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Rural Livelihoods in Armenia

by

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Rural Livelihoods in Armenia[♣]

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Abstract

In this paper the structure of the rural economy in Armenia is explored from a household perspective. The paper draws on the livelihoods framework, recognizing the different capitals and activities that support rural households' livelihood strategies. Ownership of capitals and access to activities are examined in relation to the incidence of poverty on the basis of data from a recent large-scale survey of rural households in Armenia. Different measures for the outcome of livelihood strategies in terms of well-being are observed, which are consistently linked to income levels across poor and other households. Income-poor households are found to be less well-endowed especially with financial and social capital. They derive smaller income shares from economic activities, and more from dissaving and social payments. The findings are relevant to policies aimed at alleviating rural poverty.

JEL: P46, Q12, R20, O12, O18

1. Introduction

The transition of many formerly communist countries towards a market economy has had mixed economic effects. On one hand, it introduced freedom of enterprise and of trade, allowed a wider choice of consumption goods, and shifted the focus from production volumes to increasing efficiency in production; on the other, in all transition countries unemployment, inequality and poverty have sharply increased and industries have collapsed without sufficient development of new sectors. Particularly in the former Soviet republics in the Trans-Caucasus and Central Asia, which relied heavily on trans-Soviet linkages prior to 1991, the pain of transition has often outweighed its economic gains so far. Market reforms are typically incomplete, the regional infrastructure has broken down, and poverty levels are often high (Milanovic, 1998; UNDP, 1999). Given the importance of agriculture and the generally high proportion of the population living in rural areas in these regions (EBRD, 2002), there is a need for 'developing long-term strategies for improving food security, alleviating poverty and encouraging sound use of natural resources' (Babu and Tashmatov, 1999). Such strategies are predicated on an adequate understanding of the structure of the rural economy.

The present study explores and explains the structure of the rural economy in Armenia on the basis of data from a recent large-scale household survey (Lerman and

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Mirzakhanian, 2001). Conceptually, it draws on the livelihoods approach (Ellis, 2000), focusing on the portfolio of households' economic activities, and the results of that diversity of activities in terms of income and other measures for well-being. This appears to be an appropriate method for investigating rural household behaviour in post-communist societies, where both income levels and income sources have changed dramatically over the last decade.

In line with this approach, the exploration of survey findings focuses on the households' endowment of capitals (natural, physical, financial, human, and social) in section 5; the economic activities in which the households employ these assets (section 6); and the level of well-being, measured in various ways, that households are capable of attaining in their livelihood strategies (section 7). Section 8 makes a formal connection between livelihood components, well-being and poverty by analysing the risk of being poor with a logistic regression model. Section 9 concludes. Before analysing the survey data, we present an outline of the livelihoods framework in the next section, background information on Armenia in transition in section 3, and an introduction to the data in section 4.

2. Livelihoods, Diversity and Well-being

This paper is structured around the concepts of livelihood and diversity. 'A *livelihood* comprises the assets (natural, physical, human, financial and social capital), the activities, and the access gained to these … that together determine the living gained by … the household' (Ellis, 2000:10). Thus, the unit of study is the household. Assets form households' endowment of resources with which to gain their living. In this definition, the conventional meaning of assets is expanded to include, besides material and financial resources, also household members' skills and experience (human capital), their relations within wider communities (social capital), and their natural environment (natural capital). Assets are combined with economic activities (wage employment, entrepreneurship, migration labour, etc.) to result in a household's livelihood. A livelihood thus comprises a household's 'means to a living', or its strategy to attain a level of material well-being, reflected in income, consumption, satisfaction, health and longevity, and other measures.

The second central term in this paper is *diversity*, which follows naturally from the idea of livelihood. Diversity in a household's activities and income 'refers to the existence, at a point in time, of … different household income sources…' (Ellis, 2000:14). Households' incomes normally derive from more than one source: income diversification is the norm, specialisation the exception (Barrett *et al,* 2001). This recognition corrects the conventional portrayal of rural households as depending on farm income, which in fact is but one of potentially many income sources.

Typically, household income diversity is especially large in rural areas. Rural households are often producers as well as consumers, which implies the presence of profit (from sold output) and in-kind income (if output is consumed) as household income components in addition to, for instance, wages. Also, the gap between urban and rural incomes (Rauch, 1993), the urban bias in economic development and the more limited market development that often characterises rural areas (Gruever and Zeager, 1990) make it less likely that any single source of income is sufficient to meet rural household needs.

For similar reasons, income diversity is particularly relevant to developing economies. There is a growing awareness that the traditional approach equating rural areas with agriculture in much development thinking is, and probably always was, false. Rural

households in Africa derive up to 40-45 % of their income from non-agricultural sources; in developing Asia this is about 30 %, in Latin America 40 % (Haggblade *et al,* 2002). More recently also rural diversity in the transition economies in Central and Eastern Europe and the former Soviet Union has received attention from academics and the international institutions (Csaki and Tuck, 2000; Csaki and Lerman, 2001; EBRD, 2002; Spoor, 2003).

3. Armenia during Transition

Armenia is the smallest former Soviet republic outside the Baltic States. It is a mountainous country of less than 30,000 sq. km located in the Trans-Caucasus, bordering Turkey, Georgia, Azerbaijan, and Iran. Its population is 3.1 million, with another 5 million Armenians living outside the state territory (EBRD, 2002).

