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Utilities' Pricing and the Poor: the Case of Armenia

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Executive Summary

1. Armenia gained independence in 1991 with the break-up of the FSU and the collapse of the CMEA; its transformation to a market economy was subject to a series of exogenous shocks and by 1993, GDP was only 46 per cent of its 1990 level. Economic growth resumed in 1994 and has averaged 7.5 per cent per annum in real terms up to 2003.
2. In 1996, 54.7 per cent of the population were classified as poor and 27.7 per cent suffered from extreme poverty. By 2003, the head count poverty measure stood at 42.9 per cent of the population, with the number in extreme poverty falling to 7.4 per cent of the population. Yerevan experienced the steepest fall in poverty. The transition to a market economy was accompanied by a sharp rise in the inequality in income distribution. The Gini Co-efficient has fallen in recent years but it is still high by international standards (0.434 in 2003).
3. The Government of Armenia's (GoA) policy objectives are to maintain and broaden economic growth and to reduce poverty and inequality through pro-poor growth as outlined in its Poverty Reduction Strategy Paper (PRSP). Sustained employment growth and more effectively targeted social transfers are key elements in this strategy.
4. Another important element is the selective privatisation, restructuring and commercialisation of public utilities, in particular, electricity, water (both household consumption and irrigation for the agricultural sector), gas and heating. These structural reforms are an integral part of the transition to a market economy and are aimed at raising efficiency and eliminating the need for public subsidy.
5. The purpose of this paper is to attempt to estimate the impact on poverty (by considering household expenditure) of further rises in electricity, and household water tariffs, and to analyse the impact of higher irrigation charges on the agricultural sector.
6. The analysis of utility pricing requires a counterfactual against which to assess the consequences of policy choices. It is important to distinguish between the before-after comparison of pre-1991 with post-1999 and the 1991-99 period with post-1999. Although both are legitimate, the view in this paper is that the second comparison is the most sensible. As the pre-privatisation status quo was not beneficial to the poor this suggests that it is possible to devise policies which are both pro-poor and ensure financial viability to service providers.
7. The analysis utilises published and unpublished secondary data and data on consumption baskets derived from the NSS for the years 1998/99, 2001 and 2002.
8. The likely effects of the proposed changes in irrigation water tariffs are discussed to establish their likely effects on rural poverty.
9. Electricity tariffs have already risen significantly and the other main utility tariffs are scheduled to increase, in order to cover costs, finance new investments and eliminate dependence on public subsidy.

10. Pre-1991, utility services in general were equitable but inefficient; most households had access to reliable, inexpensive electricity; connections to piped utility water were common, with household tariffs set below costs. By the mid- to late-1990s however, the utilities were in crisis; the failure to maintain and invest in the utilities, the decline in the quality of service, increasing losses and greater dependence on public subsidies and poor payment compliance, meant that systems were on the point of collapse.
11. The distributional consequences of subsidies were not self-evidently pro-poor and there is no evidence that non-payment was linked to income level.
12. GoA and the IFIs saw poor payment compliance as the result of inappropriate institutional incentives and limited operational capacities. The view was taken that final prices should reflect real resource costs, irrespective of their distributional implications, and that new institutions, with clear incentives and supported by an effective legal framework, were needed to enforce payment.
13. For electricity, restructuring and privatisation has already occurred within a new regulatory framework; payment compliance has risen dramatically and subsidies have been eliminated. The reform of domestic water supply is following similar principles; the restructuring of utilities supplying irrigation water is less advanced although moves towards full cost recovery will intensify in the next few years.
14. The degree to which increases in tariffs and in payment compliance impact on the poor depends on the degree to which the Social Security System is able to accommodate these changes. The Social Security System in Armenia was substantially reformed in 1999. Social Security is divided between social assistance, pensions and social insurance and employment and remuneration regulations.
15. The major element in the social assistance programme is the family benefit system. This targets benefits at the very poor below the food poverty line. Evidence suggests that it has been effective for this group but benefit levels are very low and subject to dramatic changes due to budgetary constraints.
16. Other forms of benefit do not provide an effective cushion against poverty. Pensions are very low and have risen only slowly. They are not sufficient on their own to lift the old out of poverty. Unemployment benefit is paid to only a small proportion of the registered unemployed, who are only a small proportion of the overall unemployed.
17. In summary, the Social Security System provides basic support for the very poor but little for those above the food poverty line but below the overall poverty line. In addition, the budgetary allocations for benefits and the benefit levels are subject to unpredictable changes.
18. The evidence from other countries, largely in Latin America, suggests that the incidence of subsidies pre-reform largely benefited middle-income consumers and that post-reform, the poor may have benefited through better access and a more reliable service, although at the same time paying higher prices.

19. In Armenia, welfare gains from increased access would have been of less importance had not the systems deteriorated in the 1990s; given the latter situation, however, it is at least in principle possible that better access following restructuring and privatisation provided welfare gains to lower income households.
20. An earlier study (Lampietti et al 2001) estimated that current expenditures on utilities accounted for 18 per cent of poor and 11 per cent of non-poor average household monthly expenditures. Household energy consumption accounted for between 16 and 30 per cent of monthly household cash expenditures. The 1999 electricity price rise was estimated to have led to a fall in electricity consumption of 17 per cent, a fall in collection rates and an increase in arrears. It concluded that many poor households were spending the minimum on electricity consistent with meeting their basic needs.
21. These estimates are significantly higher than those based on NSS data and our own estimates. Expenditure on electricity accounted for 2.9 per cent of consumer expenditure in 1998/1999, 4.9 per cent in 2001, 4.4 per cent in 2002, and based on NSS data, 4.3 per cent in 2003. Some reconciliation of these two sets of data is possible. The Lampietti et al (2001) survey excluded those households declaring zero electricity consumption whereas the NSS data include such households. The Lampietti survey was conducted shortly after the large electricity price increases in 1999 and it is possible that in the short run, the impact would have been to push up expenditure, with an adjustment in the longer run to lower physical consumption.
22. Estimated per capita expenditure on water was insignificant at 0.25 per cent of consumer expenditure in all three years and in fact fell in 2002.
23. To explain the results for electricity, it is argued that there is a kinked demand curve; if poor households are “on” the very elastic section of the schedule, even a small increase in price will lead to a large cut in consumption; once consumption is cut to the minimum to meet basic needs however, poor households face difficult choices – either pay more for the same level of consumption, cut back on consumption, refuse to pay their electricity bills, obtain electricity illegally and/or switch to substitutes (with perhaps deleterious consequences for their health and the environment).
24. When consumption expenditure is analysed by decile income groups, a non-linear relationship is identified. For expenditure on electricity, the lowest decile group (the very poor) spend a higher proportion of total consumer expenditure on electricity than do the very rich (the highest decile group). But for decile groups II to V, expenditure on electricity accounts for an even higher proportion of consumer expenditure. It may well be therefore that it is the poor, rather than the very poor, who are more vulnerable to further increases in electricity prices. The very poor simply cannot afford to pay higher prices and must therefore cut consumption and/or search for substitutes.
25. Electricity meter coverage is now complete, especially in the urban areas and payment of electricity bills (compliance) was 94 per cent in 2003.

