more exposed to poverty.

Many extension of the study could be carried out.

First of all further efforts should be directed to improve the estimated SAM. Additional (and more reliable) information could probably be included in the representation of supply chain for agricultural processing and food industry. Moreover, even in the absence of a complete regional disaggregation of accounts, a valuable improvement of the SAM could be realized including separate accounts for non agricultural rural activities considered as 'strategic' for rural development processes. The results of NARA study may probably supply useful information on this point.

On the side of households' accounts an alternative classification criteria could be tried, for example according to the income composition in terms of sector and type of occupation. The CBS dataset on households' budget can support this further elaboration.

Finally some further extensions could be pursued on the methodological side. First of all moving toward non-linear general equilibrium model. Indeed CGE can be considered as a complementary tool for input-output analysis, allowing the researcher to assess the influence of changes in prices on policy outcomes (Rose, 1995). Moreover an analysis of possible dynamic effects of changes in sectoral policies should be considered, above all when the hypothesised policies are likely to affect investments and factors productivity.

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Appendices

Appendix I

Social Accounting Matrix of Syrian economy, 2004

LIST OF ACCOUNTS

COMMODITIES

RAW AGRICULTURAL PRODUCTS

Crops

- Raw cotton
- Hard wheat and durum
- Soft wheat
- Tobacco
- Barley
- Sugar beet
- Checkpeas
- Lentil
- Cumin
- Tomato
- Potato
- Garlic
- Soybean
- Sunflower
- Sesame
- Olives
- Citrus
- Grapes
- Apples
- Apricot
- Pistachio
- Crops by-products
- Other crops

Animal Products

- Beef
- Cow milk
- Lamb
- Sheep milk
- Poultry meat

Poultry eggs

Manure

Other animal products

PROCESSED AGRICULTURAL COMMODITIES

Wheat flour

Cotton lint

Cotton seeds

Olive oil

Raw sugar

Refined sugar

Processed tobacco

Canned vegetables

Packed tomato

Tomato paste

Packed citrus

Agricultural industry by-products

Other agricultural processed products

OTHER COMMODITIES

Other processed food

Beverages

Other industries

Water, electricity, gas

Building and construction

Services

Public administration

ACTIVITIES

AGRICULTURE

Crops

Cotton crop

Hard wheat and durum

Soft wheat

Tobacco

Barley

Sugar beet

Chick peas

Lentil

Cumin

Tomato

Potato

Garlic

Soybean

Sunflower

Sesame

Olive

Citrus (lemon & naval)

Grapes

Apples

Apricots

Pistachio

Other trees

Other crops

Packaging fruit and vegetables

Cotton ginning

Livestock

Cattle

Sheep

Other livestock

FOOD INDUSTRY

Milling durum

Tobacco industry

Canning

Sugar industry

Sugar refinery

Olive oil industry

Tomato paste industry

Other food and beverages

OTHER PRODUCTIVE ACTIVITIES

Other industries

Utilities

Building and constructions

Services

Public administration

FACTORS

Hired labour

Other factors

Taxes less subsidies

INSTITUTIONS

HOUSEHOLDS

Urban HH decile 1

Urban HH decile 2

Urban HH decile 3

Urban HH decile 4

Urban HH decile 5

Urban HH decile 6

Urban HH decile 7

Urban HH decile 8

Urban HH decile 9

Urban HH decile 10

Rural HH decile 1

Rural HH decile 2

Rural HH decile 3

Rural HH decile 4

Rural HH decile 5

Rural HH decile 6

Rural HH decile 7

Rural HH decile 8

Rural HH decile 9

Rural HH decile 10

ENTERPRISES

GOVERNMENT

OTHER TRANSFERS WITHIN COUNTRY

CAPITAL

CHANGES IN INVENTORIES

CAPITAL FORMATION

NET LENDING-BORROWING

REST OF THE WORLD

GOODS AND SERVICES

FINANCIAL FLOWS

Appendix II

Output and Income Multipliers by Commodity and by Production Activity

Output multipliers for exogenous increase in demand for commodity by impacted sector Absolute and % values

