A Social Accounting Matrix for Nepal for 2007: Methodology and Results

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Introduction and Background

A Social Accounting Matrix (SAM) is a generalization of the production relations and extends this information beyond the structure of production to include: (a) the distribution of value added to institutions generated by production activities; (b) formation of household and institutional income; (c) the pattern of consumption, savings and investment; (d) government revenue collection and associated expenditures and transactions; and (e) the role of the foreign sector in the formation of additional incomes for household and institutions. In particular, the accounting matrix of a SAM identifies the economic relations through six accounts: (1) total domestic supply of commodities; (2) activity accounts for producing sectors; (3) main factors of production (e.g. labour and capital); (4) current account transaction between main institutional agents such as households and unincorporated capital, corporate enterprises, government and the rest of the world and the use of income by the representative households; (5) the rest of the world; and (6) one consolidated capital account (domestic and rest of the world) to capture the flows of savings and investment by institutions and the rest of the world respectively.

Social accounting matrices can serve two basic purposes: (i) as a comprehensive and consistent data system for descriptive analysis of the structure of the economy and (ii) as a basis for macroeconomic modeling. As a data framework, a SAM is a snapshot of a country at a point in time (Pyatt and Thorbecke, 1976). To provide as comprehensive a picture of the structure of the economy as possible, a particular novelty of the SAM approach has been to bring together macroeconomic data (such as national accounts) and microeconomic data (such as household surveys), within a consistent framework. The second purpose of a SAM is the provision of a macroeconomic data framework for policy modeling. The framework of a SAM can often help in establishing the sequence of interactions between agents and accounts which are being modelled. A SAM provides an excellent framework for exploring both macroeconomic and multi-sectoral issues and is useful starting point for more complex models (Robinson, 1989).

The prime of objective of this study is to produce a SAM for Nepal for 2007 using existing 2007 SAM prepared for Nepal as part of the GTAP data base, supplemented with available official information on production, consumption and macro-economic aggregates and the Household Income and Expenditure. In addition to capturing the structure of Nepalese economy for 2007, the SAM 2007 is served as a consistent data base for the GTAP modelling system to assess the welfare implication of global trade shocks on Nepal. The key features of the new SAM 2007 are discussed below.

The paper is organized in five sections. Section 2 provides a detailed description of the SAM structure and the methodology adopted to update/construct the SAM 2007. Major adjustments that were invoked to reconcile conflicting data sources are also highlighted in this section. Derivation of the factor account estimates is presented in section 3. Estimates of data sets for institutions, including household, are discussed in section 4. An analysis of SAM results is presented the final section.

Nepal SAM 2007

The 2007 SAM identifies the economic relations through *four types of accounts*: (i) production activity and commodity accounts for 114 sectors; (ii) 3 factors of production involving labour, capital and land; (iii) current account transaction between 3 main institutional agents; household-members and unincorporated capital, government and the rest of the world; and (iv) a consolidated capital account to capture the flows of savings and investment. The disaggregation of activities, commodities, factors and institutions in SAM 2007 is given in Table 1.

Table 1: Disaggregation and Description of Nepal SAM Accounts

Set	Description of Elements
Activities (57)	
Agriculture (14)	Paddy, Wheat, Other Grain, Vegetables & Fruits, Oilseed, Sugar-cane, Jute and Other Plant Fibers, Other Crops, Cattle, Other Animal Product, Raw Milk, Wool, Forestry, and Fishing
Mining (4)	Coal, Oil, Gas and Other Mining
Manufacturing (24)	Meat, Meat Product, Vegetable Oil, Dairy Product, Other Grain Mill, Sugar, Other Food Product, Beverage-Tobacco, Textile, Wearing Apparel, Leather Product, Lumber, Paper & Paper Product, Petroleum, Chemical and Rubber, Mineral Product, Iron & Steel, Non-Ferrous Metal, Fabricated Metal, Motor-Vehicle, Other Transport Equipment, Electronic Equipment, Other Mech. & Equipment, Other Manufacturing.
Utility (3)	Electricity, Gas and Water
Services (12)	Construct, Trade, Other Transport, Water Transport, Air Transport, Communication, Financial Intermediaries, Insurance, Other Business Services, Recreation and Other Services, Government Services and Dwelling
Commodities (57)	
Agriculture (14)	Paddy, Wheat, Other Grain, Vegetables & Fruits, Oilseed, Sugar-cane, Jute and Other Plant Fibers, Other Crops, Cattle, Other Animal Product, Raw Milk, Wool, Forestry, and Fishing
Mining (4)	Coal, Oil, Gas and Other Mining
Manufacturing (24)	Meat, Meat Product, Vegetable Oil, Dairy Product, Other Grain Mill, Sugar, Other Food Product, Beverage-Tobacco, Textile, Wearing Apparel, Leather Product, Lumber, Paper & Paper Product, Petroleum, Chemical and Rubber, Mineral Product, Iron & Steel, Non-Ferrous Metal, Fabricated Metal, Motor-Vehicle, Other Transport Equipment, Electronic Equipment, Other Mech. & Equipment, Other Manufacturing.
Utility (3)	Electricity, Gas and Water
Services (12)	Construct, Trade, Other Transport, Water Transport, Air Transport, Communication, Financial Intermediaries, Insurance, Other Business Services, Recreation and Other Services, Government Services and Dwelling
Factors of Production (3)	
Labour (1)	Labour
Capital (2)	Capital and Land
Current Institutions (11)	
Households (7)	Rural: landless, Agricultural marginal farmer, Agricultural small farmer, Agricultural large farmer Urban: Households with low educated heads, Households with medium educated heads and households with high educated heads
Others (2)	Government, and Rest of the World
Capital Institutions (1)	

The year 2007 was chosen as the base year to construct the Nepal SAM as most of data of the key components of activity-commodity and institutional accounts are available for the year 2007. Moreover, the newly updated/constructed input-output table prepared for GTAP is also available for 2007 reflecting the consistent activity-commodity accounts for 2007. The consistent activity-commodity accounts then formed the base on which the factors and institutional accounts were disaggregated to derive the Nepal SAM 2007.

The construction of 2007 SAM is based on several data sets drawn from diverse sources. They are listed below.

1. The Input-output table 2007 for Nepal; Prepared as part of the GTAP modelling system.
2. The Input-output table 2000 for Nepal prepared by Institute for Policy Research and Development (IPRAD)[2].
3. Central Bureau of Statistics (2003), Nepal Living Standard Survey II, 2002/03 conducted by Central Bureau of Statistics.
4. Ministry of Finance (2008), Economic Survey of Nepal.
5. Revenue Data from Inland Revenue Board.
6. Statistical Yearbook prepared by Central Bureau of Statistics.
7. Nepal Labour Force Survey 2008, Central Bureau of Statistics.

The construction procedure proceeded in two steps. In the <u>first step</u>, a 'proto-SAM' was constructed using the data collected from diverse sources. Since the data came from different sources as well as for different years, in line with the expectation, the estimated 'proto-SAM' was unbalanced. In the <u>second step</u>, the SAM was balanced by adjusting the activity and commodity (i.e. private consumption, intermediate demand vectors) accounts as explained below.

Constructing a SAM is not only an exercise in putting together a complete data set, but also an estimation process on the basis of insufficient and partly inconsistent data. In this current exercise, the first step to generate a consistent and balanced SAM is to build a macroeconomic SAM (i.e. the Macro SAM). The main objective of the Macro SAM is to summarize and to show the circular flow in the economy in general and inter-dependence between commodity, activity, consumption, and flow-of-funds without sectoral or institutional detail. Thus, in the second step a preliminary disaggregated SAM (i.e. also referred to as the Micro SAM) is constructed using available disaggregated information drawn from various data producing agencies. Subject to data availability, the disaggregated SAM segregates most of the Macro SAM accounts to the desired sectoral and institutional breakdowns. While ensuring balance between the receipts and outlays for all accounts, the disaggregated or micro SAM must reproduce the control totals of the macro SAM. The correspondence between accounts of the aggregated micro SAM and macro SAM thus ensure its desired consistency with the national account data.

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[2] Under this initiative a GTAP Compatible Input Output (I/O) Table and Social Accounting Matrix (SAM) was prepared. More specifically, a 57*57 Input/Output Table and an Aggregative SAM Prepared were prepared for Nepal.

Overview of the Nepal SAM for 2007

The Nepal macro SAM is "anchored" primarily to the 'Input-output table 2007', 'National Accounts' data and other macro aggregates. The complete Macro SAM for 2007 containing the national accounts and other data including transfers, taxes and foreign transactions is shown in Table 2. Savings of households have been adjusted to fulfil the macroeconomic balance of the SAM. Government savings are computed as the difference between total government receipts and total government spending.