During the Soviet era, Armenia was an industrialised country with a large rural population. The market-oriented reforms introduced in 1991-92 comprised the privatisation of many productive resources and organisations, a large degree of liberalisation of trade and prices, and decentralisation of economic decision-making. Importantly for the rural economy, Armenia was one of the few former Soviet Republics to privatise agriculture effectively and swiftly during 1991-92: the bulk of cultivable land and agricultural output is now in small family farms (Lerman and Mirzakhanian, 2001). The macroeconomic and structural reforms led to a severe economic contraction, but growth resumed as early as 1994. By 1993, GDP had declined to 47 percent of its 1990 level, and then gradually recovered to 68 percent in 2000. Agricultural output, on the other hand, did not register any significant declines during transition, remaining stable during 1990-97 and increasing afterwards to 113 percent of the 1990 level (CIS, 2001). This is an exception to the strong downward trends observed in all former Soviet republics, and it is probably attributable to the swift and decisive transition to individual farming in 1992. As a result of these differential trends in the growth behaviour of agriculture and the economy as a whole, the share of agriculture in GDP rose from 17% in 1990 to 29% in 1999, while agricultural employment increased from 17% of the labour force in 1990 to more than 40% in 1999. In absolute numbers, agricultural labour nearly doubled between 1990 and 1999 as labour-intensive individual agriculture attracted workers from depressed urban areas (CIS, 2001). During the last decade of the 20th century, Armenia thus transformed from an industrialised state to one that is to a significant degree agrarian.

In addition to the shock of system change from central planning to a market economy, natural disasters and a military conflict contributed to a sharp decrease in welfare. In 1988, Armenia experienced an earthquake affecting 40 percent of its territory and a third of its population. In 1990-94, it was involved in a territorial war with Azerbaijan over Nagorno-Karabagh and absorbed a large inflow of refugees. In 1997 a severe drought followed. *Per capita* levels of income sank by nearly 60% during the initial economic decline, dropping (in constant 1995 dollars) from US$1,500 in 1990 to US$620 in 1992 (MinFin, 2000). Subsequently incomes increased to US$940 in 1999, still nearly 40% below the 1990 level (WDI, 2002). In 1999, 43 % of the population was below a poverty line of US$2.15 per person per day at 1995 PPP. This compares to 19 % in Russia and Georgia and 24 % in Azerbaijan (World Bank, 2000). Poverty is not predominantly rural. Using a relative poverty line, the ratio of rural poverty to urban poverty incidence is 0.9 (Csaki and Tuck, 2000). This is plausibly due to the widespread availability of land outside the cities: consumption of own-

produced food accounts for 43 % of rural incomes, but is reportedly absent in urban incomes (EBRD, 2002).

Table 1 summarises some key economic changes during the transition.

Table 1: Armenia in Transition: Key Economic Indicators

Indicators	1990	1999-2000
Population (million)	3.7	3.1
Emigration (million)		0.9 (1991-2001)
Rural population, %	30	33
GDP (index)	100	68
Agricultural output (index)	100	113
Agricultural employment (persons)	275,400	560,400
Share of agriculture		
... in GDP, %	17	29
... in employment, %	17	43
GNP per capita (constant 1995 dollars)	1,475	943
Incidence of poverty, % of population		
... below $2.15 per day (1995 PPP)	NA	43
... below $4.30 per day (1995 PPP)	NA	86
Food consumption, calories per person per day	1,809 (1992)	1,944 (2000)

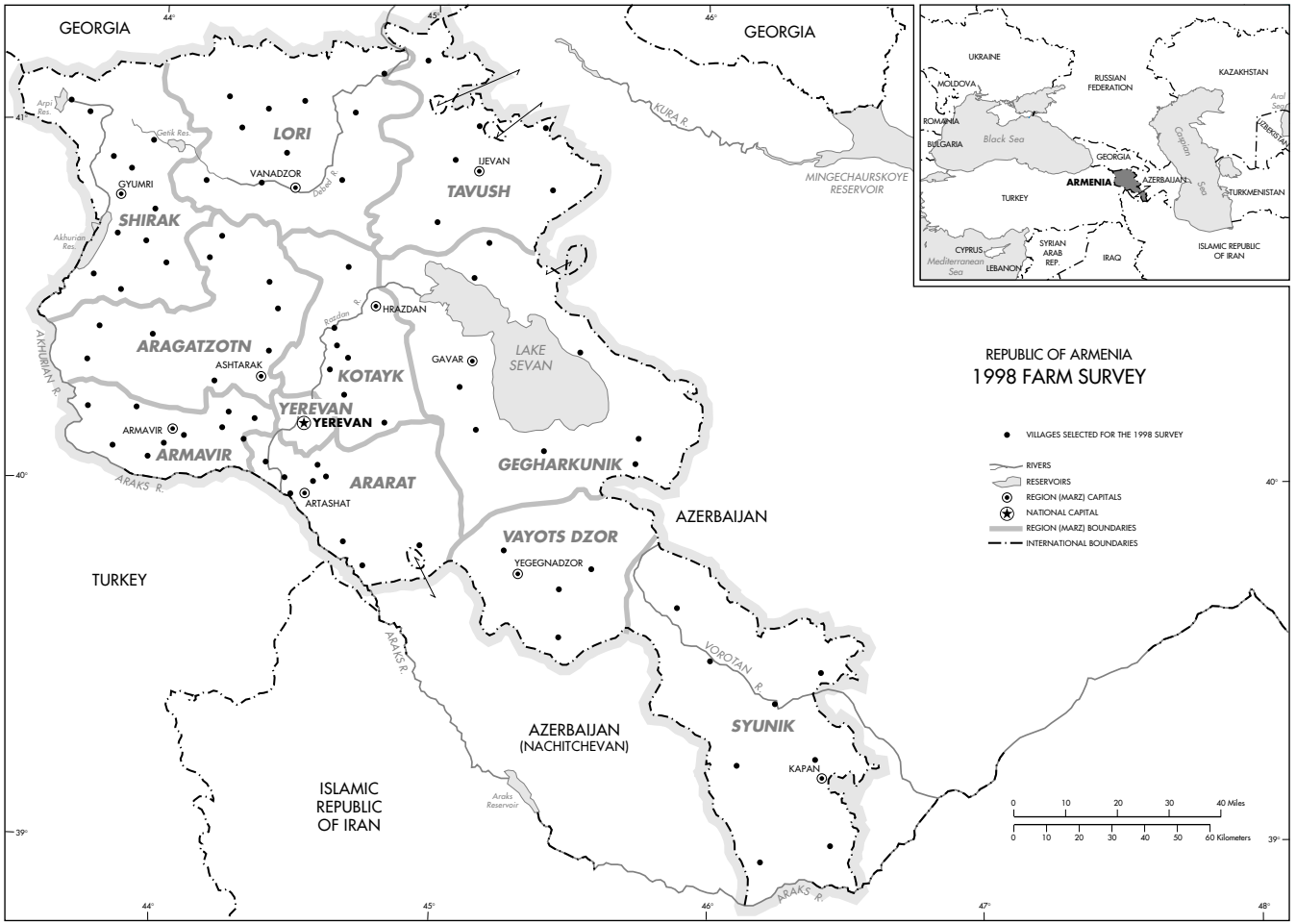
Sources: population and emigration: EBRD (2002), based on the 2001 census; GNP per capita: WDI (2002); incidence of poverty: Csaki and Tuck (2000) based on 1996 LSMS survey; food consumption: FAOSTAT database; all other data: CIS (2001)