	TOTAL	agriculture	food industry	other activities	agriculture	food industry	other activities
Raw cotton	2.827	1.206	0.145	1.476	43%	5%	52%
Hard wheat and durum	2.926	1.308	0.124	1.494	45%	4%	51%
Soft wheat	2.707	1.222	0.120	1.364	45%	4%	50%
Tobacco	2.377	1.246	0.139	0.992	52%	6%	42%
Barley	1.653	0.782	0.066	0.805	47%	4%	49%
Sugar beet	2.575	1.214	0.122	1.240	47%	5%	48%
Checkpeas	2.271	1.116	0.105	1.051	49%	5%	46%
Lentil	2.107	1.230	0.106	0.771	58%	5%	37%
Cumin	2.319	1.219	0.122	0.979	53%	5%	42%
Tomato	2.232	1.187	0.112	0.933	53%	5%	42%
Potato	2.544	1.276	0.133	1.135	50%	5%	45%
Garlic	2.070	1.184	0.105	0.781	57%	5%	38%
Soybean	0.134	0.062	0.006	0.066	46%	5%	49%
Sunflower	1.887	0.843	0.089	0.955	45%	5%	51%
Sesame	0.477	0.221	0.023	0.232	46%	5%	49%
Olives	2.046	1.190	0.112	0.744	58%	5%	36%
Citrus	1.949	1.145	0.105	0.700	59%	5%	36%
grapes	2.052	1.190	0.108	0.754	58%	5%	37%
Apples	2.014	1.173	0.111	0.730	58%	6%	36%
Apricot	1.992	1.158	0.106	0.728	58%	5%	37%
Pistachio	2.393	1.177	0.124	1.092	49%	5%	46%
crops byproducts	2.735	1.259	0.122	1.354	46%	4%	49%
Other crops	2.540	1.178	0.118	1.245	46%	5%	49%
beef	2.554	1.348	0.166	1.039	53%	6%	41%
cow milk	2.554	1.348	0.166	1.039	53%	6%	41%
lamb	2.777	1.508	0.208	1.061	54%	8%	38%
sheep milk	2.794	1.517	0.210	1.067	54%	8%	38%
Poultry meat	3.060	1.239	0.565	1.257	40%	18%	41%
poultry eggs	3.060	1.239	0.565	1.257	40%	18%	41%
manure	2.560	1.350	0.168	1.041	53%	7%	41%
Other animal products	3.044	1.244	0.552	1.248	41%	18%	41%
Hard +soft wheat flour	5.514	1.790	1.250	2.474	32%	23%	45%
Cotton lint	3.527	1.926	0.161	1.440	55%	5%	41%
Cotton seeds	3.527	1.926	0.161	1.440	55%	5%	41%
Olive oil	2.200	0.349	1.107	0.744	16%	50%	34%
raw Sugar	2.286	0.366	1.035	0.886	16%	45%	39%
Refined sugar	2.489	0.351	1.132	1.006	14%	45%	40%
Processed tobacco	1.884	0.135	0.954	0.795	7%	51%	42%
Canned vegetables	2.229	0.368	1.107	0.754	17%	50%	34%
Packed tomato	2.633	1.599	0.117	0.917	61%	4%	35%
Tomato paste	2.458	0.399	1.114	0.944	16%	45%	38%
Packed citrus	2.633	1.599	0.117	0.917	61%	4%	35%
Ag. Industry byproducts	5.152	1.314	1.710	2.128	26%	33%	41%
Other ag. Processed prod.	2.371	0.310	1.121	0.939	13%	47%	40%
Other processed food	1.148	0.148	0.527	0.473	13%	46%	41%
Beverages	1.750	0.229	0.827	0.694	13%	47%	40%
Other industries	1.732	0.161	0.132	1.439	9%	8%	83%
water, electricity, gas	3.115	0.205	0.159	2.751	7%	5%	88%
Building and construction	2.770	0.172	0.134	2.464	6%	5%	89%
Services	2.336	0.178	0.133	2.025	8%	6%	87%
Public administration	2.461	0.210	0.157	2.094	9%	6%	85%