Table 2: Nepal Macro SAM 2007

(Billion Rupees)

SAM Accounts	SNA Accounts	Code		ACT	COM	Factors					Domestic Institutions		Capital	RoW	Total Income
				1	2	3					4		5	6	
						Labour	Capital	Land	Indirect Tax	Import duty	Household	Government	Investment		
Activity A/C	Activities	1			1192.4										1192.4
Production A/C	Commodities	2		406							647.4	46.2	196.4	93.6	1389.3
Distribution of Primary Income	Income Generation by Institutions	3	Compensation To Employees	287											287.0
			Operating Surplus	317											317.0
			Land Return	72											72.3
			Indirect Tax	18.1	52.3										70.4
			Import Duty	3.1	10.6										13.7
Use of Income	Primary Income of Institutions	4	Household			287	317	72.3				8.0		92.6	776.1
			Government						70.4	13.7	16.0				100.1
Consolidated Capital AC	Capital Account	5	Capital								112.8				196.4
Rest of World	Rest of the World-Imports (current)	6	Imports	90.0	134.0							45.9		37.8	224.0
Total Expenditure A/C				1192.4	1389.3	287.0	317.0	72.3	70.4	13.7	776.1	100.1	196.4	224.0	

Note: Based on the SNA-SAM Relationship

Production Accounts

Production accounts composed of activities and commodities. Activity and commodity accounts of a SAM deal with the supply and demand components of the economy. Derivation of activity-commodity accounts thus imply generation of each element of supply and demand by the representative activity-commodity classification. In the current exercise it envisages derivation of supply and demand components by 57 representative activities and commodities.

<u>Value Added</u>: According to the 'National Accounts' of Nepal, estimates of value added are provided for 15 broad sectors (this is referred to as 'NA 15 sector'). Value added data by 15 sectors are available for 2007 which is the base for the value added update. These value added information are used to derive the value added by 57 SAM activities. The generation of value added by 57 SAM activities from the NA 15 sector information is discussed below.

In the **first** step a mapping is defined to establish a correspondence between the NA 15 sectors and SAM 57 activities. Classification of value added sectors according to these groups is shown in the Table 3.

Table 3: Classification of SAM Value added Sectors by Groups

NA 15 Sector	SAM 57 Activity
Agriculture-Forestry and Fishing (2)	Paddy, Wheat, Other Grain, Vegetables & Fruits, Oilseed, Sugar-cane, Jute and Other Plant Fibers, Other Crops, Cattle, Other Animal Product, Raw Milk, Wool, Forestry, and Fishing **(1..14)**
Mining and Quarrying (1)	Coal, Oil, Gas and Other Mining **(15..18)**
Manufacturing (1)	Meat, Meat Product, Vegetable Oil, Dairy Product, Other Grain Mill, Sugar, Other Food Product, Beverage-Tobacco, Textile, Wearing Apparel, Leather Product, Lumber, Paper & Paper Product, Petroleum, Chemical and Rubber, Mineral Product, Iron & Steel, Non-Ferrous Metal, Fabricated Metal, Motor-Vehicle, Other Transport Equipment, Electronic Equipment, Other Mech. & Equipment, Other Manufacturing **(19..42)**
Electricity, Gas and Water Supply (1)	Electricity, Gas, Water supply **(43..45)**
Construction (1)	Construction **(46)**
Wholesale and Retail Trade (1)	Trade **(47)**
Transport, Storage and Communication (1)	Air Transport, Water Transport, Land Transport, Other Transport, Communication **(48..51)**
Financial Intermediation (1)	Financial Intermediation and Insurance **(52..53)**
Real estate, renting and business activities (1)	Other Business Services **(54)**
Hotels and restaurants; Public administration and defence; Education, Health and Social Work; Other community, social and personal service activities (5)	Recreation and Other Services, Government Services, Dwelling **(55..57)**
Set Definition: j=1..15	K= 1...57; a=1...14; b=15..18; c=19..42; d=43..45; e=46; f=47; g=48..51; m=52..53; x=54; z=55..57;

In the **second** step, value added for SAM 57 activities is derived using the value added information of the NA 15 sectors. For example, value added for agriculture sub-sector for 2007 ($_{NA}VA_j^{07}$) by National Account classification is mapped to 14 SAM agriculture activities to generate value added for 2007 for these 14 sectors (VA_a^{07}). This procedure is applied to derived 2007 value added for the remaining 43 SAM activities using the value added of the remaining 14 NA sectors. Adding of the

derived value added using the above procedures generates the value added for the 57 SAM activities for 2007.

$$VA_K^{07} = VA_a^{07} + VA_b^{07} + VA_c^{07} + VA_d^{07} + VA_e^{07} + VA_f^{07} + VA_g^{07} + VA_m^{07} + VA_x^{07} + VA_z^{07} \qquad (1)$$

<u>Outputs or Domestic Supply:</u> As mentioned above, along with value added data the NA also provided gross output data by the activities included in the above 15 broad NA sector classification. Similar mapping schemes were used to generate gross output vectors for the 57 activities (Q_K^{07}) for 2007.

<u>Indirect Tax:</u> Information of indirect tax mobilized from the domestic bases for 2007 ($_{IRB}IT_W^{07}$) by selected commodity (i.e. referred to as w) is obtained from the 'Inland Revenue Broad (IRB)'. The sector classification used by IRB is different from the 57 SAM activity classifications. Hence a mapping scheme relating the IRB classification to SAM activity classification is defined. Thus using both the NTA information and mapping scheme the indirect tax vector for 2007 (IT_K^{07}) was derived.

<u>Intermediate Input Use:</u> Inter-industry transaction matrix for 2007 is not available from which input use for the SAM 57 activities can be obtained. Value added vector derived for the 57 activities are deducted from the gross output vector for the 57 activities to derive the intermediate input use by 57 SAM activities for 2007.

$$IU_K^{07} = Q_K^{07} - IT_K^{07} - VA_K^{07} \qquad (2)$$

<u>Imports of Goods and Services:</u> Information of imports of goods and services for 2007 year ($_{UN\_COMTRADE}M_m^{07}$) is obtained from Import of Commodities by 6-digit level, collated by Detail Export-Import figure (HS 6 Digit) produced by the UN-COMTRADE (*http://comtrade.un.org*) database. The sector classification (i.e. denoted as m) used by UN-COMTRADE varies from the 57 SAM activity classifications (i.e. k). Hence a mapping scheme linking the UN-COMTRADE classification to SAM classification is used to derive imports by 57 SAM sectors for 2007.

$$M_K^{07} = {}_{UN\_COMTRADE}M_m^{07} \qquad (3)$$

Revenue from import bases for 2007 fiscal year ($_{IRB}dM_W^{07}$) is obtained from the Inland Revenue Board (IRB). The goods sector classification used by IRB is different from the 57 SAM import classifications. Hence a mapping scheme relating the IRB classification to SAM commodity classification is used to derive import duty by 57 commodity-imports for 2007.

$$dM_K^{07} = {}_{NBR}dM_W^{07} \qquad (4)$$

<u>Total Supply:</u> Main components of the supply side of an economy are domestically produced goods and services or outputs (Q_K^{07}) and imports of goods and services (M_K^{07}). Total supply of goods and services (SS_K^{07}) for 2007 by 57 SAM activities are generated by adding outputs to imports. Total supply is given as:

$$SS_K^{07} = Q_K^{07} + M_K^{07} + dM_K^{07} \qquad (5)$$

The estimates of supply and its components by 57 commodities are reported in table below.

