

APPENDIX B. TECHNICAL NOTE ON THE SOCIAL ACCOUNTING MATRIX

A social accounting matrix (SAM) can be defined as an organized matrix representation of all transactions and transfers between different production activities, factors of production, and institutions (households, corporate sector, and government) within the economy and with respect to the rest of the world. A SAM is thus a comprehensive accounting frame work within which the full circular flow of income from production to factor incomes, household income to household consumption, and back to production is captured. All the transactions in the economy are presented in the form of a matrix in a SAM. Each row of the SAM gives receipts of an account while the column gives the expenditure. The total of each row is supposed to be equal to the total of each corresponding column. An entry in row i and column j represents the receipts of account i from account j . A SAM can be regarded as an extension of input-output (I-O) tables, a widely used framework to provide detailed information on the flow of goods and services, as well as on the structure of production costs. In this matrix, final consumption expenditure, capital formation, and trade are shown by product or industry of origin and intermediate consumption both by product or industry of origin and destination. Income generation is shown by value-added. However it is worth noting that the symmetric I-O table is based on the absorption (use) matrix and make (supply) matrix. An absorption matrix gives the inputs of the commodities into industries (activities), while each row of the make matrix gives the distribution of the output of different commodities produced by the industry of that row. Each column of this matrix gives the values of output of that commodity produced by different industries. The symmetric I-O table is obtained from these two matrices by making certain mathematical assumptions regarding technologies (CSO 2005). The I-O matrix does not show the interrelationship between value-added and final expenditures. By extending an I-O table and showing an entire circular flow of income at the macro level, one captures the essential features of a SAM.¹

As shown in the figure below, a village SAM has the following account structure: (1) commodity accounts; (2) factor accounts; (3) institutional accounts; (4) capital accounts; and (5) rest of the world (ROW) accounts. The SAM constructed for this study covers the entire village. The basic structure of this SAM is based on the following transactions and transfers in the economy: Production requires intermediate goods and the primary factors of production, viz. labour and capital. These factor endowments are contributed by institutions (viz. households, firms, and government) that, in turn, receive factor payment as value-added. Apart from the value-added, village institutions get income from other sources, such as transfers from the government and the rest of the world. The income is spent as the consumption expenditure on goods and services and for payment of taxes,

¹ Previous attempts to build a SAM for India have been made by Sarkar and Subbarao (1981), Sarkar and Panda (1986), De Janvy and Subbarao (1986), Subramanian (1993), Pradhan and Sahoo (1996), and Pradhan, Saluja, and Singh (2006). At the village level, however, there is only one SAM in India, according to our knowledge. This was constructed by Shankar and Sadoulet (1990) for Kanzara village of Maharashtra state to examine the effects of investments on the village economy. This SAM covered 40 households and, in that sense, it did not cover the entire village.

and the rest is saved for the future. The total supply in the economy has to be matched by the demand made by the institutions and capital formation, i.e., purchase of investment goods. In the SAM, an extra breakdown of the household sector is done to reflect the role of people in the economy.

Appendix Table 1: The Structure of the SAM

			EXPENDITURES						
			ENDOGENOUS			EXOGENOUS			TOTALS
			FACTORS	HOUSEHOLDS	PRODUCTIVE ACTIVITIES	GOVERNMENT	REST OF THE WORLD	CAPITAL ACCOUNT	
RECEIPTS OR INCOMES	ENDO-GENOUS	FACTORS	0	0	T ₁₃	X ₁₄	X ₁₅	X ₁₆	Y ₁
		HOUSEHOLDS	T ₂₁	T ₂₂	0	X ₂₄	X ₂₅	X ₂₆	Y ₂
		PRODUCT ACTIVITY	0	T ₃₂	T ₃₃	X ₃₄	X ₃₅	X ₃₆	Y ₃
	EXO-GENOUS	GOVERNMENT	L ₄₁	L ₄₂	L ₄₃	t ₄₄	t ₄₅	t ₄₆	Y ₄
		REST OF WORLD	L ₅₁	L ₅₂	L ₅₃	t ₅₄	t ₅₅	t ₅₆	Y ₅
		CAPITAL ACCOUNTS	L ₆₁	L ₆₂	L ₆₃	t ₄₄	t ₄₅	t ₄₆	Y ₆
TOTALS		Y ₁	Y ₂	Y ₃	Y ₄	Y ₅	Y ₆		

The village SAM for Nana Kotda consists of the following components:

Production activities: The production sectors included in the SAM are: (1) crop husbandry—wheat, jowar, bajra, maize, tur, other pulses, oilseeds, cotton, fruits and vegetables, and other crops (cultivation of these crops is divided for irrigated and rainfed areas, but in SAM we have only one column for each crop); (2) animal husbandry—milk and milk products, wool and meat, cow dung manure, and bullocks; (3) construction; (4) service providers and the self-employed—fruit and vegetable vendor, bangle vendor, cloth shop, pan shop, PDS shop, transport, carpenter, and other services; (5) manufacturing—cotton ginning factory; and (6) services—government services (education, welfare) and private services (petty services).

Factors of production: The factors of production included in the SAM are: (1) Labour—males and females (by sex); and (2) capital—capital includes mixed income of the self-employed.