26. Although connection to piped water was common in Armenia service was often unreliable and households spend considerable time transporting, pumping and storing water.
27. The domestic sector has become much more important to the water industry and tariffs to domestic customers were increased by almost 100 percent between 1995 and 1999. However, non-payment has become a major problem with bill enforcement almost non-existent.
28. Lampietti et al. (2001) argue that the Armenian water utilities are caught in a low-level equilibrium trap, characterised by decreasing service quality and falling revenue. Dissatisfaction is widespread, with the rural poor having the lowest level of satisfaction and having significantly less access to running water compared to the rural non-poor and urban households.
29. Metering increased markedly in Yerevan in 2004 and is beginning to spread outside the capital. Although it is still a small proportion of total users, the speed with which metering is being extended suggests that payment compliance may rise sharply in the near future. At present, self-reported usage is significantly underreported; this misperception is used as a common justification for not paying bills.
30. Lampietti et al (2001) estimate that if payments were fully enforced expenditure by households on water would represent 8 percent of monthly expenditure. For those household who pay their bills water represents 7 percent of monthly household expenditure.
31. The results reported here are consistent with Lampietti et al. (2001); despite the reported level of tariffs for both domestic water and sewage, the data indicate an extremely small expenditure by all decile groups. This strongly supports the evidence of significant under-reporting of usage and/or non-payment.
32. The crucial issues are therefore whether the utilities can monitor usage and, if so, enforce payment for what is consumed. The first of these depend on the extension of metering.
33. If payment is enforced we expect a similar response to that in electricity. Many poor households will reduce their consumption to a basic minimum suffering a welfare loss. If they attempt to cut consumption below this level by seeking alternative less healthy sources of supply this raises fundamental public health issues.
34. The agricultural sector was de-collectivised in 1991 through a comprehensive and equitable programme of land privatisation. There are currently 337,000 privately owned family farms, between one two hectares in size, and accounting for over 95 per cent of agricultural output. It is estimated that 50 per cent of the rural population (35 per cent of total population) is poor.
35. In the 1990s there was a shift in cropping patterns towards subsistence crops, mainly grains and potatoes, away from fodder crops, fruits and grapes production. This farm structure is not conducive to the commercial exploitation of agriculture and will not provide the revenue for the investments

necessary to change Soviet-style infrastructure, especially the rehabilitation of the irrigation system which is in disrepair and does not provide the level of service which a productive agricultural sector requires.

36. Domestic demand represents the biggest outlet for agricultural production but despite significant growth in the agricultural sector, rural farm incomes have declined and rural poverty has remained unchanged. Part of the benefit of agricultural growth is being realised in the urban sector.
37. The irrigation system remains heavily subsidised; fees do not reflect the cost of supplying the water and non-payment by farmers is common. There is pressure on the GoA to reach full cost recovery by 2007.
38. Central responsibility for water supply was given to the State Committee for Water Management in 2001. Irrigation water is supplied to farmers by the village councils or local water enterprises. It is widely accepted that lack of ownership of the system is a major reason for lack of maintenance, inefficient use of water and high transmission losses. Water Users Associations were introduced in 1996 to test the transfer of operation and maintenance of tertiary irrigation systems to private water users but they have not been successful in improving water delivery mechanisms.
39. The irrigation system of Armenia, built originally to service large Soviet farms, has to be transformed to service the new farm structure. At present, farmers are unwilling to pay for water when supply is unreliable, they receive no technical support in planning water use and they are largely unaware of the marginal benefits of irrigation use on their farming systems.
40. A PSIA published in 2003 estimated the effects of increased water tariffs on farm profits. The quantitative results must be treated with care but they point to a worsening situation in fodder production in the relatively productive marzes but positive profits for most other crops. In the less productive marzes, where poverty levels are higher, the overall situation deteriorates.
41. There is evidence of significant changes in cropping patterns following the increase in irrigation charges and data from the 2003 Agricultural Survey show that the share of irrigation in total production costs has fallen dramatically as compared to 1997. This is almost certainly the result of a fall in consumption, consistent with the fall in farm incomes of rural households.
42. Higher water charges are likely to be an important factor in the increased financial vulnerability of farms, putting economic development at risk and adding to health and environmental risks if farmers switch to extensive use of drainage and waste water (qualitative results of the 2003 PSIA).
43. Lack of data made it impossible to up-date the 2003 PSIA. However given the changes in agricultural land use since 1998 and the associated changes in agricultural output and water tariffs, coupled with knowledge of the irrigation needs of different crops and the availability of irrigation water by marze, we can make some preliminary predictions as to whether the move towards staple crops will continue, or whether there will be a return to traditional cash crops.

If the former is the dominant trend, the potential for rising poverty is increased.

44. It can be tentatively concluded that the fall in the use of irrigation water at the national level, coupled with increases in tariffs, can at least partly explain the inability of the agricultural sector to improve output yields
45. If the GoA is able to enforce payment for irrigation water in the near future, rural households without an off-farm source of income with which to subsidise agricultural production will not be able to meet the full costs of water supply
46. The dangers of charging the full cost of water supply to the sector in its current state are that first, it may cause a rationalisation of the sector with a significant increase in poverty (extreme poverty is found among the landless) and second it will hinder or prevent the GoA's strategy for sustainable development which aims to use the natural resources of Armenia in an appropriate way.
47. A successful rural development strategy that is able to realise the potential to increase productivity and raise quality depends upon an irrigation system that is reliable and accessible to areas in which the production of profitable crops is possible.
48. It must be taken as given that the GoA will pursue its policies of restructuring and selective privatisation and commercialisation of utilities provision with the objectives of moving to full cost pricing, the elimination of public subsidies and full payment compliance. The position of the GoA is that poverty alleviation should be achieved through the social security/benefits system rather than attempted through the manipulation of utility tariffs.
49. However, the social security/benefit system is not designed, nor does it provide, adequate protection for any but those below the extreme poverty line. Those who are poor but not in extreme poverty are vulnerable to the effects of utility price rises taking place and in prospect.
50. This opens the debate as to how to protect vulnerable, poor households in the absence of the extension of social benefit support. The alternatives are some form of lifeline tariff which subsidise an initial block of consumption or direct income transfers.
51. Income transfers work well in countries with low degrees of poverty and with sufficient funds to finance the administration of social assistance and with a small informal sector than makes means testing easier. Armenia, with its widespread poverty, insufficient budget resources and limited capacity to means test, does not meet these criteria.
52. The objections to the use of life-line tariffs are: that the complexity of the changes taking place makes it difficult to isolate the impact of utilities; that welfare programmes aimed at consumers will not reach the unconnected poor; the inefficiency generated by imposing social and welfare objectives on the utilities. However, lifeline tariffs may still be efficient in the second best sense than relying on the inadequate social welfare programme.

53. Access and affordability of utility services are the key issues for the poor and attention has focused on two forms of cross-subsidy – Obligatory Service (OS) and Universal Service Obligation (USO). Under OS utility operators must allow access to their services to all users who wish to join the system at the prevailing tariff. The USO is intended to give all households access to the system but controls tariffs so that an ‘acceptable’ level of consumption is achieved. The high levels of persistent poverty and unemployment in Armenia and the attendant risk of self exclusion suggest the importance of Universal Service Obligations.
54. There are a number of methods of financing Universal Service Obligations: cross-subsidies among consumers; direct transfers to consumers; the setting up of a specific fund; the extension of the concession to the company(ies) concerned. An ideal scheme maximises the benefits for the target group but minimises the efficiency losses through distortions.
55. A block tariff provides such a mechanism. Appropriate choice of tariffs would shield the poor without compromising the financial viability of the utilities.
56. The objections to this device are that having different tariffs for any of the utilities provides scope for households receiving the service to re-sell in an informal market. However, the increasing (and in the case of electricity almost complete) coverage of meters makes this much less persuasive.
57. The cost effectiveness of such a scheme depends on identifying accurately the ‘kink’ in the demand curve which separates the inelastic part of the schedule, where price increases have high welfare costs, from the elastic portion. The existence of metering provides a method of establishing accurate physical consumption data which, in principle, could be linked to other characteristics of the household to establish this point.
58. The collection and estimation of such a consumption level in the case of the major utilities is an urgent priority for the GoA.
59. It is impossible given the limited availability of statistical data to provide a quantitative assessment of increased water tariffs on Armenian agriculture; the high levels of non-payment at present suggest limited consequences.
60. However, if the GoA is able to enforce payment in some manner there is little doubt that households without an off-farm source of income could not meet the full costs of water supply and rural poverty will rise.
61. Charging full costs in the current state of the agricultural sector may also cause a rationalisation of the sector with significant cost in terms of rising poverty as extreme poverty in rural areas is found among the landless.
62. Such a strategy may also impede the development of the GoA’s strategy for sustainable development
63. The high productivity levels needed to alleviate rural poverty and contribute sustainable development in Armenia will not emerge until the irrigation system is reliable and accessible to areas in which production of profitable

crops is suited. The imposition of higher tariffs before this is unlikely to contribute to either objective.