Output multipliers for exogenous increases in final demand of productive sectors by impacted sector
Absolute and % values

	TOTAL	agriculture	food industry	other activities	agriculture	food industry	other activities
Cotton crop	2.827	1.206	0.145	1.476	43%	5%	52%
Hard wheat and durum	2.927	1.309	0.124	1.495	45%	4%	51%
Soft wheat	2.743	1.239	0.122	1.382	45%	4%	50%
Tobacco	2.377	1.246	0.139	0.992	52%	6%	42%
Barley	2.757	1.305	0.110	1.343	47%	4%	49%
Sugar beet	2.575	1.214	0.122	1.240	47%	5%	48%
Checkpeas	2.578	1.266	0.119	1.193	49%	5%	46%
Lentil	2.112	1.233	0.106	0.773	58%	5%	37%
Cumin	2.324	1.221	0.122	0.981	53%	5%	42%
tomato	2.255	1.199	0.113	0.942	53%	5%	42%
Potato	2.593	1.300	0.136	1.157	50%	5%	45%
Garlic	2.128	1.217	0.108	0.803	57%	5%	38%
Soybean	2.540	1.170	0.121	1.249	46%	5%	49%
Sunflower	2.724	1.217	0.129	1.379	45%	5%	51%
Sesame	2.523	1.170	0.123	1.229	46%	5%	49%
olive	2.046	1.190	0.112	0.744	58%	5%	36%
Citrus(Lemon&Naval)	1.984	1.165	0.107	0.712	59%	5%	36%
graps	2.056	1.192	0.109	0.755	58%	5%	37%
Apples	2.016	1.174	0.111	0.731	58%	6%	36%
Apricots	1.994	1.159	0.106	0.728	58%	5%	37%
Pistachio	2.393	1.177	0.124	1.092	49%	5%	46%
other trees	2.162	1.184	0.111	0.867	55%	5%	40%
Other crops	2.729	1.176	0.121	1.432	43%	4%	52%
Packaging fruit and veg	2.633	1.599	0.117	0.917	61%	4%	35%
Cotton Ginning	3.527	1.926	0.161	1.440	55%	5%	41%
Cattle	2.554	1.348	0.166	1.039	53%	6%	41%
Sheep	2.794	1.517	0.210	1.067	54%	8%	38%
other livestock	3.060	1.239	0.565	1.257	40%	18%	41%
Milling durum	5.529	1.795	1.253	2.481	32%	23%	45%
tobacco industry	2.160	0.155	1.094	0.911	7%	51%	42%
Canning	2.229	0.368	1.107	0.754	17%	50%	34%
Sugar industry	2.463	0.394	1.115	0.954	16%	45%	39%
sugar refinery	13.064	1.844	5.939	5.281	14%	45%	40%
Olive oil industry	2.201	0.349	1.108	0.744	16%	50%	34%
Tomato paste industry	2.458	0.399	1.114	0.944	16%	45%	38%
Other food and beverages	2.372	0.310	1.121	0.941	13%	47%	40%
other industries	2.895	0.269	0.221	2.405	9%	8%	83%
utilities	3.117	0.205	0.159	2.752	7%	5%	88%
building and constructions	2.770	0.172	0.134	2.464	6%	5%	89%
services	2.321	0.175	0.130	2.015	8%	6%	87%
public administration	2.461	0.210	0.157	2.094	9%	6%	85%

Income multipliers for exogenous increases in final demand for commodities by impacted institutional sector