Table 4: Supply and its components

<div align="right">(Million Rupees)</div>

Commodity	TS07	Gross Output	Value Added	Input	Imports*	Imports Cif	Duty
Paddy Cultivation	47172	45704	38569	7135	1468	1402	66
Wheat Cultivation	14201	13644	11274	2370	557	554	3
Other Grain Cultivation	22250	21551	18912	2640	699	672	27
Vegetable and Fruit Cultivation	60720	43043	38210	4834	17677	16630	1047
Oilseed Cultivation	5545	5004	4390	613	541	507	34
Sugarcane Cultivation	3603	3323	2832	492	280	279	1
Jute and Other Plant Fibres Cultivation	3038	3029	2645	384	9	8	1
Other Crop Cultivation	52476	47529	41517	6012	4947	4623	324
Cattle Rearing	13283	12135	7464	4672	1148	1079	69
Other Animal Product	21724	20777	14014	6763	947	881	67
Raw Milk	52167	49694	29703	19991	2474	2458	16
Wool	1032	262	203	59	771	748	23
Forestry	9598	9457	8421	1036	141	133	8
Fishing	6177	6177	3186	2991	0	0	0
Coal Mining	150	74	50	24	75	70	5
Oil Mining	400	255	221	34	145	135	10
Gas Mining	505	345	317	28	160	149	11
Other Mining	6520	3832	3478	354	2688	2511	177
Meat	2529	2481	527	1954	48	48	0
Meat Product	1599	1554	617	937	45	45	0
Vegetable Oil Industry	26040	12634	4138	8496	13406	12958	448
Dairy Product	13464	10308	3969	6339	3156	2903	254
Other Grain Milling	27578	24222	8639	15583	3356	3104	252
Sugar Industry	3284	3144	1417	1727	140	136	4
Other Food Product	22423	11918	6122	5796	10505	9765	740
Beverage-Tobacco Product	15343	9984	6024	3960	5359	4887	472
Textile	16701	8482	3223	5259	8219	7708	512
Wearing Apparel	18247	12957	6360	6597	5290	4854	436
Leather Product	20220	16915	2174	14741	3306	3117	188
Lumber	6517	5368	643	4725	1149	1066	82
Paper & Paper Product	19934	18327	4318	14009	1607	1546	61
Petroleum	36908	152	132	20	36756	33548	3208
Chemical and Rubber	19987	6622	4469	2153	13365	12951	414
Mineral Product	8460	4143	2284	1859	4317	4183	134
Iron & Steel	11268	4688	968	3720	6580	6286	294
Non-Ferrous Metal	18416	18182	8435	9747	234	210	25
Fabricated Metal	16503	15839	10347	5492	663	610	54
Motor-Vehicle	5921	2040	830	1210	3881	3509	372
Other Transport Equipment	3577	839	350	489	2738	2545	193
Electronic Equipment	8601	1176	273	903	7425	7133	292
Other Machinery and Equipment	10109	1109	591	518	9000	8551	449
Other Manufacturing	6250	3337	1372	1965	2913	2692	221
Electricity Generation	26673	22780	13925	8855	3893	3734	159
Gas Extraction and Distribution	1711	1472	740	732	240	221	19
Water Generation	2684	2531	1815	717	153	144	9
Construction	140353	125964	48536	77428	14389	13780	609
Trade	97669	95170	88286	6884	2498	2312	186
Other Transport	73828	63064	56639	6425	10763	10039	724
Water Transport	3254	2290	1926	364	964	921	43
Air Transport	14832	11127	7551	3575	3705	3415	290
Communication	43396	41888	15094	26795	1508	1483	25
Financial Intermediaries	9827	6394	2006	4389	3433	3431	1
Insurance	32667	28990	25090	3899	3678	3677	0
Other Business Services	58200	57328	33739	23590	871	843	28
Recreation and Other Services	80643	75717	38808	36909	4926	4609	317
Government Services	86349	79225	58469	20756	7124	6870	254
Dwelling	56779	55475	49668	5807	1304	1304	0
Total	**1389308**	**1151673**	**745923**	**405750**	**237636**	**223977**	**13658**
Share (%)	**100.0**	**82.9**	**53.7**	**29.2**	**17.1**	**16.1**	**1.0**

Note: * refers to total imports including intermediate imports.

Private or Household Consumption: Vector of private or household consumption has been obtained from the information of 'final consumption expenditure by basic heading of 154 commodities at current price', contained in Nepal Livings Standard Survey II (NLSS-II) produced by Central Bureau of Statistics (CBS) in 2003. Commodity classification of CBS is different than the SAM commodity classification. Hence in the *first step*, BBS consumption estimates by 140 commodities ($_{NA}pC_K^{07}$) are mapped to 57 SAM commodities classification (pC_K^{07}). Derivation of private consumption vector for 2007 is shown below.

$$pC_K^{07} = {}_{NA}pC_K^{07} \tag{6}$$

Government Consumption: Government consumption usually confines to sectors such as 'public administration' and 'education' and 'health'. The rationale is that different purchases (e.g. agriculture, commodities and services) by government are included under the sector public administration data. Information of government expenditure for 2007 fiscal year ($_{NA}gC^{07}$) is thus used to derive government consumption by 57 SAM activities for 2006/07 ($gC_K^{07} = {}_{NA}gC^{07}$).

Exports of Goods and Services: Information on exports of goods for 2007 ($_{UN\_COMTRADE}E_E^{07}$) is obtained from Export of Commodities by 6-digit level, collated by Detail Export-Import figure (HS 6 Digit) reported by UN-COMTRADE (*http://comtrade.un.org*) database. Again the sector classification of UN-COMTRADE is different from the 57 SAM classifications. Hence a mapping scheme linking the UN-COMTRADE classification to SAM classifications is used to derive exports by 57 SAM commodities for 2007.

$$E_k^{07} = {}_{UN\_COMTRADE}E_E^{07} \tag{7}$$

Investment: National account experts and Input-output and SAM builders are well conversant to the special treatment of goods and services with respect to capital formation and stock change. It is well known that only goods can be stored. Furthermore, only some specific goods can generate investment or form capital which assists further production. On the other hand, services must be consumed instantaneously implying that it cannot be stored and hence last for longer time duration to be able to form capital. National accounts section contains information on origin of capital formation or investment, stock change and valuables for 2007. These information is used to derive gross fixed capital vector invoking 2000 IOT shares (i.e. $I_K^{07} = shI_K^{2k} \cdot I^{07}$).

Final Demand: Above estimates of consumption, exports and investment are added together to derive final demand vector for the 57 SAM commodities (FD_K^{07}). This is specified as:

$$FD_K^{07} = pC_K^{07} + gC_K^{07} + E_K^{07} + I_K^{07} \tag{9}$$

Intermediate Input Demand: Final demand (FD_K^{07}) has been deducted from the total supply (SS_K^{07}) to derive intermediate input demand by 57 SAM commodities ($ID_K^{07} = SS_K^{07} - FD_K^{07}$). The resulting input demand in the first instance did not produce equality between supply and demand vectors. Hence an iterative balancing technique was used to re-estimate the input demand vector such that use of it ensures the equality between sectoral supply and demand. In this process specific elements

of the consumption vector, value added vector and intermediate input vector have been modified not only to ensure supply-demand but also to restrict significant deviation of the technical coefficients from the observed realities. The finalized estimates of the intermediate input demand are then added to the estimates of final demand to equate demand and supply (ID_K^{07} + FD_K^{07} - SS_K^{07} = 0). The estimates of demand are reported in the table below.

The estimates of demand by major components are reported in the table below.

Table 5: Total Demand and Components

(Million Rupees)

Commodity	IntDD07	Cp2007	Cg2007	GFC07*	Export07	FD07	TDD
Paddy Cultivation	28136	17992	0	1031	14	19036	47172
Wheat Cultivation	3088	10517	0	308	288	11113	14201
Other Grain Cultivation	5384	15999	0	612	255	16866	22250
Vegetable and Fruit Cultivation	4144	54387	0	1072	1118	56576	60720
Oilseed Cultivation	4398	777	0	40	329	1147	5545
Sugarcane Cultivation	1625	1952	0	21	5	1978	3603
Jute and Other Plant Fibres Cultivation	1720	1182	0	5	131	1319	3038
Other Crop Cultivation	6687	44726	0	390	673	45790	52476
Cattle Rearing	4155	8706	0	288	134	9128	13283
Other Animal Product	10001	11393	0	37	292	11722	21724
Raw Milk	7142	44346	0	636	44	45026	52167
Wool	339	648	0	1	45	694	1032
Forestry	4049	5257	0	118	173	5548	9598
Fishing	4	5902	0	54	217	6173	6177
Coal Mining	6	51	0	4	89	144	150
Oil Mining	22	20	0	341	17	378	400
Gas Mining	21	93	0	375	16	484	505
Other Mining	208	319	0	5413	580	6312	6520
Meat	8	2521	0	0	0	2521	2529
Meat Product	212	1387	0	0	0	1387	1599
Vegetable Oil Industry	364	10744	0	762	14171	25676	26040
Dairy Product	1379	11290	0	163	633	12086	13464
Other Grain Milling	10780	16136	0	531	131	16798	27578
Sugar Industry	205	2735	0	80	264	3079	3284
Other Food Product	5705	12938	0	498	3283	16718	22423
Beverage-Tobacco Product	2324	11492	0	288	1239	13019	15343
Textile	4063	7375	0	131	5132	12638	16701
Wearing Apparel	8243	7174	0	121	2709	10004	18247
Leather Product	12281	7252	0	55	632	7940	20220
Lumber	60	1044	0	4036	1377	6457	6517
Paper & Paper Product	13007	3892	0	89	2947	6928	19934
Petroleum	0	36721	0	7	180	36908	36908
Chemical and Rubber	2836	1140	0	597	15414	17150	19987
Mineral Product	2660	4612	0	7	1180	5799	8460
Iron & Steel	3202	877	0	7184	6	8066	11268
Non-Ferrous Metal	13365	953	0	3928	170	5051	18416
Fabricated Metal	6825	2829	0	6833	16	9677	16503
Motor-Vehicle	531	5025	0	365	0	5390	5921
Other Transport Equipment	463	3114	0	0	0	3114	3577
Electronic Equipment	611	4395	0	2205	1389	7990	8601
Other Machinery and Equipment	1467	2611	0	475	5556	8642	10109
Other Manufacturing	121	3536	0	2524	69	6129	6250
Electricity Generation	21803	2657	0	2213	0	4870	26673
Gas Extraction and Distribution	541	1047	0	123	0	1170	1711
Water Generation	1441	1121	0	123	0	1244	2684
Construction	0	4778	0	135574	0	140353	140353
Trade	39717	35903	0	8860	13188	57951	97669
Other Transport	34506	32763	0	5816	742	39321	73828
Water Transport	1170	1479	0	523	82	2085	3254