1. Introduction¹

Armenia became independent in 1991 with the break up of the Former Soviet Union (FSU) and the collapse of the Council for Mutual Economic Assistance (CMEA). Its transformation to a market economy has, however, been punctuated by a series of exogenous shocks, independent of and additional to those associated with these political events. The 1988 earthquake had left Armenia coping with widespread damage and homelessness at the time of the collapse of the FSU. These problems were exacerbated by the war with Azerbaijan over the disputed enclave of Nagorno Karabakh, which began in the late 1980s and intensified after 1991. A stable cease-fire was established in 1994 but at present the dispute remains unresolved and the borders with both Azerbaijan and Turkey remain closed, while supply routes to the north have also been severely disrupted by unrest in Georgia. The war generated large refugee movements, many of which remain unsettled, and which continue to destabilise the border areas.

The combination of these shocks saw GDP fall by 1993 to only 46.0 per cent of its 1990 level (PRSP, 2003, p.16). Inflation reached 5,000 per cent in 1994, and there were very large falls in employment. By 1996, 54.7 per cent of the population were classified as poor and 27.7 per cent suffered from extreme poverty, defined with reference to a minimum food basket (World Bank, 1999).

Economic growth resumed in 1994 and averaged around 7.5 per cent per annum in real terms up to 2003, despite setbacks such as the Russian crisis in 1998 and adverse weather conditions in 1999. There is some evidence of acceleration since 2000 (IMF, 2004). However, the impact of this impressive growth has not been strongly reflected in the figures for levels of poverty. This is undoubtedly partly due to the growth being associated with an increase in inequality, high even by the standards of the former states of the FSU. This primarily reflected the narrow basis of that growth, with the growth of private sector employment failing to outweigh the declines in employment in the state sector. However, the preliminary results of the 2003 household survey indicate a fall in poverty, especially in extreme poverty, and with some evidence of a decline in inequality. Nevertheless, despite these encouraging signs there is no doubt that poverty remains widespread and severe and that inequality remains at an unusually high level.

The Government of Armenia's (GoA) policy objectives are to maintain and broaden the economic growth that has characterised the post-1994 decade and to reduce poverty and inequality by encouraging a broader based distribution of the fruits of that growth, captured by the notion of encouraging pro-poor growth and outlined in Armenia's Poverty Reduction Strategy Paper (PRSP). The PRSP identifies two broad elements in the strategy; to encourage high rates of growth of employment income by

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increasing the level of employment and the level of remuneration to above the poverty line; to raise and more effectively target social transfers (PRSP, 2003, p.33).

An important element in this strategy has been the selective privatisation, restructuring and commercialisation of the public utilities, in particular, water (both drinking and sewage and irrigation), electricity, gas and heating. This structural reform has been an integral part of the process of transition to a market economy and has been aimed at raising efficiency and eliminating public subsidy. Electricity tariffs have already risen and it is anticipated that the other main utility tariffs will increase, given the need to cover costs and finance new investments and the concomitant elimination of public subsidies. The poverty and distributional impact of utility pricing is thus a major policy concern for Armenia. This paper attempts to analyse the impact of tariff increases on poverty and inequality and focuses on the sectors that are important from the perspective of poor consumers.

The analysis of utility pricing policy requires a counterfactual against which to assess the consequences of particular policy choices. However, the complexity of Armenia's post-1991 experience has implications for the appropriate implicit or explicit counterfactual, which underlies the discussion of the impact of utility pricing on the poor. Before 1991 utility provision was almost universal and prices were extremely low. If the before-after counterfactual is pre-1991 post-1999 then it is certainly the case that welfare losses are substantial. However, between 1991 and 1999 major changes to provision and access took place as a consequence of the exogenous shocks discussed above. Therefore, a pre-1999 post-1999 counterfactual will give different results. Either counterfactual experiment is legitimate on its own terms but it is our view that the most appropriate for the purposes of this paper is the latter. For this reason, although commercialisation may well have an adverse impact on low-income households, we argue that the pre-privatisation status quo was not necessarily beneficial to the poor and that it is, therefore, possible to devise policies that are both 'pro-poor' and, at the same time, ensure the financial viability of utility service providers.

We attempt to assess the impact of the increases in tariffs and the degree of payment compliance achieved to date, on the incomes of the poor. The impact of recent tariff increases is calculated for the different deciles, based on the data generated by successive household surveys. The likely effects of the increased drinking water tariff and the concomitant policies raising compliance are also investigated. Finally, some consequences of the impact of the proposed changes in irrigation water tariffs are discussed to examine their likely effects on rural poverty.

The paper is structured as follows. Section 2 gives a brief snapshot of the overall economic and poverty profile for Armenia. Section 3 outlines the pre-reform structure of utilities in Armenia and describes the new institutional structures, which have been constructed to achieve full cost recovery, eliminate dependence on the state budget and reduce the possibilities for corruption. Section 4 discusses how social security benefits have evolved and the degree to which they might compensate for the increases in utility prices. Section 5 reviews the lessons learned from international experience and suggests a number of guidelines to organise the investigation of Armenia's experience. Section 6 reviews earlier investigations of the impact of utility pricing on the poor and reports the findings, based on successive household surveys

and informed by assumptions derived from the earlier sections, about how the actual and proposed tariff increases have affected the consumption bundles of different deciles. Section 7 reports, under a variety of assumptions, how the increases in irrigation tariffs are likely to impact on rural poverty. Finally, section 8 reports our policy recommendations.

2. An Economic and Poverty Profile of Armenia

The key macroeconomic indicators for the last 10 years are shown in Table 1 below. Growth rebounded strongly in 1994 from the depths of the transition recession averaging around 7.5 percent per year, despite setbacks in 1997 and 1999 reflecting, in the first case, drought and in the second, the Russian financial crisis. Figures since 2000 point to an acceleration, with average annual growth of over 10 percent since 2001.

Table 1 Major Macroeconomic Indicators

	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
Nominal GDP (drams billions)	187.1	522.3	661.2	804.3	955.4	987.4	1031.3	1175.9	1362.5	1623.3
Real GDP (1996 prices)	584.3	624.7	661.2	683.2	732.7	757.2	803.0	879.7	992.8	1130.8
Real GDP growth (% change)	5.4	6.9	5.9	3.3	7.3	3.3	5.9	9.6	13.2	13.9
Exchange rate (\$ period average)	288.7	405.9	413.4	490.8	504.9	535.1	539.5	555.1	573.4	578.8
GDP (millions of US dollars)	1315.2	1468.3	1579.3	1638.9	1892.2	1845.4	1911.6	2118.4	2376.3	2804.8
Official unemployment rate (%)		8.3	10.1	10.8	9.2	11.2	11.7	10.4	10.8	10.1
Inflation (CPI period average)	5273	176.0	18.7	13.9	8.7	0.6	-0.8	3.1	1.1	4.7

Sources: Table 1, p. 10, World Bank (2002) and World Bank Development Indicators (2004) and Armenian National Statistical Service

Inflation fell rapidly from the hyperinflation experienced in 1994 to single digits in 1998 and has been sustained at this low level ever since; the small spike in 2003 represents the impact of a short run increase in food prices rather than a return to general inflationary pressures.