4. The Data

The empirical basis of this study is a large and representative survey of rural households in Armenia, implemented in 1998 by the World Bank's Environmentally and Socially Sustainable Development Unit (see Lerman and Mirzakhanian (2001) for details). The survey covered 75 villages and 7,000 people in 1,500 households. This is 9 % of all villages and 0.5 percent of all Armenian rural (more precisely: land-owning) households. Data were collected in all 11 provinces, within which villages were selected randomly. In each village, 20 households were surveyed so as to reach a 1,500 household sample size. The survey was focused on land-owning households since one of its aims was to collect data on the country's agricultural sector. However, with the widespread land ownership that characterises rural Armenia, this did not significantly bias the survey's representation of rural households in general. The map shows Armenia's geography and the location of the villages in the survey.

<Map: The 1998 Household Survey: Geographical Frame>

Data collected in the sample comprised household demographics, education and labour market data, detailed land and food production data, and information on the use and effects of irrigation networks, on savings and credit, on non-farm activities, and on households' experiences during crises. An overview of findings is provided in Lerman and Mirzakhanian (2001).


GEORGIA
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YEGEGNADZOR
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KAPAN
VANADZOR
GYUMRI
IJEVAN
HRAZDAN
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LAKE SEVAN
MINGECHAURSKOYE RESERVOIR
KURA R.
ARAKS R.
AKHURIAN R.
VOROTAN R.
Arpi Res.
Getik Res.
Akhurian Res.
Araks Reservoir
AZERBAIJAN
AZERBAIJAN (NACHITCHEVAN)
TURKEY
ISLAMIC REPUBLIC OF IRAN
UKRAINE
MOLDOVA
ROMANIA
BULGARIA
Black Sea
RUSSIAN FEDERATION
KAZAKHSTAN
GEORGIA
ARMENIA
AZERBAIJAN
TURKEY
Caspian Sea
TURKMENISTAN
CYPRUS
Mediterranean Sea
LEBANON
SYRIAN ARAB REP.
IRAQ
ISLAMIC REPUBLIC OF IRAN
REPUBLIC OF ARMENIA
1998 FARM SURVEY
VILLAGES SELECTED FOR THE 1998 SURVEY
RIVERS
RESERVOIRS
REGION (MARZ) CAPITALS
NATIONAL CAPITAL
REGION (MARZ) BOUNDARIES
INTERNATIONAL BOUNDARIES
0 10 20 30 40 Miles
0 10 20 30 40 50 60 Kilometers
44°
45°
46°
47°
48°
41°
40°
39°

5. Capitals

In this section the nature and quantities of the 'five capitals' that underpin households' livelihoods is explored for the Armenian survey sample. These capitals include natural, physical, human, financial, and social capital (Ellis, 2000), and we examine differences in endowments between 'poor' and 'non-poor' households. Unless otherwise specified, households are classified into poor and non-poor based on the $4.30 poverty line. Based on this poverty line, the Armenian rural sample included 63 % of poor and 37 % of non-poor respondents.

Natural capital

Armenia is a mountainous country, and most of the agricultural land is uncultivable, consisting of mountain pastures and hay meadows. The country is divided into two extremely unequal parts: the narrow strip of the Ararat Valley at an average altitude of 800-1,000 m, which extends along the Turkish border from northwest to southeast and includes the capital city of Yerevan; and the rest of the country, which is mostly mountains with occasional deep valleys (average altitude 1,500-3,000 m). Nearly half the country's population live in the Ararat Valley and, without Yerevan, this region accounts for 28% of the rural population.