Commodity	IntDD07	Cp2007	Cg2007	GFC07*	Export07	FD07	TDD
Air Transport	2219	8598	0	385	3631	12613	14832
Communication	18093	23148	0	1207	948	25303	43396
Financial Intermediaries	8553	1274	0	0	0	1274	9827
Insurance	6269	26396	0	0	2	26398	32667
Other Business Services	45571	6762	0	0	5867	12628	58200
Recreation and Other Services	17847	62796	0	0	0	62796	80643
Government Services	3940	28038	46181	0	8191	82410	86349
Dwelling	32238	24541	0	0	0	24541	56779
Total	**405750**	**647361**	**46181**	**196449**	**93567**	**983558**	**1389308**
Share (%)	**29.2**	**46.6**	**3.3**	**14.1**	**6.7**	**70.8**	**100.0**

Note: * includes stock change.

Factors Accounts

Factors of production (FP) play an important role in the process of producing and distributing the fruits of growth and development, i.e. by providing factor services to production activities and in return factors receive value-added in the form of wages and salaries, profits and rents. The level of the distribution is in accordance to the level and kind of endowments; hence, the income subsequently transferred to household groups (i.e. as owners of labour and capital) will be heavily influenced, thereby typifying household behaviour.

The FP can be classified into three main categories of factor ownership (a) labour, (b) fixed assets and (c) capital services. Unlike the first the last two are not straightforward. It must be taken into account that only households provide labour services, whereas fixed assets, land and capital services are provided both by households and other institutions (i.e. corporation and government). Classifications of labour types should aim at grouping individuals into homogeneous groups of income earners. For the grouping differences regarding average factor incomes and gender within or between labour groups must be taken into account. Among others, the most important could be labour skills reflecting different occupational categories or different income groups of earners using gender as an additional criterion. More concretely, for most production activities the factor labour can be distinguished according to highly skilled professionals, managers, traders, government employees, personal services employees, blue-collar labourers or street vendors. For agricultural activities these could be agricultural farm owners, farm administrators and land workers of distinct labour types: landless farmers, subsistence farmers, etc. It is should be clear that all or most could be classified according to gender.

Information from developing countries as well as Nepal appears to be no different, inevitably show a high incidence of self-employed or family based activities, hence, differences according to the ownership of fixed assets and capital incomes generated by unincorporated and corporate sectors should be taken into account. Incomes from unincorporated capital (mainly family enterprises) can additionally distinguish imputed wage for the self-employed worker and the remaining capital income. A desirable classification of factors of production is presented below.

Table 6: A Desirable Factor Classification

Labour	Capitalist and Others
1. Self-employed Labour	1. Unincorporated or mixed income
2. High Skilled Professionals and Managers	2. Corporate
3. Medium Skilled Professionals and Technicians	3. Rentiers
4. Government and non-Government Office Clerks	

Labour	Capitalist and Others
(employees)	
5. Workers (Transport Workers, Mechanics and Other Industrial Workers)	
6. Artisans and Handicraftsmen	
7. Informal (Street-vendors and non economic services n.e.s.)	
8. Agricultural Owners/Administrators	
9. Agricultural Workers	
10. Agriculture Subsistence farmers	

Even though the above classification of factors appears to be desirable it was not possible at this point to derive a desirable classification of factors as stated above. In the present version of the SAM 2007 the factors are classified into one aggregate type of labour, one aggregate type of capital and one aggregate type of land.

Factor Income by Activities: Detailed information on sectoral employment for the different factor categories was extracted from the 2000 IOT and the Nepal and Labour Force Survey 2008. The information of the two above sources are added together to define a factor-sector share matrix ($shyF_{Fk}$)[3]. Derived value added vector by 57 SAM activities for 2007 (VA_K^{07}) is distributed among 3 factor types using the factor-activity share matrix ($shyF_{Fk}$) to generate the factorial income matrix by activity for 2007 (yF_{Fk}^{07}). The derivation is shown below.

$$yF_{Fk}^{07} = shyF_{Fk} \cdot VA_K^{07} \qquad\qquad (10)$$

Distribution of sectoral value added by the 3 representative factors and 57 activities is reported below.

Table 7: Estimates of Factor Incomes by Activities

(Million Rupees)

	Labour	Capital	Land	Value Added
Paddy Cultivation	22160	4136	12228	38525
Wheat Cultivation	7918	1376	1980	11274
Other Grain Cultivation	12440	2247	4224	18912
Vegetable and Fruit Cultivation	8418	8518	20661	37598
Oilseed Cultivation	2028	556	1806	4390
Sugarcane Cultivation	1007	510	1286	2802
Jute and Other Plant Fibres Cultivation	1474	517	654	2645
Other Crop Cultivation	16907	8413	15718	41039
Cattle Rearing	6171	109	1184	7464
Other Animal Product	6197	2702	5115	14014
Raw Milk	17236	5100	7367	29703
Wool	91	30	82	203
Forestry	1755	6320	0	8075
Fishing	1574	1612	0	3186
Coal Mining	9	36	0	44

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[3] Following the symbols used in the Input-output reports on Nepal SAM (2007), please note F, K, H respectively denote factor, activity-commodity, and household groups.

	Labour	Capital	Land	Value Added
Oil Mining	15	128	0	143
Gas Mining	28	176	0	204
Other Mining	357	2563	0	2920
Meat	204	304	0	508
Meat Product	225	357	0	582
Vegetable Oil Industry	479	1030	0	1509
Dairy Product	423	1866	0	2289
Other Grain Milling	893	5731	0	6624
Sugar Industry	151	572	0	723
Other Food Product	326	950	0	1276
Beverage-Tobacco Product	399	910	0	1309
Textile	1486	722	0	2207
Wearing Apparel	985	2376	0	3360
Leather Product	386	1193	0	1578
Lumber	129	315	0	444
Paper & Paper Product	530	1784	0	2314
Petroleum	11	30	0	41
Chemical and Rubber	767	3047	0	3815
Mineral Product	533	820	0	1353
Iron & Steel	82	617	0	699
Non-Ferrous Metal	585	7226	0	7811
Fabricated Metal	802	8653	0	9455
Motor-Vehicle	211	619	0	830
Other Transport Equipment	150	200	0	350
Electronic Equipment	76	85	0	161
Other Machinery and Equipment	52	353	0	405
Other Manufacturing	283	637	0	920
Electricity Generation	1804	10219	0	12023
Gas Extraction and Distribution	137	409	0	546
Water Generation	301	1514	0	1815
Construction	11214	32494	0	43708
Trade	45040	39751	0	84791
Other Transport	15913	36422	0	52336
Water Transport	1035	686	0	1721
Air Transport	1870	2960	0	4830
Communication	4031	8492	0	12523
Financial Intermediaries	396	631	0	1026
Insurance	6762	15801	0	22563
Other Business Services	11049	18354	0	29403
Recreation and Other Services	15978	10858	0	26836
Government Services	45141	13328	0	58469
Dwelling	10095	39110	**0**	49205
Value Added	**286721**	**316472**	**72305**	**675498**
Share (%)	**42.4**	**46.9**	**10.7**	

Institutions Accounts

Current account transactions are captured between 3 institutional agents; households and unincorporated capital, government and the rest of the world. Household account includes 8

representative groups (6 rural and 2 urban). One consolidated capital account is also defined to capture the flows of savings and investment by institutions and the rest of the world respectively.