Absolute and % values

		Urban			Rural		
	TOTAL	total	1st decile	10th decile	total	1st decile	10th decile
Raw cotton	1.052	0.628	0.017	0.191	0.424	0.019	0.082
Hard wheat and durum	0.879	0.525	0.014	0.160	0.354	0.016	0.069
Soft wheat	0.853	0.509	0.013	0.155	0.344	0.016	0.067
Tobacco	1.051	0.627	0.017	0.191	0.424	0.019	0.082
Barley	0.475	0.284	0.008	0.086	0.192	0.009	0.037
Sugar beet	0.886	0.529	0.014	0.161	0.357	0.016	0.069
Checkpeas	0.770	0.459	0.012	0.140	0.310	0.014	0.060
Lentil	0.813	0.485	0.013	0.148	0.328	0.015	0.064
Cumin	0.925	0.552	0.015	0.168	0.373	0.017	0.072
Tomato	0.823	0.491	0.013	0.149	0.332	0.015	0.064
Potato	0.983	0.587	0.016	0.179	0.396	0.018	0.077
Garlic	0.804	0.480	0.013	0.146	0.324	0.015	0.063
Soybean	0.047	0.028	0.001	0.008	0.019	0.001	0.004
Sunflower	0.650	0.388	0.010	0.118	0.262	0.012	0.051
Sesame	0.171	0.102	0.003	0.031	0.069	0.003	0.013
Olives	0.858	0.512	0.014	0.156	0.346	0.016	0.067
Citrus	0.786	0.469	0.012	0.143	0.317	0.014	0.061
grapes	0.834	0.497	0.013	0.151	0.336	0.015	0.065
Apples	0.841	0.502	0.013	0.153	0.339	0.015	0.066
Apricot	0.805	0.480	0.013	0.146	0.325	0.015	0.063
Pistachio	0.851	0.508	0.013	0.155	0.343	0.016	0.067
crops byproducts	0.879	0.525	0.014	0.160	0.354	0.016	0.069
Other crops	0.867	0.517	0.014	0.158	0.350	0.016	0.068
beef	0.756	0.451	0.012	0.137	0.305	0.014	0.059
cow milk	0.756	0.451	0.012	0.137	0.305	0.014	0.059
lamb	0.783	0.467	0.012	0.142	0.316	0.014	0.061
sheep milk	0.787	0.470	0.012	0.143	0.317	0.014	0.062
Poultry meat	0.802	0.479	0.013	0.146	0.324	0.015	0.063
poultry eggs	0.802	0.479	0.013	0.146	0.324	0.015	0.063
manure	0.757	0.452	0.012	0.138	0.305	0.014	0.059
Other animal products	0.800	0.477	0.013	0.145	0.323	0.015	0.063
Hard +soft wheat flour	1.866	1.113	0.030	0.339	0.752	0.034	0.146
Cotton lint	1.191	0.711	0.019	0.216	0.480	0.022	0.093
Cotton seeds	1.191	0.711	0.019	0.216	0.480	0.022	0.093
Olive oil	0.825	0.492	0.013	0.150	0.333	0.015	0.064
raw Sugar	0.767	0.458	0.012	0.139	0.309	0.014	0.060
Refined sugar	0.806	0.481	0.013	0.146	0.325	0.015	0.063
Processed tobacco	0.535	0.319	0.008	0.097	0.216	0.010	0.042
Canned vegetables	0.808	0.482	0.013	0.147	0.326	0.015	0.063
Packed tomato	0.868	0.518	0.014	0.158	0.350	0.016	0.068
Tomato paste	0.801	0.478	0.013	0.146	0.323	0.015	0.063
Packed citrus	0.868	0.518	0.014	0.158	0.350	0.016	0.068
Ag. Industry byproducts	1.724	1.029	0.027	0.313	0.695	0.032	0.135
Other ag. Processed prod.	0.666	0.397	0.011	0.121	0.268	0.012	0.052
Other processed food	0.326	0.195	0.005	0.059	0.132	0.006	0.026
Beverages	0.490	0.293	0.008	0.089	0.198	0.009	0.038
Other industries	0.723	0.432	0.011	0.131	0.292	0.013	0.057
water, electricity, gas	1.014	0.605	0.016	0.184	0.409	0.019	0.079
Building and construction	0.849	0.507	0.013	0.154	0.342	0.016	0.066
Services	0.956	0.570	0.015	0.174	0.385	0.018	0.075
Public administration	1.130	0.675	0.018	0.205	0.456	0.021	0.088