Institutions: The institutions covered in the SAM are: (1) households *by* occupation—small farmers, medium farmers, large farmers, labour, self-employed in non-agriculture, service, and other households (the farmers are divided into three categories based on the cultivatable land owned by them—marginal farmers own up to 2.5 acres, small farmers own from 2.5 to 5.0 acres, and large farmers own land above 5.0 acres); and (2) government—only the village Panchayat (local body) is taken as the government. The village Panchayat receives land and house taxes from households as income and government grants from other sources outside the village. It gives grants for the

development activities such as house construction, which are treated as an expenditure for the Panchayat along with its other expenditures. Savings in the economy, including depreciation on capital, consist mainly of household savings.

Outside the village: Consists of values of sectors and labour going out of the village and coming into the village

Construction of the SAM for the village of Nana Kotda required data on the output in different sectors, the value-added by these sectors, and sector-wise consumption of different components of final demand. The value-added for each sector is divided into labour income (hired) by gender and capital income (including mixed income). Although the sex-wise value of labour is separately available, for inverting the SAM we have made it a single row for the all hired labour.

In all there are 55 producing sectors. The first 13 sectors (from rice to animal husbandry) correspond to the agricultural sector, where many of the items are produced in the village. For the construction of the SAM, the normal yield for the crops has been taken for the last two years (i.e. 2006–07 and 2007–08), because 2006–07 happened to be a drought year. The sectors 14 to 38 are manufacturing sectors where all the items are brought from outside the village—except for cotton ginning (for which there is only one factory), which produces cotton inside the village and sends the entire production, including that of cotton seed, outside the village. The other remaining sectors are the service-providing sectors in the village. The activities could not be separated from commodities because the data available was directly on a commodity basis, both for inputs as well as outputs. Hence, the SAM is directly in the commodity x commodity form. The commodity x commodity matrix is derived from use and supply matrices.

A complete census of all households in the village was carried out to collect data on all entities and the sector-wise expenditure of different types of households, as well as data about the occupation and education level of all household members. Except for salaried and wage-labour households, the details of costs and revenue earned were collected for all households. For example, data collected from wheat producers included data on the value of the output of wheat produced in the fields (area x yield x price), value of the by-products, and consumption of different inputs like seed, fertilizers, pesticides, etc. For salaried and wage-labour households, the details of their incomes were collected.

In addition, detailed information was collected from all institutions/organizations (like schools, cooperative societies, and Panchayats) about their activities, costs, and revenues. Details were also collected about the working of NREGA in the village.

In the SAM for cultivators there is one row under capital for each crop. This is the total for different categories of cultivators. In the column under capital these values have been given separately for different types of cultivators. The entry in the cell of capital and self-employed row is equal to the total of capital column for all self-employed non-agricultural categories. For all other households the entire earnings are put under “capital.” The earnings under labour consist of those for the labour as well as some

helpers getting salaries. There are some labourers who go to nearby villages/Idar town to earn money. The major income from outside the village, however, is from services. The total of their income is put under service households.

For trading activities (like fruit, vegetable, and bangle vendors) income is calculated as net profits earned by deducting the value of inputs from the gross receipts. In the case of fruits and vegetables the expenditure obtained from the census of the household is adjusted for the expenditure by the fruit and vegetable vendor. Similar adjustments have been done in the cases of the cloth shop, the pan shop, and PDS shops.

There are two cooperatives in the village, namely, the milk cooperative and the farmers' service society. The income shown in the column is their profit. This profit is divided among its members who are agriculturists. There is a separate column for this in the SAM in order to show the importance of cooperatives in the village. For the construction of the SAM, as well as for using it for multiplier analysis, we have merged the column with the different columns under crop production (refer to Appendix C).

The SAM is a double-entry table that provides information about the economy. Each row of the table details the receipts of an account, while the columns detail the corresponding expenditure. A SAM is always a square matrix. SAM provides information on interactions between production activities (by sectors), factors of production (capital and labour), institutions (households by occupations, local government), capital accounts, and the rest of the world (imports, exports). These accounts are symmetrically arranged (in rows and columns) forming a square matrix that traces the origin and destinations of expenditure and receipts. A simplified aggregate SAM for the economy of Nana Kotda is given.

The first row gives the income of factors of production. This income consists of the income of male and female labour working in the village, the income of labour working outside the village, and capital income, including the mixed income of the self-employed (e.g., income of the family labour of cultivators). The second row shows the income of the households, which is mainly in the form of the income of the factors of production. It also includes the grants from the government. The corresponding column gives the expenditure of households, taxes paid, and the saving of the household.

The third row gives the income of production activities. This income is in the form of the consumption by households and consumption by the production activities in the form of intermediate consumption and exports. The corresponding column gives the expenditure in the form of payments to factors of production, expenditure on inputs on item produced in the village, and payments to outside world in the form of imports of inputs of materials and labour. The fourth row gives the income of the local government from taxes and the fourth column gives the expenditure of the government. The fifth row, as well as the fifth column, tells about the exports from the village and imports to the village. The last row and last column deal with the capital account, which is in the form of saving of the household, local government, and from outside.

From the perspective of this study, a SAM is a powerful tool in that it can include sufficient details to point out gender differences—and biases—in the division of labour, patterns of income received, and expenditures incurred. In addition to the transparency of income distribution and the labour composition of production (as it emerges from the description of the productive structure of the economy), it allows one to examine the impact of different NREGA works via simulations of hypothetical policy intervention scenarios.