Household Accounts

Households (HHs) should be conceptualized as consumption units, different from income earning agents (e.g. labourers, rentiers and capitalists), which receive "transfers" from the factor of production which they own and "sell" to production activities. This distinction is important because the income sources of earning agents can be diverse, (as many as the activities which use the factor(s) owned by the agents), while 'income' to households (viewed as a group of income earning agents) may come from the different factor endowments which the members of the household possess and may simultaneously come from several factor endowments.

Generally, in specifying household classifications the following criteria are considered:

1) Regional differences, i.e. urban and rural households;
2) Educational level of the head of the household;
3) Gender of the head of the household; and
4) Access to productive forms of material wealth particularly, agricultural land and land rights.

The above criteria can be justified on the grounds that:

a) Urban-rural income differentials are usually large. The average per capita disposable income of urban households is considerably higher than that of rural households. And often female headed household are more vulnerable;
b) Among the factors that can help to generate homogeneity the most relevant appear to be classifications according to homogeneity in consumption expenditure or savings patterns;
c) In urban areas differences in household income levels and consumption patterns are closely related to the educational level of the household head, while for rural households the size of farm landholdings appears to be most significant determinant; and
d) Significant differences in consumption pattern and in income generating capacity are found between those rural households primarily engaged in agricultural activities and those whose main income source is derived from non-agricultural activities.

The 2007 SAM distinguishes eight household types, classified according to location and occupation of the household's head. Household classifications contained in SAM 2007 are based on NLSS-II classifications (NLSS2, 2003). The details are provided in the table below.

Table 8: Household Types and Their Definition

SAM HH Classification	HIES Classification
Landless Farmer	Landless Farmer
Small Farmer	Marginal Farmer (less than 0.5 Bigha Land)
Medium Farmer	Small Farmer (Having land between 0.51 and 2.50 Bigha)
Large Farmer	Large Farmer (more than 2.51 Bigha)
Low Education	Low Education (Education of household head <= class 10)
Medium Education	Medium Education (Education of household head having both Secondary School Certificate and Higher Secondary certificate)
High Education	High Education (Education of household head having Bachelor and higher degrees)

Main sources of household's income are factor returns and various transfer from domestic and external institutions. Generation of household income from these sources is discussed below.

Household Income from Factors: Direct factor incomes (i.e. wages, mixed income and land rents) constitute the major source of household income. Compensation to employees or labour factor payments is paid entirely to the household groups, as they are the only suppliers of the labour factor. Control totals for these three types of factor-incomes are already estimated above which must be distributed among the 7 representative households according to their factor endowments. Factor endowment information ($shfY_{FH}$) are contained in NLSS-II 2003. Control totals for factor income (yF_{Fk}^{07}) are applied on the factor endowment shares to generate households income from factors ($fY_{FH}^{07} = shfY_{FH} \cdot \sum_{K} yF_{FK}^{07}$). This procedure ensures that the observed factor endowment structure (i.e. reflecting the factorial income distribution) of 2003 as well as the factor control totals for 2007 are preserved.

Household Receipts from Other Sources: Besides factor incomes, households also receive income from other sources, namely remittances or factor incomes from abroad, government transfers and transfers from the corporations. Information of foreign remittance for 2007 fiscal year ($rowR^{07}$) is obtained from the 'national accounts'. Remittance share information by household groups ($shfR_H$) are contained in NLSS 2003. Control totals for remittance ($rowR^{07}$) are applied on the remittance shares to generate households income from remittance ($rowR_H^{07} = shfR_H \cdot_{row} R^{07}$). This procedure ensures that the observed remittance structures of 2003 as well as the remittance control totals are preserved.

Similar procedures are also applied to distribute institutional transfers by representative household groups. Again institutional transfer (i.e. by government) share information by the representative household groups are obtained from NLSS-II 2003. Control totals for the institutional transfers are applied on these shares to generate households' income from government transfers ($gTr_H^{07} = shgTr_H \cdot_{NA} gTr^{07}$). Total receipts by household groups are derived from all the above sources and this is defined as:

$$R_H^{07} = \sum_{F} fY_{FH}^{07} + rowR_H^{07} + gTr_H^{07} \qquad\qquad (10)$$

Estimated household's receipts from different sources are provided in table below.

Table 9: Estimates of Household's Receipts from Different Sources

(Million Rupees)

Household Groups	Labour Income	Capital Income	Land Income	Government Transfer	Remittance	Total
Rural Land Less	102523.9	29631.9	0.0	1800.0	19562.4	153518.3
Rural Land Small	63051.7	14178.1	1667.6	1280.0	17786.2	97963.6
Rural Land Medium	74015.2	120822.4	29750.2	960.0	35643.4	261191.3

Household Groups	Labour Income	Capital Income	Land Income	Government Transfer	Remittance	Total
Rural Land Large	4349.6	63296.9	33772.9	680.0	9899.6	111999.0
Urban Lower Educated	28609.0	6572.8	1688.2	1480.0	4736.7	43086.7
Urban Medium Educated	11331.4	26356.5	2502.6	1200.0	1942.0	43332.5
Urban Higher Educated	2840.2	55612.8	2924.0	600.0	3078.8	65055.8
All Households	**286721.0**	**316471.5**	**72305.5**	**8000.0**	**92649.2**	**776147.2**
Share (%)	**36.9**	**40.8**	**9.3**	**1.0**	**11.9**	**100.0**

Household Expenditure Pattern: Consumption expenditure constitutes the major component of their outlays. Consumption expenditure by the 7 representative household groups and 57 SAM commodities is estimated using the expenditure structure contained in NLSS 2003. NLSS 2003 provides detailed breakdown of expenditure by 7 household groups and products. In particular, the product classifications adopted in NLSS which are different are mapped to 57 SAM commodity groups. Household consumption by 57 SAM commodities (pC_K^{07}) has already been derived using the private consumption control total and the private consumption structure for the 57 SAM commodities. Derived consumption vector is then distributed among the 7 household groups using their derived expenditure structures ($shpC_{HK}$). The procedure generates a consumption matrix for 2007 by 7 representative household groups and 57 SAM commodities ($pC_{HK}^{07} = shpC_{HK} \cdot pC_K^{07}$).

Household Outlays: Other notable expenditures incurred by household groups are income tax payment. Income tax payment shares contained in NLSS 2003 ($shdT_H$) and NA income tax payment control total ($_{NA}dT^{07}$) are used to derive income tax payments by household groups ($dT_H^{07} = shdT_H \cdot _{NA}dT^{07}$).

Total outlays by household groups are defined as:

$$P_H^{07} = \sum_K pC_{HK}^{07} + dT_H^{07} \qquad\qquad (11)$$

Household savings are determined by deducting household payments from household income in such way that savings close the account as well as reflect a savings pattern reflected in NLSS 2003. The household's outlays by these three categories are shown in Table 10.

Table 10: Estimates of Household's Outlays by Categories

(Million Rupees)

Household Groups	Consumption	Direct Tax	Savings	Total Outlay
Rural Land Less	151743.4	0.0	1774.9	153518.3
Rural Land Small	90258.1	0.0	7705.4	97963.6
Rural Land Medium	209757.6	350.0	51083.7	261191.3
Rural Land Large	78994.9	4500.0	28504.2	111999.0
Urban Lower Educated	39574.9	500.0	3011.8	43086.7
Urban Medium Educated	33790.7	2650.0	6891.8	43332.5
Urban Higher Educated	43241.4	8000.0	13814.4	65055.8
All Households	**647361.1**	**16000.0**	**112786.1**	**776147.2**
Share (%)	**83.4**	**2.1**	**14.5**	

Other Institutions Accounts

Receipts and outlays of other three current institutions are discussed below.