The strong economic growth and benign inflationary climate have generated a strong increase in average wages but have had relatively little impact, until recently at least, on employment and unemployment. Official unemployment continued to rise until 2000 and has not fallen substantially since, despite the extremely rapid growth over the last few years. In addition, the official unemployment figures understate the true extent of unemployment; there is a general acceptance of a much higher figure. The 2001 Integrated Household survey suggested a rate of 25 percent (PRSP, 2003, Footnote 115, p. 75) while successive Labour Force Surveys suggest unemployment may be as high as thirty five percent of the labour force (PRSP, 2003, p. 98).

Although there is no doubt that an extremely large proportion of Armenians were plunged into severe poverty in the immediate aftermath of the collapse of communism and the following period of hyperinflation and subsequent stabilisation, there is much less agreement about the precise figures, the weight that can be attached to them and of the evolution of the poverty profile since then. This is partly because of the non-comparability of successive surveys. However, there is also a widespread view that 10 years of sustained high growth and large-scale remittances are difficult to reconcile with the levels of poverty, which the surveys appear to indicate, although, as noted in the introduction, preliminary analysis of the latest survey does show sharp falls in all the measures of poverty.

There have been five major household surveys informing poverty analyses in Armenia since the mid-1990s. Table 2 summarises the main features of the earlier studies and highlights the reasons for the non-comparability over time.

Table 2: Poverty in Armenia in 1994/95 and 1996

Report year	Data year	Poverty line	Poverty Headcount % (P0)	Poverty gap (P1)	Severity of Poverty (P2)	Extreme Poverty Headcount	Gini Coefficient (income)
World Bank 1996	Pilot Survey 1994/95	Relative lines: 40% and 15% of median expenditures	Overall: n.a. Urban: 31 Rural: 25			Overall: n.a. Urban: 20 Rural: 12	Not available
World Bank 1999	Household Survey 1996	Absolute line	Overall: 54.7 Urban: 58.8 Rural: 48.0	Overall: 21.5 Urban: 23.0 Rural: 18.9	Overall: 11.0 Urban: 11.5 Rural: 10.3	Overall: 27.7 Urban: 29.6 Rural: 24.4	0.587

Source: World Bank, 2002, Table 2, p.12,.

There are evident methodological differences between the first survey and the 1999 survey. Not least, is the shift from the relative poverty lines employed in World Bank 1996 and the absolute line used in World Bank 1999. However, like the earlier survey the 1999 study is based on a survey of actual expenditures and paints a picture of widespread poverty, with half of those classified as poor living below the food poverty line and being classified as in extreme poverty. The level of inequality is also extremely high, especially by comparison with the relatively low levels of inequality experienced pre-1991.

Since 1999 there have been three further, annual household surveys, in 2001, 2002 and 2003. The analysis and results from 2001 and 2002 are extensively discussed in the *Social Snapshot and Poverty in the Republic of Armenia* (2004). The results from the 2003 survey are incomplete but some of its main conclusions are now available. The main directly comparable results, based on a common World Bank methodology, are reported in Table 3.

Table 3: The Evolution of Poverty in Armenia

	1996	1999	2001	2002	2003
Head count poverty	54.7	55.1	50.9	49.7	42.9
Of which poor but not very poor	27.0	32.1	34.9	36.6	35.5
Of which very poor	27.7	22.9	16.0	13.1	7.4
Poverty Gap	21.5	19.0	15.1	13.5	8.9
Severity of Poverty	11.1	9.0	6.1	5.2	2.8

NNS (2004) Chapter IV and IMF (2004)

Head count poverty proportions fall continuously although from such high levels that the 2003 figure of 42.9 per cent of the population still represents an unusually high level of poverty by international standards. The numbers in extreme poverty fall much more substantially, from over a quarter of the population to 7.4 per cent by 2003. However, this was, for the most part, a migration from just below to just above the extreme poverty line rather than out of poverty altogether. The proportion of the population above the extreme poverty line but below the overall poverty line rose from 27 per cent in 1996 to 36.6 per cent in 2002, only falling to 35.5 per cent in 2003.

The urban/rural mix of the poor changed quite substantially over the period of the surveys. In the early period poverty was more concentrated in the towns, as the dramatic collapse of the old industrial structure devastated the urban areas and many people retreated to family plots in the countryside, partly based on the extremely equitable land privatisation of 1991-92. However, recovery has also been concentrated in the urban centres, particularly Yerevan, and poverty has fallen more in towns and cities than in the country, reversing the earlier pattern. The precise figures are given in Table 4.

Table 4: Urban and Rural Poverty (Headcount measure)

	1996	1999	2001	2002	2003
Urban Poverty	58.8	58.3	51.9	52.6	39.7
<i>Of which</i> Extreme poverty	29.6	23.2	18.3	15.0	7.9
Rural Poverty	48.0	50.8	48.7	45.3	47.5
<i>Of which</i> Extreme poverty	24.4	22.5	11.3	10.2	6.8

Source: NSS (2004), chapter 4

Although extreme poverty has fallen considerably in rural areas, the overall level of poverty remains, at 47.5 per cent, almost unchanged from its 48 per cent level in the 1996 survey. This partly reflects the unfavourable movements in the prices of agricultural products, which fell sharply in the late-1990s relative to general inflation (PRSP, 2003, p.19).

The regional distribution of poverty has also changed markedly with the capital, Yerevan, showing much steeper falls in overall poverty than any of the other regions and with a very strong regional pattern emerging. The overall falls in poverty in the latest surveys also conceal increases in poverty in some of the more remote Marzes² such as Shirak. The full picture is given in Table 5.

Table 5: The Regional Distribution of Poverty: 1996-2003

	1996	1999	2001	2002	2003
Armenia	54.7	55.1	50.9	49.7	42.9
Yerevan	58.2		46.7	43.8	29.6
Aragatsotn	51.1		60.3	72.1	57.0
Ararat	54.2		44.7	45.4	42.8
Armavir	38.1		53.7	51.6	48.3
Gegharkuniq	48.1		62.2	47.2	59.9
Lori	51.5		54.2	44.6	34.0
Kotayq	62.4		50.5	55.9	52.5
Shirak	63.1		57.8	73.6	72.2
Syuniq	47.1		<i>n.a</i>	32.7	34.6
Vayots Dzor	61.5		51.1	53.2	42.9
Tavush	56.1		59.7	42.2	30.7

Source: NSS (2004), Appendix Table 5

Armavir and Gegharkuniq marzes are particularly striking, with the proportions in poverty rising even relative to the 1996 survey. By contrast, in Yerevan the proportion in poverty has halved and large falls are recorded for Lori and Tavush. It is clear that, to a considerable degree, the distribution of poverty reflects differences in the productivity and accessibility of land in different areas, and proximity to the border regions with Azerbaijan (PRSP, 2003, p.25).

² The provincial administrative unit in Armenia is the Marz. There are 11 Marzes, including the capital Yerevan.

In the early period, the massive rise in poverty and inequality hit large swathes of the population and the dynamics of poverty, which determine its evolution through time, received little attention and were, in any case, very uncertain. However, later surveys reveal a much clearer picture of the characteristics of the poor and the factors most correlated with their vulnerability.

As well as residence in Yerevan and the urban/rural distribution, the probability of being poor rises strongly with the number of children in the household, especially children below the age of five. The chances of being poor also rise with the number of pensioners in a household (NSS, 2004) but the risk of poverty for pensioners is, in general, no higher than for the rest of the population (PRSP, 2003, p.26). Poverty is negatively correlated with educational qualifications and with landholding and access to livestock and agricultural equipment. The incidence of poverty among women is only marginally different from that of men, with however, the incidence of extreme poverty being higher for female headed households. This is a reflection of the key factor driving the poverty figures; access to employment. Households where the householder and other members are unemployed have a much greater chance of living in extreme poverty and female-headed households have lower rates of employment (NSS 2004, Chapter 4 and PRSP, 2003, p. 26).