The Ararat Valley has the most fertile soils in Armenia. It includes nearly half the Armenian area under vineyards and orchards and about 10% of all arable land; it produces about 40% of the country's agricultural output. Its climate is hot and arid. With less than 300 mm annual rainfall and average maximum temperatures above 38 degrees centigrade, agriculture in the Ararat Valley is highly dependent on irrigation with water supplied from several local rivers (Atlas, 1984). This geographical difference in natural capital endowment is only weakly reflected in poverty figures. In the survey samples from the three provinces of the Ararat Valley, the average share of households below the poverty lines of $4.30 per person per day and $2.15 per person per day (1995 PPP) are 65 % and 30 %, respectively. In the other eight provinces, the average poverty incidence is 66 % and 35 %, respectively (only the difference based on the $2.15 poverty line is statistically significant at $p = 0.05$).

Physical capital

Rural households' main productive physical asset is *land*. As a result of the land distribution policies in the early 1990s, 97 % of households in the sample own land and 15 % lease additional land. Only 2 % have no access to land. The average household uses 1.9 hectares, an average reflecting a rather equitable distribution, with a standard deviation of 1.7 hectares. There is no difference in land use between poor households and other households.

In Armenia's dry climate, *irrigation* is an important asset in agricultural production. Production value per land unit in the 55 % of households with access to the irrigation network is three times higher than is the case for households without irrigation. Households that use irrigation work smaller areas of land (1.4 hectares, of which 0.7 hectares is irrigated) and tend to specialise more in production of fruit and vegetables. Households without irrigation have larger plots (3.2 hectares) and derive a larger share of farm income from livestock production; within crop production, their emphasis is more on staples (mainly cereals) and fodder crops. These households produce more agricultural output in value terms, but the net household income derived from it is lower due to higher costs connected to livestock production. Poor households (those below the $4.30 poverty line) have access to less irrigated land (0.35 hectare on average) than non-poor households (0.44 hectare).

A third component of physical capital is households' stock of *animals*, which constitutes the main asset in livestock production. The typical household in the sample has one cow, one other head of cattle, a few sheep or goats, and some chickens. Poor households have fewer animals; for instance, 0.7 head of cattle compared to 0.9 for non-poor households.

Finally, ownership of *machinery* is rare: only 14 % of households own one or several pieces of equipment, such as tractors, trucks, cultivators, seeders, or combines; in 4 % of households ownership is joint with other households. In contrast, access to machinery through use without ownership is available to 75 % of households, with no significant differences between poor and non-poor households. This points to the importance of machinery rental markets for agricultural production. The overall picture is that of rural households with small-scale farms producing both crops and livestock products and with quite equal access to the various types of physical capital.

Human Capital

A household's human capital is comprised of those individual characteristics of its members, both qualitative and quantitative, that help them to generate income. The main characteristics of human capital are age, education, gender, and household size. The average head of household is 54 years of age; the average age of all household members is 35. The average household has a size of 4.6 persons, of which 2.8 are of working age between 16 and 65; half (53 %) of them are women. Poor households are significantly larger (5.0 members on average) and have more dependants; their average dependency ratio – defined as the share of household members younger or older than working age (16-65 years) – is 0.41, compared to 0.36 for non-poor households.

The highest level of education completed in the household is most often secondary; women having slightly more often general secondary education, men more often vocational secondary education. In a fifth of the households no primary school education was completed by any of the household members, but adult illiteracy is virtually absent. Interestingly, poor households are on average slightly, but statistically significantly better educated than non-poor households.

One other dimension of human capital is the presence of a household member eligible for receiving a pension in the household. Having a pensioner in the household implies access to an important source of income and can be consistently (if not conventionally) viewed as part of a household's human capital. Half the households in this sample included one or more pensioners. Poor households less often so (in 48 % of households) than non-poor households (54 %)

Financial capital

Sources of financial capital include household savings, borrowing, and receiving remittances from family members working outside the home village (within or outside of Armenia). Only 10% of households had any cash savings, while borrowing is reported by the majority of households: 50 % borrowed in 1997, and 65 % of households had outstanding debt in 1998. Poor households are slightly more often borrowers (54 % borrowed in 1997, compared to 48 % of non-poor households), much less often savers (5 % compared to 18 %). They also receive less often remittances (15 % of poor households, compared to 31 % of the non-poor). Although receiving remittances is quite frequent (20 % of households have access to them) and they appear to have a poverty-alleviating effect, remittances are relatively unimportant in total household incomes (4 % of it on average).

Loans taken out in 1997 were predominantly obtained on the informal market. Mostly this was from relatives and friends (for 84 % of households reporting debt) or from private moneylenders (13 %). Only in six cases was this bank credit. Debts varied between 50,000 and 390,000 dram, averaging 170,000 dram, which amounts to just under a third of average annual household income of 509,000 dram (see Table 3, note 7). No interest was reported on any of the loans, and collateral was involved only in 8 % of the cases. Loans were most frequently used to pay land tax, water charges, and debts to other households, which were reported as loan use by 82 %, 49 % and 30 % of borrowing households, respectively.

The picture that emerges from these figures is that of a rural economy with an active, but almost exclusively informal financial market providing small interest-free and uncollateralized loans to households. A plausible motivation for these loan transactions between households may be pooling of scarce financial resources in order to meet tax obligations to the authorities and ongoing debt obligations to private parties.