Income multipliers for exogenous increases in final demand for production activities by impacted institutional sector
Absolute and % values

		Urban			Rural		
	TOTAL	**total**	**1st decile**	**10th decile**	**total**	**1st decile**	**10th decile**
Cotton crop	1.052	0.628	0.017	0.191	0.424	0.019	0.082
Hard wheat and durum	0.879	0.525	0.014	0.160	0.355	0.016	0.069
Soft wheat	0.864	0.516	0.014	0.157	0.348	0.016	0.068
Tobacco	1.051	0.627	0.017	0.191	0.424	0.019	0.082
Barley	0.793	0.473	0.013	0.144	0.320	0.015	0.062
Sugar beet	0.886	0.529	0.014	0.161	0.357	0.016	0.069
Checkpeas	0.873	0.521	0.014	0.159	0.352	0.016	0.068
Lentil	0.815	0.486	0.013	0.148	0.329	0.015	0.064
Cumin	0.928	0.554	0.015	0.169	0.374	0.017	0.072
tomato	0.831	0.496	0.013	0.151	0.335	0.015	0.065
Potato	1.002	0.598	0.016	0.182	0.404	0.018	0.078
Garlic	0.827	0.493	0.013	0.150	0.333	0.015	0.065
Soybean	0.882	0.526	0.014	0.160	0.356	0.016	0.069
Sunflower	0.939	0.560	0.015	0.171	0.379	0.017	0.073
Sesame	0.903	0.539	0.014	0.164	0.364	0.017	0.071
olive	0.858	0.512	0.014	0.156	0.346	0.016	0.067
Citrus(Lemon&Naval)	0.800	0.477	0.013	0.145	0.322	0.015	0.062
graps	0.835	0.498	0.013	0.152	0.337	0.015	0.065
Apples	0.842	0.502	0.013	0.153	0.339	0.015	0.066
Apricots	0.806	0.481	0.013	0.146	0.325	0.015	0.063
Pistachio	0.851	0.508	0.013	0.155	0.343	0.016	0.067
other trees	0.815	0.486	0.013	0.148	0.328	0.015	0.064
Other crops	0.894	0.533	0.014	0.162	0.360	0.016	0.070
Packaging fruit and veg	0.868	0.518	0.014	0.158	0.350	0.016	0.068
Cotton Ginning	1.191	0.711	0.019	0.216	0.480	0.022	0.093
Cattle	0.756	0.451	0.012	0.137	0.305	0.014	0.059
Sheep	0.787	0.470	0.012	0.143	0.317	0.014	0.062
other livestock	0.802	0.479	0.013	0.146	0.324	0.015	0.063
Milling durum	1.870	1.116	0.030	0.340	0.754	0.034	0.146
tobacco industry	0.614	0.366	0.010	0.112	0.247	0.011	0.048
Canning	0.808	0.482	0.013	0.147	0.326	0.015	0.063
Sugar industry	0.826	0.493	0.013	0.150	0.333	0.015	0.065
sugar refinery	4.229	2.523	0.067	0.768	1.705	0.078	0.330
Olive oil industry	0.825	0.492	0.013	0.150	0.333	0.015	0.064
Tomato paste industry	0.801	0.478	0.013	0.146	0.323	0.015	0.063
Other food and beverages	0.665	0.397	0.011	0.121	0.268	0.012	0.052
other industries	1.209	0.722	0.019	0.220	0.488	0.022	0.094
utilities	1.014	0.605	0.016	0.184	0.409	0.019	0.079
building and constructions	0.849	0.507	0.013	0.154	0.342	0.016	0.066
services	0.949	0.566	0.015	0.172	0.383	0.017	0.074
public administration	1.130	0.675	0.018	0.205	0.456	0.021	0.088