Government Account: Sources of government income include tax and non-tax revenues. The main sources of tax revenue are (i) indirect taxes on imports and domestic production and (ii) direct taxes in the form of personal income taxes. Amounts for all of the four elements of tax revenues (i.e. IT_K^{07}, dM_K^{07} and dT_H^{07}) are already defined in the supply-demand section. The main sources of other than tax revenue are the income from the government owned corporations, financial institutions etc. Moreover, part of the value added which accrues to government in accordance to her participation in the production process is also included under the 'non tax' head. However, due to data limitation the non-tax contributions could not be ascertained in this exercise. Hence government income refers to tax revenue only. Total government receipt (gR^{07}) is thus defined as:

$$gR^{07} = \sum_K IT_K^{07} + \sum_K dM_K^{07} + \sum_H dT_H^{07} \qquad\qquad (12)$$

Government spends most of her income on purchase of goods and services (gC_K^{07}) and transfer programmes (gTr_H^{07}). Rest of the income constitutes government savings. Government savings (gS^{07}) act as the balancing factor between its receipts and outlays. The balancing condition envisages that receipt must equate the outlay. This is specified as:

$$gR^{07} - \sum_K gC_K^{07} + \sum_H gTr_H^{07} + gS^{07} = 0 \qquad\qquad (13)$$

Rest of the World Account: Rest of the world account records inflow and outflow of foreign resources in a country in a fiscal year. The major sources of inflows are: imports of goods (M_K^{07}) and services and foreign assistance (i.e. $rowS^{07}$ also known as foreign savings). Major form of outflow includes exports of goods and services (E_K^{07}), net factor returns and net current transfer (remittances). Amounts for all of these four elements which are defined above are assembled in this account to complete the account as well as to verify its balance. The balancing condition envisages that sum of inflows must equates the sum of the outflows. This is specified as:

$$\sum_K M_K^{07} + rowS^{07} - \sum_K E_K^{07} + \sum_{FK} yF_{Fk}^{07} + \sum_H rowR_H^{07} = 0 \qquad\qquad (14)$$

Some Key Features of SAM 2007

Salient features of the SAM 2007 are discussed here in terms of economic structure and the household profile.

Demand and Supply Structure

Thestructures of demand and supply of 2007 are reported in Table 11 and Table 12. Key observations are discussed below.

Table 11: Composition of Demand in Various Data Sets

		(In percent)
Demand Composition	**NA 07**	**SAM 07**
Final Demand Composition		
Private Consumption	65.8	65.8
Public Consumption	4.8	4.7
Exports Goods and Services	9.8	9.7
GFC	19.6	19.8
Statistical Discrepancy	0	0
Total Final Demand	100.00	100.00
Demand Composition		
Intermediate Demand	'...'	33.5
Final Demand	'...'	66.5
Total Demand	100.00	100.00

Source: SAM 2007 and Consolidated Account of Nation of Nepal.

- According to national account 2007 (i.e. first column of the above table), total consumption (private + public) accounted for about 71 percent of final demand of Nepal in 2007. Total investment is around 20 percent of final demand. The share of exports is around 10 percent.

- A desirable property of a SAM is the exact or close association between NA values and SAM values. The final demand composition of SAM 07 is shown in the second column of the above table. The largest component of final demand i.e. the private consumption component of the SAM 07 preserved exact correspondence with their counterpart values in NA 07. The SAM 07 values of other three components showed very close correspondence with their counterpart values in NA 07. Very small discrepancies noted above are due to the re-adjustment of some of the stock change values.

Table 12: Composition of Supply in Various Data Sets

		(In percent)
Supply Composition	**NA 07**	**SAM 07**
GDP Composition		
GDP at Factor Cost	92.8	92.8
Indirect Tax less Subsidies	7.2	7.2
Gross Domestic Product	100.0	100.0

| Supply Composition	NA 07	SAM 07
Factor Income Composition		
Compensation to Employees (Labour Income)	42.2	42.4
Operating Surplus (Capital Income)	57.8	57.6
Factor Income	100.0	100.0
Supply Composition (Excluding Intermediate Use)		
Domestic	75.9	75.8
Imports	24.1	24.2
Total Supply	100.0	100.0
Supply Composition		
Intermediate Use	'----'	33.5
Final Use (including taxes, tariff, imports etc.)	'----'	66.5
Total Supply	100.0	100.0

Source: SAM 2007 and Consolidated Account of Nation - of Nepal.

- The largest component of GDP is factor returns which accounted for about 93 percent in 2007. The share of the net indirect tax has been around 7 percent in 2007. Decomposition of factor income by labour and capital sources suggests that returns of capital and labour factors are is around 58 percent and 42 percent respectively.

- Again the desirable property of exact/close association between NA values and SAM values has been preserved for the GDP and supply compositions in SAM 07.

- Decomposition of supply by domestic and external sources also reveals close correspondence between NA values and SAM estimates between for 2007. The share of imported supply in 2007 is 24 percent while the domestic supply in 2007 is around 76 percent.

Structure of 2007 Economy by Key Sectors

The economic structure of Nepal as contained in SAM 2007 by 57 producing activities is presented by 7 broad sectors for comparison with national account data for the same year. According to the SAM 2007 data, all service sectors (i.e. including trade and transport) together accounts for about 51 percent of gross domestic product. National account also reports 51 percent contribution by service sectors. *The service sector has thus emerged as the leading sector in Nepal for income generation.* Service sector is followed by agriculture sub-sector accounting for about 33 percent of GDP. The contribution of manufacturing sub-sector is around 7.5 percent of GDP. Construction sub-sector with 6.5 percent contribution closely follows the manufacturing sub-sector. National account estimates also report 33, 7.5 and 6.5 percent contributions by agriculture, manufacturing and construction sub-sectors respectively. Exact correspondences between national account data and SAM 2007 for other sub-sectors are also found and reported below. Establishing exact or very close correspondence between national account estimates and SAM is an important criterion to validate the SAM data base.

Figure 1: Value added shares by NA 07 and SAM 07
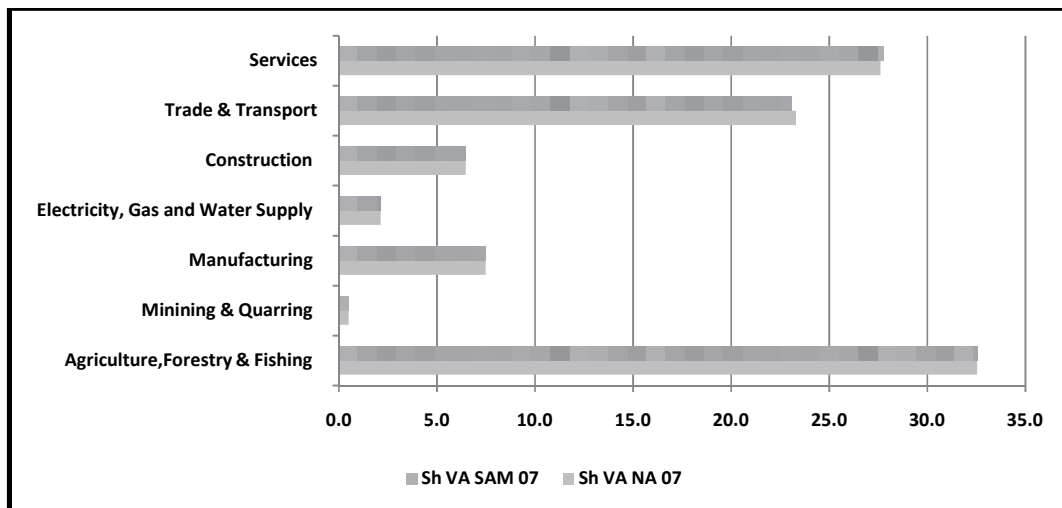
The desirable characteristic of the exact or close correspondence between national account data and estimates generated by the SAM has been preserved in Nepal SAM 2007.

Activity Level Endogeneity Degree and Linkages

The representation of economic structure of an economy as contained in a SAM is best understood by assessing the activity level endogeneity degree and backward linkage. To proceed with the analysis of multipliers and linkages it is necessary to calculate the matrix of technology coefficients (e.g. Leontief I-O technology coefficients). The inverse of the coefficient matrix after deducting for the identity matrix represents the so-called matrix of production multipliers.

The <u>backward linkages</u>, which are the total column sum of the inverse, provide valuable information about the degree of integration of an activity across and with the rest of the economy. Using this indicator it is possible to determine which activities contribute most to growth as a result of an exogenous increase in final demand, say exports. <u>Forward linkages </u>on the other hand help us to understand the importance of a commodity for the rest of the economy in terms of intermediate demand or marketing. Therefore a commodity that exhibits high forward linkages it is said to be important in the process of expansion or high growth, in this context potential bottleneck can be identified.

List of activities with highest backward linkages are shown in table below.