Social Capital

Social capital may be defined as 'the ability of actor to secure benefits by virtue of membership in social networks or social structures' (Portes and Sensenbrenner, 1998). Various proxies for social capital were observed in the survey data. First, membership in a professional agricultural organisation was reported by 7 % of households, with no significant differences between the poor and non-poor. Second, nearly half (43%) of the households reported co-operation in some farming-related area, most often in irrigation (27 % of households), followed by joint use of machinery and equipment (9%) and joint sale of products or professional consultation (9%). Virtually no co-operation was reported in production, processing, or input purchasing. Non-poor households significantly more often (in 55 % of cases) engaged in co-operation than poor households (37 %).

A third measure for social capital that is highly relevant in Armenia is the incidence of mutual help in hard times, which may reduce households' vulnerability to shocks (Dudwick, 2003). Unsurprisingly in view of Armenia's recent history of drought, earthquake, and political violence, about 45 % of respondents reported they had experienced a serious economic crisis that had endangered the well-being of their family in the last 5 years. About a fifth (21 %) of these households had received help from relatives during and after the crisis, 5 % had received help from others (a state agency, charitable organization, or church). However, 73 % had received no help at all. Households were also asked to report whom they could rely on for help if they were now struck by 'a major crop failure, massive livestock deaths, or some other type of major crisis'. If such an event were to occur, households expected to rely for assistance most frequently, in 48 % of responses, on close relatives, friends, and neighbours. Only a tenth would expect assistance from some state or private institution (village or regional administration, NGO, moneylender or insurance company). The rest (42%) did not expect to receive help. The higher figures for expected help than for actual assistance in the past suggest that either respondents overestimate their ability to rely on help from outside the household, or that such networks of assistance have become more widespread, perhaps in response to recent hardships. Poor households reported significantly less often (in 53 % of cases, compared to 64 % of the non-poor) that they expected to have access to such help.

We now turn to the other elements of the livelihoods framework: households' economic activities, and the incomes and levels of well-being that households attain based on their capital endowments and engagement in economic activities.

6. Diversity in Activities and Incomes

A household's portfolio of economic activities can be measured either by studying its allocation of resources (mainly labour) to different activities, or in terms of household income shares. Tables 2 and 3 present household labour allocated to various economic activities and shares of total household income derived from them.

The main economic activity in this rural household survey is food production by farming the own plot, most often in the areas of both crops and livestock. Over four-fifths of the available labour force in the average rural household is engaged in farming, and this activity is reported by nearly all households (Table 2). The second most frequent activity (for 43 % of households) is non-agricultural self-employment, but the amount of labour allocated to this is quite low. Off-farm wage employment is nearly as frequent: in 36 % of households, one or several household members are employed off-farm. However, on average more than twice as much labour is allocated to off-farm wage employment compared to self-employment. Most frequently (12 %), wage employment is in the social sector, which probably reflects the large presence of aid, relief and development NGOs in Armenia.

While households on average allocate three-quarters of their labour to agriculture, the activity portfolios are even more diversified at the individual level. Of all 4,178 working-age individuals (16-65 years of age) in the sample, only a small minority of 20 % (870 individuals) report full-time employment in agriculture.

Table 3 presents an alternative measure of diversity, which is the structure of household income. Consistently with the relatively large allocation of labour to farming, food production is the dominant source of household income (see column A). Yet income other than from farming accounts for 38 % of household income on average. Most of this non-farming income is derived from off-farm wages and social payments, and the contribution of other sources is of limited importance.

The last two columns in Table 3 (B and C) show the frequency of various sources of income in the survey and the contribution of each source to the total income of respondents reporting income from that particular source. Over 60 % of households in the sample rely on social payments for a fifth of their incomes on average. Nearly 40 % of households report income from wages, which account for a quarter of total income for this group of respondents. A worrying feature in Table 3 is the 18 % of households who derived over a fifth of their 1997 incomes from sale of assets. Sale of household asses appears to be a survival strategy for the poor (Dudwick, 2003). Indeed, poor households in the sample (below the $4.30 poverty line) derived 5 % of household income from this source, compared to only 2 % for non-poor households (the sample mean for this source is 4% of total income – see Table 3).

Income-poor households were found to be significantly less often engaged in economic activities compared to non-poor households. Of all income-poor households (defined by the $4.30 poverty line), self-employment in non-farm or non-agricultural activities was reported by 34 % (compared to 51 % of the non-poor) and wage employment was reported by 36 % (compared to 44 % of the non-poor).

From a livelihoods perspective the figures in Tables 2 and 3 show that rural Armenia does not fully overlap with Armenia's farm sector. Nearly a fifth of labour is allocated in the average household to off-farm activities, in either waged jobs or self-employment; and non-farm sources other than social payment provide a quarter of total household income. There are pronounced differences in participation in economic activities between poor and non-poor households.