An important group reflecting these different characteristics of poverty is refugees and other displaced persons. Many of the refugees still live in hostels, in which conditions are poor, with poor access to basic facilities and utilities. They have lower access to employment and suffer from much higher levels of illness, much of it chronic (PRSP, 2003, p.29).

As well as substantial rises in the incidence of poverty, Armenia has also experienced a very sharp increase in inequality. The Gini Coefficients for a number of key distributions are given in Table 6.

Table 6: Inequality in Armenia

Gini Coefficients					
	1996	1999	2001	2002	2003
<i>By consolidated incomes</i>	0.653	0.570	0.528	0.449	0.434
<i>By current incomes</i>	0.602	0.593	0.535	0.451	0.438
<i>By current expenditures</i>	0.444	0.372	0.375	0.354	0.334

Source: NNS (2004) Chapter IV and IMF (2004)

Figures for income inequality in 1996 were high, even by the standards of the CIS and other constituent states of the FSU.

3. The Reform and Re-structuring of Utilities in Armenia

The Pre-Reform Structure of Utilities in Armenia

The major utilities, namely electricity, gas, heating and water, inherited in 1991 from the Soviet period, reflected the characteristics of that system and were, by the late-1990s, severely deteriorated, providing an inadequate service to rich and poor alike.

Electricity

Before 1991 there was large scale, heavy investment in power generation and distribution, planned on a regional rather than state basis (Armenia was integrated with Georgia in terms of power generation and distribution) with a single, integrated company, Armenergo, controlling generation, transmission and distribution. In turn, this led to extensive investment in energy intensive economic activities (pump-based irrigation systems for example). Connection to the system was almost 100 percent and final household consumption of utility services was provided at low and even nominal rates. The break up of the FSU, the switch to hard currency trading for oil imports, a failure to invest in simple maintenance during the first years of transition and the failure to update the system meant that by the mid-1990s the electricity supply industry was on the point of collapse; between 1992-1995 households on average received only 2-4 hours of electricity per day (Lampietti et al., 2001, p.1). Although prices were raised sharply from 10 AMD per kilowatt hour in 1994 to 21 AMD in 1997 (IMF, 1998, Table 7. p. 57), the tradition of prices below cost, with large numbers of privileged households given exemptions with little link to household circumstances (IMF, 1998, p18 and Section C, p.38), the lack of any enforcement of payment, combined with the political, economic and social pressures of the period, meant that collection rates fell to very low levels (Lampietti et al. 2001, p.1). The fiscal correlate of this situation was large open subsidies throughout the 1990s and mounting debts (IMF, 1998).

Gas and Heating

Gas and heating were integrated with electricity as part of the Armenergo Company. However, unlike electricity, accessibility was relatively low at the time of the break-up of the FSU (PRSP, 2003, p.95) and the system has deteriorated considerably since. There was some provision of centralised heating in Yerevan but little elsewhere and none in the rural areas.

Domestic Water

As with electricity, prior to independence in 1991, water connection was widespread, especially in the cities, and water prices were set at very low rates below cost, with an effective cross subsidy from industrial users. The collapse of the industrial base in the early-1990s increased the importance of domestic water users to the revenues of the water industry. However, the inherited system was expensive in terms of energy for pumping and the infrastructure was, for the most part, old and in need to upgrading at the beginning of the period. The decrease in maintenance and the failure to make any new investment led to a significant deterioration in the overall network. Water losses rose sharply; almost 55-60 percent of water is now lost in distribution (PSAI, 2003, p.15). Service quality declined dramatically, with households only receiving water for a number of hours each day and with a great deal of time spent transporting and storing water against the eventuality of service interruption. In addition, the quality of the water supplied fell (World Bank, 2002, p. 12) and the decay of the system has been paralleled by increases in water borne diseases (PSAI, 2003, p.15). Despite substantial price increases (from 0.7 AMD per cubic meter in 1994 to 21 AMD in 1997 (IMF, 1998, Table 7, p. 57), unsurprisingly, as with electricity, payment compliance dropped and was only 10 percent in the mid-1990s (Lampietti et al. 2001). The financial counterpart of this was large subsidies in the national budget and arrears, which were several multiples of annual revenue. These subsidies, however, were 'almost equally distributed among the poor and non-poor' (PRSP, 2003, p. 91).

Irrigation Water

Although Armenia is not a water-stressed country (World Bank, 2002, p.ii), its geography and climate mean that irrigation is necessary for 80 per cent of the country's overall agricultural production (World Bank, 2002, p.1) and irrigation water is the major claim on the country's water resources. In the Soviet era, this was provided via very energy intensive pumping stations at nominal prices. Based on the low energy price the system was also extended into mountainous and intrinsically low productivity areas. In addition, despite irrigation costs differing considerably between the regions, farmers paid the same, low rate for their water. The inherited infrastructure was therefore extremely inefficient once Armenia had to adjust to the new era of high-energy prices, and supported an economically inappropriate geographical mix of crops.

The failure to invest in updating the system and the collapse of systematic maintenance were exacerbated by the consequences of land privatisation and the break-up of the collective farms. In the new structure, responsibility for the integrity of the network became unclear and a significant deterioration occurred, with the area under irrigation falling significantly and water supplies becoming extremely erratic in many areas. The system is now characterised by very high rates of water loss, partly through the deteriorated conveyance infrastructure (World Bank, 2002, p.7) but also because of water being illegally extracted from the system. At the same time payment compliance is very low so that the sector is reliant on very large transfers from the state budget. However, these subsidies were even less likely to benefit the poor than for domestic water (PRSP, 2003, p. 91).

The conclusions from this brief review of the immediate impact of transition on the utilities are straightforward. By the late-1990s the system was collapsing; it was not financially viable and required large open and hidden subsidies. However, the distributional consequences of such subsidies were not self-evidently pro-poor. Those gaining from the subsidies were those not paying for their utility services. But exemption from payment was not strongly linked to poverty or low income, and there is no evidence that payment compliance was correlated with income; a culture of non-payment appears to have been general across large sections of society independent of their financial means. At the same time, the relatively flat tax system meant that such subsidies were being paid for within a relatively regressive tax structure. In addition, access to the system was poor and deteriorating, especially in the poor rural areas and the areas hit by the earthquake and the war. In summary, the system was both inefficient and inequitable.

The decision was made to improve the system, which would require major investment, and simultaneously remove the subsidies. Although donors have provided some of the investment, for the most part this decision, re-affirmed at numerous points and re-iterated in the PRSP, implied a sharp increase in tariffs and, crucially, the enforcement of payment.

Institutional Re-Structuring

The Government and the IFIs saw the enforcement of payment largely as a problem of institutional incentives allied to operational capacity. The objective was to construct

institutions with a clear, unambiguous incentive, supported by appropriate legal devices, to enforce payment. The view was taken, and has been repeatedly re-affirmed, that final prices should reflect real resource costs, independent of the distributional implications. At the same time, it is apparent that the encouragement of a culture of payment was regarded as of value in itself, even given the consequences for the poor. In fact, non-payment for utilities was (and is) a characteristic of all income groups but clearly increased tariffs and payment discipline will affect the poor more severely. However, the Government's position was and is that the alleviation of poverty should be achieved through the social benefit system rather than attempted through the manipulation of utility tariffs.

At the centre of the new forms of organisation for all the utilities is the Public Services Regulatory Commission (PSRC). This organisation was established by Parliament in 1997, originally as the regulatory agency for energy. However, in 2004 it acquired responsibility for water and became the central agency dealing with the determination of tariffs for energy (electricity and gas), heating, drinking water and sewage and irrigation. However, it is worth noting that the PSRC does not set the tariffs for the Water Users Associations (WUAs). The PSRC sets the tariff(s) charged by the State Commission for Water Resources (SCWR) to the WUAs.