Table 13: Ten Economic Activities with the Highest Backward Linkage SAM 07

Activity	Endogeneity Degree	Backward Linkages	Forward Linkages
Leather Product	0.8382	3.9973	3.3142
Meat	0.7743	2.1834	1.0013
Dairy Product	0.7089	2.1422	1.0906
Beverage-Tobacco Product	0.6795	2.1060	1.3820
Construction	0.6182	1.9750	1.0000
Communication	0.6479	1.9667	1.2813
Lumber	0.8471	1.9641	1.0023
Paper & Paper Product	0.7565	1.9115	1.4427
Meat Product	0.5934	1.8790	1.0106
Non-Ferrous Metal	0.5309	1.8478	2.3754

- The activities with backward linkages over 2.0 are Leather Products, Metal, Dairy products and beverage and tobacco etc. In economic terms these are the activities to be incentivized if fast growth is a strategy. However, due consideration has to be given to the importance of the sector in the total economy.

- The highest degree of endogeneity, 65% and higher is observed for several manufacturing commodities and some primary activities. The finding seems to support the thesis that manufacturing of primary activities with high input structure tend to have higher backward linkages.

- Activities with higher (highest) backward linkages usually are associated with lower (lowest) forward linkages. Except for few activities, such inverse associations between the backward and forward linkages are also found in the case of SAM 2007.

Table below shows the list of activities with lowest backward linkages.

Table 14: Ten Economic Activities with the Lowest Backward Linkage SAM 07

Activity	Endogeneity Degree	Backward Linkages	Forward Linkages
Chemical and Rubber	0.1137	1.1449	1.1253
Other Transport	0.1027	1.1403	2.8631
Gas Mining	0.1161	1.1397	1.0296
Vegetable and Fruit Cultivation	0.1090	1.1336	1.1009
Oilseed Cultivation	0.1106	1.1319	1.2854
Other Mining	0.1041	1.1234	1.0458
Trade	0.0747	1.1171	4.8301
Other Machinery and Equipment	0.0596	1.0865	1.1067
Wool	0.0587	1.0739	1.0409
Petroleum	0.0473	1.0597	1.0000

- It is important to note that activities with relatively low backward linkages are associated with low endogeneity degrees. Relatively low backward linkages for these activities may be due to their heavy reliance of imported raw material or higher payments to the primary factors.

- At the other end it is also interesting to see that mainly service activities as well as nature based activities (e.g. gas, crude petroleum etc.) are the one showing the lowest endogeneity degree. In most economies services and natural resources are indeed poorly linked with the rest of the economy; therefore this is not surprising in the case of Nepal.

Household Receipt and Consumption Pattern

Income and expenditure profiles of the representative households as contained in SAM 07 are provided in Table 15 and Table 16.

Table 15: Household Income Profile

(In percent)

Household Groups	Labour	Capital	Land	Transfer Government	Remittance	Total Income
Rural Land Less	35.8	9.4	0.0	22.5	21.1	19.8
Rural Land Small	22.0	4.5	2.3	16.0	19.2	12.6
Rural Land Medium	25.8	38.2	41.1	12.0	38.5	33.7
Rural Land Large	1.5	20.0	46.7	8.5	10.7	14.4
Urban Lower Educated	10.0	2.1	2.3	18.5	5.1	5.6
Urban Medium Educated	4.0	8.3	3.5	15.0	2.1	5.6
Urban Higher Educated	1.0	17.6	4.0	7.5	3.3	8.4
All Households	100.0	100.0	100.0	100.0	100.0	100.0

- Almost 36 percent of labour income accrues to landless households followed by rural medium farmer (26 percent) and rural small farmers (22 percent). Almost 58 percent of capital income (i.e. mixed income) accrues to the two rural household groups namely rural medium farmer (38 percent); and rural large farmer (20 percent). These three household groups are closely followed by the urban high educated household group receiving around 18 percent capital income.

- Around 60 percent of the government transfers are received by the rural household groups. Two major beneficial rural households are rural landless (23 percent) and rural small farmer household (16 percent). Foreign remittances are received predominantly by the rural household group namely rural medium farmer household (39 percent). Together they receive more than 92 percent of foreign remittance.

Table 16: Household Outlay Profile

(In percent)

Household Groups	Consumption	Direct Tax	Savings Rate
Rural Land Less	23.4	0.0	1.2
Rural Land Small	13.9	0.0	7.9
Rural Land Medium	32.4	2.2	19.6
Rural Land Large	12.2	28.1	25.5
Urban Lower Educated	6.1	3.1	7.0
Urban Medium Educated	5.2	16.6	15.9
Urban Higher Educated	6.7	50.0	21.2
All Households	100.0	100.0	14.5

Consumption Pattern

The basic needs (BN) classification is introduced to capture the situation of the household groups in terms of those wants which characterizes their well being situation. For reasons of importance as well as considering the activity classification, 9 types of wants have been distinguished. The household consumption matrix of SAM 07 has been re-classified by 9 basic needs using a mapping between 57 SAM commodity classification and 9 basic needs classification (please see Annex 1). The consumption by basic needs categories and by seven household groups is shown in figure below.

Figure 2: Consumption Pattern by Basic Needs and Household Groups
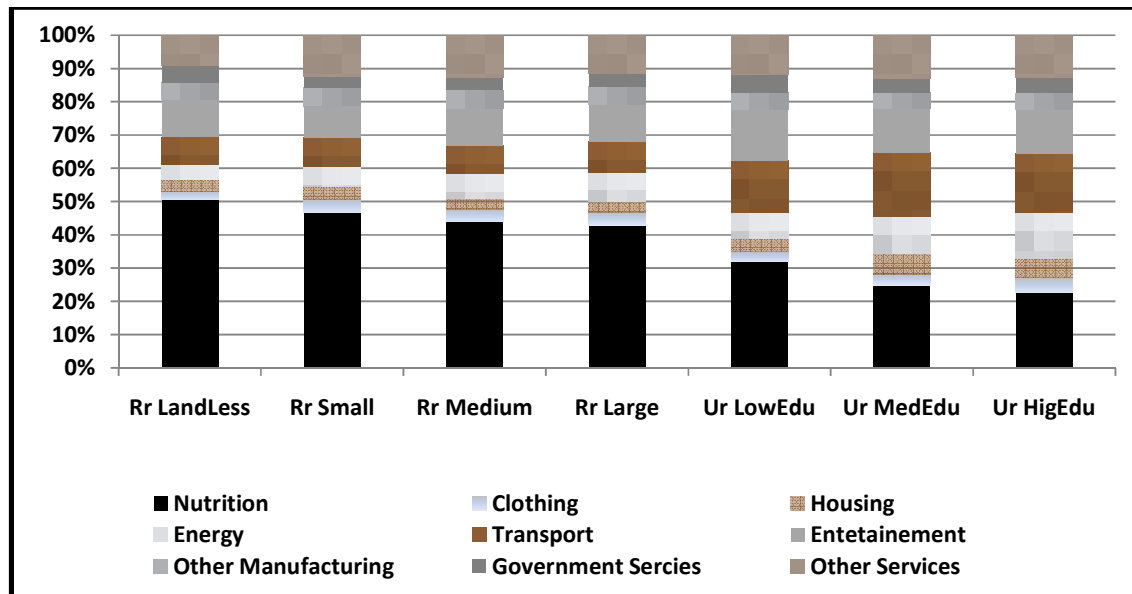
- On average, households in Nepal spent around 38 percent of their resources on nutrition. Income spent by rural household on nutrition is almost double (i.e. 46 percent) than that spent by their urban counter part (26 percent).

- All four rural households have found to spend more than 40 of their income on nutrition. They are: rural landless (50 percent); rural small farmers (47percent); rural medium (44 percent) and rural large farmers (43 percent). Out of three urban households, only one household has spent more than 26 of their income on nutrition. Urban low education household has spent 32 percent of their income on nutrition.

- Household in Nepal on average spent 18 percent of their total incomes on transport services. Significant differences have been observed between transport expenditure patterns of rural and urban household groups. More specifically, income spent by urban household on transport is almost double (i.e 16 percent) than that spent by their urban counter part (8 percent).

- On average, households in Nepal spent around 11 percent of their resources on energy. Again, significant differences have been observed between transport expenditure patterns of rural and urban household groups. More specifically, income spent by urban household on transport is almost double (i.e 10 percent) than that spent by their urban counter part (6 percent).

- Another basic needs on which household in Nepal on average spent around 26 percent of their total incomes is services (i.e. this is a mixed category inclusive of various types of services). Contrary to expectation, no significant differences have been observed between services expenditure patterns of rural and urban household groups.

- On average, households' expenditure on housing is on the lower side in Nepal. There may be under estimation of housing expenditure as imputed values for owner occupied houses are usually under-valued.