Table 2: Household Labour Allocation

Occupational categories	% of households allocating labour to this category	Labour in full-time average labour equivalents[1]	Labour in % of household labour time
Working on own farm	82.3	1.87	82
Employed in waged job:	36.4	0.28	12
… in agriculture	7.7	0.05	2
… in industry	8.3	0.05	2
… in trade	3.3	0.02	0
… in social sector	12.0	0.08	4
… in other state employment	11.1	0.08	4
Self-employed outside primary agriculture	42.5	0.12	5
Total	n.a.	2.27	100

Note: Figures are indicative rather than precise and do not take account of household members employed outside of the locality in (temporary) migration activities.
1. Full time equivalents (fte's) of labour were constructed by equating full time employment to 1.0 fte and part-time or occasional employment to 0.5 fte.
Source: Survey findings

Table 3: Structure of Household Incomes

Source of income	A. Average contribution to total income (%)	B. % of households with income from this source	C. Income share for households in B (100*A/B)
Food production[1]	62	96	64
Salaries	10	39	26
Social payments[2]	13	61	21
Asset sales[3]	4	18	22
Remittances[4]	4	20	20
Other on-farm activities[5]	4	26	16
Non-farm activities[6]	3	15	20
Total household income[7]	100		

Notes: Incomes are defined as revenues from an activity minus any costs. Activities which carry costs (food production and other on-farm or non-farm production) can therefore be negative.
1. Income from food production includes in-kind income, i.e. food produced by the household and then bartered or consumed by the household, valued at regional prices for 12 crop products and 8 livestock products and reported costs in 15 categories.
2. Social payments include pensions, allowances, stipends, scholarships, alimony, and humanitarian assistance from institutions and friends or relatives.
3. Asset sales include sales of household items, such as jewellery and carpets and of land and buildings.
4. Remittances include contributions to household income both from within Armenia (8 % of households) and from abroad (12 % of households).
5. Other on-farm activities include the sale of live animals, renting out land or equipment, providing farm services, processing of farm products, and sale of food.
6. Non-farm activities include providing occasional labour, crafts and small-scale industry, trade and commerce, and provision of consumer services (hairdressing, shoe repair, appliance repair and maintenance, etc.).
7. Average total household income is 509,189 dram annually, or $5,702 at 1995 PPP of 89.3 dram to the dollar (WDI, 2002).

Source: Survey findings

7. Incomes and Well-Being

Having reviewed households' capitals and diversified activities, we now turn to the levels of well-being that these livelihood components allow households to achieve. The level and distribution of several measures for well-being were observed in the sample, including incomes, expenditures, consumption, satisfaction of basic needs (nutrition and shelter), and households' capacity for wealth accumulation.

Incomes comprise both cash and in-kind income (which is food produced and consumed by the farm household). With a share of on average 56 % of on-farm food production consumed by the farm family, in-kind income accounted for 60 % of total household income of 509,000 dram in the sample. At the 1995 PPP exchange rate of 89.3 dram per international dollar (WDI, 2002), the average household income in the sample (both cash and in kind) was $5,702 in 1997. This translates to per-capita annual income of $1,387, or $3.80 per person per day on average.

These figures expressed in 1995 PPP dollars imply poverty rates that can be compared to those based on other data. Table 1 shows that, based on 1996 data, 43 % of all Armenians (not just the rural population) were below the poverty line of $2.15 per person per day and 75 % were below $4.30 per person per day. This compares to 34 % and 66 % respectively in our 1997 sample. Allowing for differences in sampling time, methodology, and income calculations, and bearing in mind that the incidence of poverty is lower in rural areas in Armenia (see section 3 above), these results are plausible and strengthen confidence in the survey findings on incomes and poverty.

As the high percentages of people in poverty suggests, average income figures are based on large underlying income differences. These are also reflected in the Gini coefficient, an inequality measure which moves closer to zero with decreasing inequality. It was calculated both on a per capita consumption basis and on a per capita income basis, where consumption (comprising both cash expenditures and consumption from in-kind income) can be argued to more directly reflect well-being than income (Deaton, 1997). The consumption-based Gini coefficient in our rural sample is 0.47, the income-based Gini coefficient 0.46[1]; this compares to a World Bank nationwide estimate of 0.44 for 1996. Income inequality in Armenia is about at the same level as in Russia and Uzbekistan and is substantially larger than in Georgia, Azerbaijan, Kazakhstan, and Tajikistan, where the income-based Gini coefficient is below 0.40 (WDI, 2002).

Poverty has more dimensions than just income. Table 4 illustrates this by presenting various measures for well-being and vulnerability, separately for income-poor and non-poor households, classified relative to the poverty line of $4.30 per person per day (1995 PPP). Income-poor households have lower consumption levels (as measured both by total consumption and by cash expenditures). They have more often experienced a crisis in the recent past. Their diet quality, reflecting food security considerations, is lower, although on average respondents evaluated their diet as not very poor.

A households' stock of consumption goods also reflects well-being in that it signals households' ability to survive shocks to their income and is a result of their potential for accumulation based on past income (de Janvry and Sadoulet, 2000). In-kind wealth may be held both in productive assets, such as land, irrigation systems, livestock, and machinery, and in consumption goods. The most important consumption goods in rural Armenia are the family home and the food stocks stored by the family for times of need. Two-fifths of

[1] Details of the calculation of the Gini coefficients are available on request from the authors.

respondents rate their housing as satisfactory, while over a quarter rate it as poor or very poor. Nearly all households (95 %) keep food stores, which in a crisis would last for between 2 and 3 months on average. These stocks are important for household survival: in an average winter month, 55 % of food consumed by the average household comes from their stores, half of it produced by the household itself. Table 4 shows that income-poor households report lower levels of well-being also by these measures.