The institutional structure of the PSRC follows much recent thinking about how to deal with corruption and a poor collection culture. It is completely independent and has a very precise and limited brief, which is carried out following clear and transparent principles. Amongst these is the legal requirement to set tariffs at cost recovery levels, which is particularly important for those utilities that remain in public ownership.

Tariff adjustment follows a well-defined procedure. Firms must indicate their intention to apply for a tariff revision at least one month in advance, with public notification in addition to the application to the PSRC. A public session is held within 90 days of the application at which the PSRC's technical staff presents their evaluation and other interested parties may make presentations. A five-member panel takes the decision based on the evidence submitted and principles which guide the PSRC. These include that tariffs are calculated to allow recovery of operational expenses, depreciation of investment and a reasonable rate of profit. In making its calculations, the PSRC assumes full compliance (taken to be 98 per cent), in order to improve companies' incentive to raise collection rates. In addition, the PSRC takes no account of the social impact of its decisions.

However, as Table 7 indicates the tariffs have not risen sharply since the late 1990s, although the figure for 2004 show rises and there are some further rises proposed in 2005. It is clear that the issue of financial viability turns on the questions of operational efficiency and cost recovery.

As well as establishing the PSRC all the utilities have been restructured so as to enhance commercialisation. The central component of this policy has been the replacement of monolithic structures with companies connected via commercial contracts. This has involved privatisation in several instances but many parts of the utility system remain in public hands, albeit in reformed and re-constituted institutions.

Table 7: Tariffs in Armenia, for 1998-2004

		1998	1999	2000	2001	2002	2003	2004
Water Supply (YWSC) ¹	AMD/m3	46	46	46	46	46	46	80.19
Wastewater (YWSC)	AMD/m3	10	10	10	10	10	10	10.01
Water Supply (AWSC) ¹	AMD/m3	46	46	46	46	46	46	90.36
Wastewater (AWSC)	AMD/m3	10	10	10	10	10	10	10.05
Gas	AMD/n. m3	51	51	51	51	51	51	59
Electricity ²	AMD/kWh	15/22/25	25	25	25	25	25	25

Note 1: Water and Sewage is provided in Yerevan by the Yerevan Waters and Sewage Company (YWSC) and elsewhere by the Armenian Water and Sewage Company (AWSC).

Note 2: Prior to the re-structuring in 1998/99 there was a multiple tariff system depending on usage.

Source: www.rcnm.am Website of the Public Services Regulatory Commission.

Electricity

The above set of policies has already been largely applied in the electricity sector. Generation has been separated from transmission and transmission from retail distribution, with each of these activities linked through long term commercial contracts. For this sector, payment compliance is now over 90 per cent and has recently risen as high as 94 per cent, while the fiscal subsidy has been eliminated.

Table 8: Household collection rate for electricity (in terms of total sales)

1996	1997	1998	1999	2000	2001	2002	2003
40	58	86	79	81	85	90	94

Source: Armenian authorities and World Bank

The improved collection rates have been achieved through the interaction of three different factors:

- The new incentives faced by the retail distribution companies to maximise their collection rates. This is partly a function of the companies acquiring a direct interest through the elimination of subsidy and the substitution of a profit motive in the provision of the service. In addition, as noted above, the operational rules governing the way in which the PSRC sets tariffs means that they are calculated on the assumption of full cost recovery (a small, internationally accepted rate of non-payment is factored in).
- The widespread installation of meters at the level of the individual apartment means that household consumption could be identified. The costs of meter installation were mostly absorbed by households, although spread out over 5 years. The incentive for those households, which had previously avoided payment, was a generous debt forgiveness scheme. Some help was forthcoming for those too poor to cover these costs.
- The authorisation of a range of sanctions against those refusing to pay bills. These included cutting supply and, crucially in the case of the poor, the removal of entitlement to social benefits.

Gas and Heating

The gas industry is less significant in terms of its household coverage. It has been re-structured around newly privatised firms, Armgasard and Armrusgas, the second formed as a debt-equity swap to clear Armenian debts with Russia, arising from the Soviet era. However, the provision of centralised large-scale heating to apartment blocks is a relic of the Soviet era and is becoming peripheral to the overall provision of heating, which, even in the case of condominiums, is provided through local boilers.

Water

It is evident that the success (against its objectives) of the programme for electricity has provided an important example for the plans for water. At the apex of the new structure, instituted in 1999, is the State Committee for Water Resources (SCWR). This organisation, corresponding to the generating sector for electricity, is responsible for the delivery (sale) of bulk water to the distribution system for drinking and for irrigation.

Domestic Water

Drinking water distribution to consumers is provided by two major providers, the Armenian Water and Sewage Company (AWSC) and the Yerevan Water and Sewage Company (YWSC). The management of these companies has been franchised to international management to (a) introduce a stronger incentive to enforce collection and (b) to introduce international management practices. A third, innovative form 'Nor Akung' providing water in Armavir Marz, supported by the German KfW provides a slightly different model. Finally, a relatively small proportion of the population relies on local water supplies, which are not yet subject to the SCWR.

Despite the institutional re-structuring, the financial situation of the domestic water supply sector remains parlous and it requires continued subsidies. This is partly because the sector was not subject to the same pressures as electricity; partly because of the recognised special nature of water. However, it is clear that the key issue remains non-payment compliance. As the PRSP notes (PRSP, 2003 p. 93) water metering, previously almost non-existent in Armenia (World Bank, 2002, p.12) will need to be implemented. This is occurring rapidly in Yerevan and its extension to the whole country has begun and is likely to accelerate. Its impact on compliance is not yet clear but is unlikely to be as straightforward as for electricity.

Irrigation Water

Irrigation water is sold by the SCWR to Water Users Associations, the present structure of which was established by Parliament in October 2002. 54 such organisations have been set up in the last two years and although there seems to be some uncertainty, this seems the likely final number. These organisations have been designed based on international evidence of best practice. They are non-profit making, are managed by boards drawn from users (farmers) and have the simple objective of providing irrigation water to end-users. The relatively large number of such associations reflects the consensus that, in the absence of effective metering for irrigation water, a local organisation, which is collectively run by end-users will provide the most effective mechanism for raising collection rates from the extremely low levels seen at present.

The low levels of cost recovery seen at present reflect two different dimensions of the failure of the old system. First, is non-payment by farmers. This reflects the culture of irrigation water being free or nominally charged in the old system, as well as the reluctance of farmers to pay for a system that is now unreliable and which requires large-scale investment before it will be able to deliver an appropriate service. In addition, farmers also report that they simply lack the money; a high proportion of farm output is for own use and the degree of marketisation is, in some areas, very low. The WUAs are an example of an institutional structure, which, if it works effectively, promotes self-policing. This requires that usage be known even if not metered. It is local dispersed information that justifies the small local organisational structure.

The second dimension of low cost recovery is the failure of irrigation fees to find their way to the organisation providing the water; money rather than water is siphoned off. As well as the belief that more locally based organisations will be better able to address this, this problem is being addressed by by-passing personal collection and making irrigation fees payable through the post-office.

However, the institutional restructuring of the utilities supplying irrigation water has only recently been completed (as of October 2004). The move towards full cost recovery in this sector seems likely to intensify in the next few years.

The policy of the government is predicated on the poverty implications of the decision to push for full cost recovery being addressed through the provision of appropriate social benefits. For this to be effective, the implications of these changes for the poor need to be clear. In particular, the precise impact on the real incomes of the poor needs to be calculated if the social benefits are to be adjusted to take account of this potentially large reduction in their real income. In principle, if all subsidies are abolished the public expenditure saved is more than sufficient to compensate the poor for the higher tariffs and greater compliance.