Multipliers and Linkages of SAM 2007

Each of the columns of the matrix of accounting multipliers, as indicated before show the effects of each corresponding exogenous injection on the incomes of endogenous accounts. Analogously to the I-O model the sum total of a column or a row can be calculated and they will be equivalent to the backward and forward income or expenditure linkages. In SAM models within account sums of columns or rows is calculated for each of the four endogenous accounts as well as the total column and row sums of all the endogenous accounts taken together. The former can be called "partial backward or forward linkages" or within account backward or forward linkages and the latter "total backward or forward linkages". As shown in the earlier section, partial backward linkages can also be named after their corresponding account multipliers such as backward and forward linkages for production, factors, and households[5.] Therefore in conclusion we can say that the basic idea of backward linkages is to trace the output increases which occur in supplying sectors or accounts when there is a change in the sector or account using their outputs as inputs, just as with forward linkages we trace the output increases which occur or might occur in using industries or accounts when there is a change in the sector or account supplying inputs[6.]

Within the SAM context given an exogenous injection into the system (e.g. government expenditure on education activity) the first effect will be to increase income of the corresponding account (i.e. activity), in turn the increase will trigger off effects on the incomes of all other endogenous accounts namely: (i) activity; (ii) commodity; (iii) factor; and (iv) households. The sizes of total as well as partial backward linkages vary across activities reflecting differences in structure of production (i.e. technology), relationship between value-added and intermediate consumption (i.e. generally the higher the share of value-added in an activity in comparison to intermediate cost, the lower is the value of the multiplier and hence backward linkage), presence of different types of indirect and direct taxes (i.e. indicating size of leakages from the system-the higher the tax rate the lower is the value of multipliers and backward linkages), and savings propensities (i.e. another of leak at the institutional level) of the representative household groups.

Decomposition of total backward linkages among its constituent is reported in Annex 2.

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[5] The interpretation of partial (within account) backward and forward linkages within a SAM framework is also similar to that of I-O models. Although the sum of all the elements, in any column (row) of the accounting multipliers matrix, could be read as the backward (forward) linkages of the expenditure-injection multipliers, the interpretation in SAM is not so straight forward because the linkages are composites of the effects of several kinds of accounts.

[6] Bulmer–Thomas, V, (1982),"Input–Output Analysis in Developing Countries", John Wiley & Sons Ltd., New York.

Annex 1: Mapping between SAM Commodity Classification and Basic Needs Classification

Nutrition	Clothing	Housing	Energy	Transport	Entertainment	Other Manufacturing	Government Services	Other Services
Paddy								
Wheat								
Other Grain								
Vegetables & Fruits								
Oilseed								
Sugar-cane								
Jute and Other Plant Fibers								
Other Crops								
Cattle								
Other Animal Product								
Raw Milk								
	Wool							
			Forestry					
Fishing								
			Coal					
			Oil					
			Gas					
			Other Mining					
Meat								
Meat Product								
Vegetable Oil								
Dairy Product								
Other Grain Mill								
Sugar								
Other Food Product								
					Beverage-Tobacco			
	Textile							
	Wearing Apparel							
	Leather Product							
						Lumber		
						Paper & Paper Product		
			Petroleum					
						Chemical and Rubber		
						Mineral Product		
						Iron & Steel		
						Non-Ferrous Metal		
						Fabricated Metal		
						Motor-Vehicle		
						Other Transport Equipment		
						Electronic Equipment		
						Other Mech. & Equipment		
						Other Manufacturing		
			Electricity					
			Gas					
			Wa Ter					
								Construct
								Trade
				Other Transport				
				Water Transport				
				Air Transport				
				Communi				

Nutrition	Clothing	Housing	Energy	Transport	Entertainment	Other Manufacturing	Government Services	Other Services
								Financial Intermed
								Insurance
								Other Business Services
					Recreation and Other Services			
							Government Services	
		Dwelling						
19	4	1	9	4	2	12	1	5

Annex 2: Linkages of SAM Endogenous Accounts

	SAM Endogenous Accounts	Backward Linkages
1	Paddy Cultivation	10.85
2	Wheat Cultivation	10.77
3	Other Grain Cultivation	10.80
4	Vegetable and Fruit Cultivation	9.76
5	Oilseed Cultivation	9.68
6	Sugarcane Cultivation	9.76
7	Jute and Other Plant Fibres Cultivation	10.84
8	Other Crop Cultivation	10.41
9	Cattle Rearing	11.00
10	Other Animal Product	11.28
11	Raw Milk	10.51
12	Wool	3.44
13	Forestry	10.36
14	Fishing	8.44
15	Coal Mining	5.23
16	Oil Mining	9.68
17	Gas Mining	9.89
18	Other Mining	9.87
19	Meat	11.60
20	Meat Product	11.49
21	Vegetable Oil Industry	6.70
22	Dairy Product	10.89
23	Other Grain Milling	11.68
24	Sugar Industry	10.28
25	Other Food Product	7.56
26	Beverage-Tobacco Product	7.81
27	Textile	7.00
28	Wearing Apparel	9.22
29	Leather Product	10.63
30	Lumber	10.85
31	Paper & Paper Product	9.98
32	Petroleum	2.33
33	Chemical and Rubber	3.71
34	Mineral Product	5.01
35	Iron & Steel	4.64
36	Non-Ferrous Metal	10.81
37	Fabricated Metal	10.50
38	Motor-Vehicle	6.03
39	Other Transport Equipment	3.38
40	Electronic Equipment	2.29
41	Other Machinery and Equipment	2.01
42	Other Manufacturing	9.25
43	Electricity Generation	9.08
44	Gas Extraction and Distribution	9.10
45	Water Generation	10.39
46	Construction	10.61
47	Trade	10.72
48	Other Transport	9.93
49	Water Transport	10.66
50	Air Transport	9.69
51	Communication	10.76
52	Financial Intermediaries	7.32

	SAM Endogenous Accounts	Backward Linkages
53	Insurance	9.25
54	Other Business Services	10.76
55	Recreation and Other Services	10.27
56	Government Services	10.09
57	Dwelling	10.18
	Average Activity Backward Linkage	**8.89**
58	Paddy Cultivation	11.64
59	Wheat Cultivation	11.77
60	Other Grain Cultivation	11.65
61	Vegetable and Fruit Cultivation	8.12
62	Oilseed Cultivation	10.68
63	Sugarcane Cultivation	10.76
64	Jute and Other Plant Fibres Cultivation	11.84
65	Other Crop Cultivation	10.52
66	Cattle Rearing	11.20
67	Other Animal Product	11.79
68	Raw Milk	11.29
69	Wool	4.33
70	Forestry	10.90
71	Fishing	9.44
72	Coal Mining	6.23
73	Oil Mining	5.47
74	Gas Mining	5.71
75	Other Mining	6.14
76	Meat	12.57
77	Meat Product	12.34
78	Vegetable Oil Industry	5.71
79	Dairy Product	8.23
80	Other Grain Milling	10.60
81	Sugar Industry	9.34
82	Other Food Product	4.93
83	Beverage-Tobacco Product	3.97
84	Textile	6.08
85	Wearing Apparel	6.98
86	Leather Product	10.25
87	Lumber	10.29
88	Paper & Paper Product	10.27
89	Petroleum	1.03
90	Chemical and Rubber	4.51
91	Mineral Product	5.42
92	Iron & Steel	4.61
93	Non-Ferrous Metal	11.77
94	Fabricated Metal	10.99
95	Motor-Vehicle	4.98
96	Other Transport Equipment	3.58
97	Electronic Equipment	2.92
98	Other Machinery and Equipment	2.73
99	Other Manufacturing	6.12
100	Electricity Generation	9.51
101	Gas Extraction and Distribution	9.02
102	Water Generation	10.93
103	Construction	10.46
104	Trade	11.12

	SAM Endogenous Accounts	Backward Linkages
105	Other Transport	9.42
106	Water Transport	7.99
107	Air Transport	7.16
108	Communication	11.26
109	Financial Intermediaries	7.79
110	Insurance	9.61
111	Other Business Services	11.17
112	Recreation and Other Services	9.71
113	Government Services	10.80
114	Dwelling	11.18
	Average Commodity Backward Linkage	**8.54**
115	Labour	10.36
116	Capital	9.04
117	Land	8.84
	Average Factor Backward Linkage	**9.41**
118	Rural Land Less	10.28
119	Rural Land Small	9.59
120	Rural Land Medium	8.37
121	Rural Land Large	7.33
122	Urban Lower Educated	9.43
123	Urban Medium Educated	7.71
124	Urban Higher Educated	6.50
	Average Household Backward Linkage	**8.46**