Table 4: Average Well-being Indicators: Income-Poor and Non-Poor Households

Well-being Indicators	Households		
	Poor (n=942)	Non-poor (n=542)	All (n=1,484)
Annual per-capita consumption ('000 dram)	46.2	99.9	65.5
Annual per-capita cash expenditures ('000 dram)	9.7	11.7	10.6
Vulnerability to crisis in recent past (%)	47	41	45
Diet quality (1=excellent, 5=very poor)	3.5	3.1	3.4
Food store quantity (months)	1-2	3	1-2
Housing conditions (1=excellent, 5=very poor)	3.3	3.0	3.2

Notes: All differences between poor and non-poor households are statistically significant for $p < 0.01$.
Source: Survey findings.

Inequality in incomes and consumption is also reflected in inequality in diet quality, housing conditions and food stocks. Virtually none of the respondents is well off, and most experience a standard of living that is considered only just satisfactory

8. Assets, Activities and Poverty

The livelihoods approach suggests that households' endowment with capitals and involvement in activities matters to the outcome of their livelihood strategies in terms of well-being. Table 5 shows how capital endowments and activities are related to a household's risk of being in poverty. The table draws together from sections 5 and 6 the differences in ownership and quality of physical, human, financial and social capital and the differences in economic activities between poor and non-poor households, classified relative to the $4.30 poverty. The table also displays the results of a binary logistic regression that was used to estimate the effect of changes in assets and activities on the risk of poverty. Some of the variables in Table 5 enter the logistic regression as continuous quantitative regressors. For these variables, the first three columns give the means for the entire sample and for the poor and non-poor subsamples. Other variables are enter the logistic regression as dichotomous regressors with yes/no values. For these variables, the first three columns give the frequencies of yes values for the entire sample and for the two poverty-level subsamples.

Poor households are shown to have less land, less access to irrigation networks, and fewer livestock. They have larger households and relatively more dependants. Since they are younger on average, these dependants are typically children rather than elderly people. They are better educated (but in a now outdated education system) and have less often access to pension payments. They are more often borrowers and seldom savers. They less often participate in professional co-operation, less often received help in a recent crisis or expect this to happen. The largest relative differences between the poor and the non-poor are in financial capital and in access to networks of co-operation and support, less in access to physical capital. As to activities, the main finding is that income-poor households less often

access any of the sources of earned income. They more often engage in sale of household assets, which plausibly represents a poverty-distress livelihood strategy.

Table 5: Assets, Activities and Poverty

Variables	Sample means and frequencies			Logistic regression results[2] (n=1,458)		
	All	Poor [1] (n=963)	Non-poor[1] (n=496)	odds ratios (Std. Error), significance		
Natural capital						
Location in Ararat valley (yes/no)	27%	26%	29%	0.843	(0.145)	
Physical capital						
Land (hectares)	1.88	1.78	1.90	0.842	(0.037)	***
Irrigated land (hectares)	0.38	0.35[a]	0.44 [a]	0.499	(0.063)	***
Cattle (head)	0.8	0.7 [a]	0.9 [a]	0.312	(0.058)	***
Using machinery (yes/no)	75%	74%	77%	1.129	(0.176)	
Human capital						
Household size (persons)	4.6	5.0 [a]	3.9 [a]	1.410	(0.082)	***
Average age (years)	35	33 [a]	41 [a]	0.976	(0.008)	***
Dependency ratio (fraction)	0.39	0.41 [a]	0.36 [a]	1.004	(0.003)	
Highest education level (1-5 scale)	2.9	3.0 [a]	2.8 [a]	1.063	(0.083)	
Working-age women (% hh size)[3]	53	53	52	1.010	(0.004)	***
Pensioner(s) present (yes/no)	51%	48% [b]	54% [b]	0.795	(0.149)	
Fnancial capital						
Borrowing (yes/no)	50%	54% [a]	43% [a]	1.370	(0.184)	**
Savings (yes/no)	10%	5% [a]	18% [a]	0.338	(0.075)	***
Social capital						
Membership in prof. organisation (yes/no)	7%	8% [a]	5% [a]	1.562	(0.447)	
Co-operation (yes/no)	44%	37% [a]	55% [a]	0.634	(0.090)	***
Expects help in crisis (yes/no)	57%	53% [a]	64% [a]	0.776	(0.105)	
Activities						
Wage employment (yes/no)	39%	36% [a]	44% [a]	0.474	(0.069)	***
Sale of household assets (yes/no)	18%	21% [a]	14% [a]	1.262	(0.229)	
Other farm activities (yes/no)	26%	22% [a]	33% [a]	0.803	(0.123)	
Non-farm activities (yes/no)	15%	12% [a]	18% [a]	0.665	(0.123)	*
Remittances (yes/no)	20%	15% [a]	31% [a]	0.393	(0.063)	***
				Key regression statistics		
				Correctly classified: 74.5%		
				LR chi(21): 386.81		
				Prob > chi²: 0.000		
				Log likelihood: -689.3751		
				Pseudo R²: 0.2191		

Notes:

1. Poverty is based on a poverty line of $4.30 per person per day (1995 PPP). The number of poor and non-poor reported below are different for different variables, dependent on missing values of these variables. In the comparisons, superscript a denotes differences between poor and non-poor households are statistically significant for $p<0.01$; superscript b indicates significance for $p<0.05$.
2. Logistic maximum likelihood estimation performed in STATA 7.0, modelling the probability of being poor. Here * indicates that the regression coefficient underlying the odds ratio is statistically significantly different from zero for $p<0.10$, based on the value of the z-statistic; ** indicates significance for $p<0.05$; *** indicates significance at $p<0.01$. Further details of the regression estimation are available on request from the authors.
3. In 179 cases with missing values for female household members, the percentage of women among adult household members was imputed by regression.