4. The Social Security System

The degree to which utility price increases impact on the poor depends partly on the degree to which the system of social security responds to the increased tariffs. It is possible that general increases in social benefits, while not being directly linked to changes in utility prices, will be sufficiently large to outweigh the price increases. Alternatively, the system may respond quickly and elastically to those pushed over the poverty threshold by the increases. In addition, it is in principle possible for the benefit system to formally adjust the level of benefits to insulate the poor and very poor from the effects of the utility price increases. For those poor not in receipt of benefits, for example the working poor, changes in the minimum wage may also ameliorate the impact.

In the immediate aftermath of independence, the social benefit system had to grapple with the rapid growth of poor and very poor households. At the same time, it had inherited an unwieldy and complex array of pensions and benefits based on privileged status (war veterans, for example), which, while understandable, especially within a society with full employment and relatively equal incomes, was inappropriate and ineffective in the face of enormous increases in poverty taking place. By 1999, the

system was widely recognised as being too complex and poorly targeted to be an effective anti-poverty programme and a new system was implemented.

Armenia's present social security system has three spheres (PRSP, 2003, p.62): social assistance; pensions and social insurance; employment and remuneration regulations.

The centrepiece of the state social assistance programme is the family benefit system, although a range of other benefits including disability, age, childbirth and maternity allowances supplement this. It has been constructed as a method of explicitly targeting benefits at the very poor i.e. those below the food poverty line (PRSP, 2003, p.64) rather than the poor for whom 'improvements in living standards...should mostly result from policies that promote their primary income' (PRSP, 2003, p.65). For beneficiary families family benefit is the main source of family income and is spent predominantly on food and electricity (NSS, 2004, p.165). The evidence suggests that it has been extremely efficient in this respect, with 45 percent of the reduction in very poor households 'preconditioned by the increase in social transfers' (PRSP, 2003, p.64), with social transfers (family benefits plus pensions) constituting the largest source of income for these families (PRSP, 2003, p.64).

The efficiency of the system at reducing poverty depends on the accuracy of the targeting formula. This has been integrated with successive household surveys and has evolved over time. Since 2002 it has taken account of electricity and telephone consumption and additional benefits have been earmarked for children. However, it has remained focussed on the very poor only, with the reduction in numbers of those in receipt of benefit seen as the way of raising benefit levels for those that remain.

It is envisaged that the present, very low benefit rate will rise, although it is clear that this depends more on the overall budgetary policy rather than developments in poverty *per se*. It is also clear that, even in the area of social benefit, the priority is policies consistent with promoting economic growth (PRSP, 2003, p.63). The resources allocated to the family benefit programme from the state budget were cut substantially between 1999 and 2002 (NSS, 2004, p.162) and as Tables 8 and 9 indicate, the overall allocation to benefits actually decreased both absolutely and as a proportion of GDP. The level of benefits also fell in absolute terms and as a proportion of the poverty food line, the minimum salary and the average monthly wage. Although there have been some recent increases in allocations, it is not envisaged within the poverty reduction strategy that per capita family benefits will reach the poverty food line until 2013 (PRSP, 2003, p.95).

Table 9: Family Benefits 2001-2015 (in current prices)

	2001	2002	2003	2004	2005	2006	2009	2012	2015
Total expenditure In billion dram	17.66	12.08	12.75	16.09	20.21	24.94	29.82	33.01	39.76
% of GDP	1.5	0.9	0.9	1.0	1.2	1.3	1.2	1.1	1.0
Beneficiaries '000s households	173.3	149.0	139.0	139.0	139.0	132.4	112.5	87.0	87.0
Average monthly benefit (drams)	8500	6760	7640	9649	12115	15697	22096	31597	38066

Source: PRSP (2003), Table 7.2, p.64

Table 10: Family Benefit and Poverty, 2001-2015 (in current prices)

	2001	2002	2003	2004	2005	2006	2009	2012	2015
Average monthly benefit per capita, drams	2458	1893	2140	2702	3393	4396	6188	8849	10661
Poverty food line per capita, drams	7368	7576	7632	7827	8002	8207	8836	9469	10169
Family benefit as % of poverty food line	33.4	25.0	28.0	34.5	42.4	53.6	70.0	93.5	104.8
Average monthly salary rate, drams	24483	26488	29462	32078	35048	38235	48927	59609	71607
Average family benefit as % of average monthly salary	10.0	7.1	7.3	8.4	9.7	11.5	12.6	14.8	14.9
Minimum salary rate, drams	5000	5000	5000	12767	13053	13387	14414	15446	16588
Average family benefit as % of minimum salary rate	49.2	37.9	42.8	21.2	26.0	32.8	42.9	57.3	64.3

Source: PRSP (2003), Table 7.3, p.66

In addition to the family benefit, the social security system includes pensions for old age and a number of special categories such as disability. The system consists of an employment insurance scheme, based on compulsory contributions and, since 1992, a supporting social pensions system for those not covered by the employment insurance (NSS, 2004, p. 166). In addition, there are a considerable number of other pensions paid to military personnel, veterans, and a number of public servants, which are considerably more generous than the old-age pension (PRSP, 2003, pp. 70-71).

Pensions are, in principle, self-financing through the compulsory social contributions. However, the numbers paying their dues have fallen substantially, with less than half paying their contributions in 1997 and the number falling further by 2000 (PRSP, 2003, p. 71). This has meant that pension rates are very low; the lowest in the CIS countries according to the PRSP (2003, p.71). In addition, despite strong economic growth they have grown very slowly. The net result has been that the average pension does not even cover the minimum food basket. In other words, without other sources of income, all pensioners would be below the poverty line, with 94 percent being very poor (PRSP, 2003, p.71). Although it is planned to raise the employment based pensions to the per capita poverty line in 2005-2006 and, in the longer term, it is planned to raise the social pension, this will not breach the level of the food poverty line until after 2013 (PRSP, Table 7.5, p.72 and p.73). In consequence, pensioners have had to be brought within the ambit of the family benefit system (NSS, 2004, p. 163).

Unemployment benefit is paid to only a small fraction of the registered unemployed and the benefit they receive is very low, representing only a small proportion of the food poverty line (about 30 percent; authors' calculations based on figures in PRSP, 2003). The registered unemployed represent only a small fraction of overall unemployment. The implication of this is that unemployment benefit makes very little contribution to reducing even the extreme levels of poverty.

This brief review of the social security system in Armenia indicates that while the very poor are in receipt of a targeted family benefit, the level of benefit is low and subject to capricious change, depending on the overall position of the state finances. For those who are below the poverty line but above the food poverty line there is little

assistance unless they fall within a number of special categories. Pensions are so low that without supplementation from elsewhere the majority of pensioners would be below the food poverty line and all of them below the overall poverty line. Unemployment benefit is received by very few, even of the registered unemployed, and fails to reach any of the unregistered. In summary, the social benefit system provides only Spartan support for the most vulnerable and very little for anyone else.

5. The International Experience

The international commentary on the impact of utility pricing is heavily dominated by the Latin American experience and concentrates on privatisation much more than on re-structuring of state owned enterprises that remain in the public sector.

The privatisation of infrastructural facilities increases the role of the private sector and produces secondary distributional consequences that have, in the past, often been underestimated or ignored. Improvements in potential access are accompanied by changes in pricing and financing rules under which the private sector operates, and even when costs fall because of privatisation, the elimination of direct or cross-subsidies may well impact adversely on vulnerable households (Estache, Gomez-Lobo and Leipziger, 2001, p.1180). It is clear that the social dimension must be explicitly integrated into the utility reform process.

Estache *et al* (2001) highlight three stylised “facts” that, they argue, question the widespread notion that the privatisation of infrastructural facilities will adversely affect poverty:

- Infrastructure privatisations are usually part of a wider set of reforms, and the impact on poverty and distribution reflects the complex interactions of multiple policy factors;
- Public sector subsidies, that often constitute a significant proportion of total public expenditure and GDP, are often not progressive in their incidence and may well increase inequality in income distribution;
- Privatisation, if designed and implemented properly, provides an opportunity to end the exclusion of the poor from access to utility services and pre-privatisation service expansions.