Sources: Survey findings

The results from the logistic regression analysis are most conveniently interpreted in terms of odds ratios (or risk ratios), which are defined as the exponentials of the corresponding regression coefficients. The percentage change of the risk of being poor due to a unit change in a particular explanatory variable (keeping all other variables constant) equals the difference of the risk ratio from 1. If the risk ratio is less than 1, increasing the explanatory variable by one unit reduces the risk of being poor. Conversely, if the risk ratio is greater than 1, increasing the explanatory variable by one unit increases the risk of being poor. For binary variables, the risk ratio gives the effect of changing that variable from value 0 to value 1, i.e. the effect of a change in state. For instance, the risk ratio of irrigated land is 0.499, which means than one extra hectare of irrigated land reduces the risk of poverty to 50 % of the risk before the addition of more land. Having a pensioner in the household (risk ratio 0.755), reduces the risk of being poor by 25 % compared to households without a pensioner, and receiving remittances (risk ratio 0.395) reduces the risk of poverty by 60 % compared to households that do not receive remittances.

The results on physical capital variables show that land area, and especially irrigated land area, as well as livestock ownership all reduce the risk of poverty. Access to machinery, counter-intuitively, increases the risk of poverty by 13% (risk ratio 1.129), but the coefficient of machinery access is not significant statistically, as is the difference in the percentage of households with access to machinery between the poor and the non-poor groups. There is also no separate significant effect for natural capital (location in the Ararat Valley), plausibly because its positive effect is already captured in physical capital variables, particularly irrigated land areas.

One human capital effect is that larger households are more at risk of poverty. With risk ratio of 1.410 on family size, one extra person in the household increases the risk of poverty by 41%. A higher average age (fewer children) and relatively more men also reduce poverty risk; but the effect is very small (although statistically significant). Education does not have a statistically significant effect on poverty, which is understandable in light of the modest difference in educational attainments between the poor and the non-poor, and perhaps limited relevance of education in the former system to present income levels. Also households with more dependants (keeping the total household size constant) are not significantly more at risk of poverty.

Among financial capitals, both higher savings and smaller borrowing are significantly related to a reduced risk of poverty. In both these cases, however, we have serious causality problems. It may in fact be that non-poor households tend to save more and to borrow less. The causality thus flows from the household's welfare status to savings and borrowings, instead of the other way round, as assumed by our model.

Social capital as represented by co-operation in professional networks significantly reduces the risk of poverty; while formal membership in a professional organisation does not. This suggests that relationships supported by regular or continuous interaction are especially important for preventing or escaping poverty. An expectation of help in the event of calamity is weakly associated with reduced poverty risk. Such reliance on social networks is obviously relevant for vulnerability (which relates to discrete, one-time events), but apparently less for poverty (which relates to a permanent state).

Households' involvement in all economic activities, except selling the household assets, is poverty risk-reducing, as expected. This is most significantly (both in the economic and statistical sense) the case for remittances and wage employment. Thus, although remittances constitute only a small part of total household income on average, they appear

important for keeping rural households out of poverty. The poverty-reducing effect of having a non-farm activity is not statistically significant.

Overall, the results show that household categories particularly exposed to the risk of poverty are those without adequate agricultural assets (such as irrigated land and livestock), those with larger families, those unable to save, those left outside networks of professional co-operation, and those with no access to wages or remittances.

8. Conclusions

In this study the nature of livelihoods in rural Armenia is explored based on a recent large-scale household survey. In line with a large body of research on rural diversity, the present paper finds that rural households draw their incomes from a range of sources. Most important is farming, i.e., food production in the areas of both crops and livestock, which generates cash income from sales and in-kind income from own consumption. Wages from employment are common as complementary income. Social payments are also important, reflecting the damage recently done to Armenia's rural economy by economic and political disintegration, war, earthquake, and drought. In line with other empirical literature, there is evidence of a high incidence of poverty and large income inequality. Rural Armenians cope by diversifying their portfolio of activities, by pooling financial resources, and by relying on co-operation in economic activities and on mutual aid in the event of a calamity.

We find evidence that access to the various forms of capital and involvement in various economic activities are linked to the risk of poverty. The rural poor in Armenia have generally lower quantities and qualities of physical, human, financial, and social capital. In particular, they have fewer agricultural assets, are unable to save and do not access networks of professional co-operation. They also derive less of their income from each of the separate categories of economic activities, and more from social payments and sale of their assets. Their lower incomes are consistently reflected in other measures for well-being including consumption, satisfaction of basic needs, and vulnerability to crises.

In view of this reality, poverty alleviation policies should include three elements. First, households' access to resources for food production should be secured. In this respect the 1991 land reform was very effective in combating deeper poverty than is already observed. It could be complemented by a more effective farm support systems in terms of extension, credit, marketing, and producer co-operation.

Culturally appropriate forms of social capital also appear to have the potential to aid rural income generation and reduce vulnerability to income shocks. Support to local NGOs, credit unions, producer organizations, water use associations, churches, and other groups may have positive effects on the income generating capacity of their members and, through production linkages, on the wider local economy.

Finally, wage employment is an important source of income, and a direct gain to poor households would be generated by widening opportunities for employment in rural commerce, services, and industry. This would give many, and particularly the poorer households, the option to improve their incomes. Support for, and expansion of, other rural non-agricultural activities such as small-scale enterprises would also be beneficial to the livelihoods of the poor, who are most involved in the rural non-agricultural economy.

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