Estache *et al* (2001) provide a comprehensive outline and discussion of the various micro and macroeconomic channels through which infrastructural privatisation can affect poverty and income distribution, focusing on evidence from Latin America. In order to avoid unnecessary duplication, Table 11 is adapted from Estache *et al* (2001, p.1182) to highlight the major microeconomic linkages.

In the case of Latin America there is some evidence that the poor benefit by enjoying greater access to utilities after privatisation. In Armenia, as in other ex-socialist economies, the pre-1991 system gave almost all households access to reliable inexpensive electricity and the welfare gains from increased access are of less importance (Lampietti (ed), 2004, p. xvi). However, access deteriorated dramatically after 1991 so welfare gains due to improved access after restructuring and privatisation are, in principle, possible relative to the deteriorated state of the network.

Table 11. Microeconomic linkages between privatisation and the welfare of the poor

Side effects of privatisation	Possible sources of increase in cost burden for the poor	Possible mitigating factors and welfare gains for the poor
The cost of increasing formality	Revenue collection and discouragement of informal connections are likely to be more effective and result in an increase in effective price paid	A formal connection, even at a cost, may be a true aspiration of vulnerable households Safety likely to increase with the formalisation of connections Informal connections may have been more expensive Reform can bring technology choices that lower costs
The cost of tariff level adjustments	Average tariff levels can increase, due to cost recovery requirements and need to finance quality related investments	Increase in average tariffs depends on pre-reform price levels and the distribution of the benefits of private participation between stakeholders Reform can cut costs significantly enough through improvements in efficiency or new technologies
The costs of tariff structure adjustments	Tariff structures likely to be reformed in ways which could increase the marginal tariff faced by a poor household	Competition likely to decrease average tariffs and may also compensate for any tariff re-balancing that affects the poor.
The costs of increasing the price of substitutes	Privatisation may restrict access to some alternative services, especially if connections to public network is mandatory	Access to other types of alternative services will not be affected if foreseen in contracts Availability of communal services may increase as a result of privatisation
The costs of increasing the price of complements	The cost of obtaining a connection to the infrastructure service is likely to increase substantially	The cost of obtaining other complementary equipment is likely to be unaffected by privatisation, but will remain high
The costs of improved quality of service	Quality of service likely to improve, but this may make network services unaffordable for the poor	There is considerable evidence showing that poor households are willing to pay reasonable amounts to improve quality of service

Source: Estache *et al.* (2001), Table 1, p. 1182.

The following linkages would also appear to be of particular importance for Armenia. First, the losses arising from changes in tariff levels and structure. Second, the costs and benefits associated with improved quality of service. However, unlike the Latin American experience, Lampietti (ed) (2004, p. 32) concludes that in the case of the six European and Central Asian economies covered, including Armenia, utility reform appears to be closely linked to falls in consumer welfare, with Armenia and Georgia showing the largest welfare loss.

The empirical evidence discussed by Estache *et al.* (2001) is piecemeal but revealing. For example, in Argentina the privatisation of infrastructure disproportionately hit middle-income of consumers through the re-direction or suppression of subsidies, with the very poor possibly benefiting through better access. In Colombia, electricity subsidies largely benefited middle-income households. Subsidies for water were focussed on poor households but were not seen as particularly progressive. In Bolivia the poor benefited from improvements in access to water, and in Chile the poor benefited from better access to electricity and telephones after privatisation. This review indicates that the prevailing and new pattern of subsidy is likely to be an important determinant of the distribution of welfare gains and losses.

The impact of privatisation on poverty and income distribution is complex and probably impossible to measure with any degree of accuracy, given the simultaneous impact of exogenous shocks and other policy changes within any specific country. To attempt to measure the impact of utility privatisation on the poor requires answers to two questions. First, who is gaining most from the pre-privatisation situation, with its system of implicit and explicit subsidies? We cannot answer this question in the case of Armenia because we have no information on the incidence of subsidies with respect to different income groups either pre-1991 or pre-1999. Second, are poorer households connected to services pre-privatisation? We have already noted that prior to 1991 most households had access but that between 1991 and the beginning of reforms in 1999 there was widespread physical destruction, severe deterioration of the system and massive social dislocation. It follows that re-connection to a re-constructed formal system may generate welfare benefits.

6. The Impact of Increased Utility Prices on the Poor

As Table 7 indicates, the level of tariffs charged by all of the utilities except electricity did not change between 1998 and 2004. However, there were major tariff increases in 2004 and further price rises are proposed for 2005. The impact of the electricity price increase in 1998/99, which accompanied the restructuring of the industry, is therefore of particular importance in assessing the likely impact of the recent and proposed tariff increases.

In this section the evidence relating to the impact of the electricity tariff increase in 1998/99 is reviewed and new evidence, based on the analysis of successive household surveys presented. In addition, the behaviour of households with respect to their consumption of the other utilities is examined.

Electricity Supply

Lampietti et al (2001) assess the impact of the 1999 electricity tariff increase with particular attention paid to issues of service availability and affordability for the poor. Increasing cost recovery for utilities was a cornerstone of the GoA economic reform programme, and progress had been made in reforming the electricity sector since 1995.

The empirical analysis was based on a survey of 2,010 randomly selected households conducted in December 1999 and January 2000. The authors urge that caution must be exercised in interpreting their findings, as the analysis did not reflect changes in the cost and structure of production that followed the 1999 tariff increase. Reported monthly per capita expenditure (PCE) is the preferred welfare measure (p.4).

For sampled households, electricity consumption fell by 17 percent, collection rates fell 9 percentage points and arrears increased four-fold. It was reported that the consumption of substitutes (wood and natural gas) increased. The poor, relative to the non-poor, cut consumption more, had a higher percentage of households in arrears and with a higher increase in the average size of arrears.

For the utility, there was a net increase in revenue from the sampled households of about 6 percent. This was less than expected for the reasons given above. Lampietti et al (2001) found that the burden of energy expenditures was large for most

households, especially the poor. Electricity constituted the bulk of such expenditures and further increases in tariffs, without access to low cost substitutes, would lead to greatest hardship for the urban poor who spend 16 percent of monthly cash expenditures on electricity and have the least access to wood.

It was estimated that current expenditures on utilities such as telephone, gas, central heating, electricity and water were 18 percent for poor and 11 per cent for non-poor of average household monthly expenditures (p.6). If households paid the full amount that they were billed for, these figures would rise by 9 percent for the poor and 3 percent for the non-poor, thus consuming a larger share of the poor's budget. 68 percent of total utility expenditures were on water and electricity (75 percent, if bills were paid in full) (p.7).

With respect to household energy consumption, energy accounts for between 16 and 30 percent of monthly household cash expenditure (p.11). Data illustrating detailed household energy consumption patterns are given in Table 4 (p.12) and price and expenditure data presented in Table 5 (p.12) and Table 6 (p.13) respectively. It is estimated that the poor consume 20 to 30 percent less of each type of energy than the non-poor, but that the burden of energy expenditure is very large, especially for the poor. Energy expenditures are approximately 30 percent of PCE for the poor and 18 percent for the non-poor (although these results must be treated with caution).

“Electricity makes up the bulk of energy expenditures for all households and the burden of raising prices would appear to be highest among the urban poor, with 16 percent of their expenditures going for electricity alone. The rural poor spend equivalent amounts on wood and electricity” (pp.12-13).

It was reported that the coverage and reliability of electricity supply had steadily increased since 1994. Armenia had improved electricity collection rates and electricity was metered in all households. However, many households were having difficulties paying their bills, and two coping mechanisms were identified: first, households would pay only a fraction of the bill, maintaining service while accumulating arrears; second, households would monitor consumption closely and then impose austerity measures when the budget was reached (p.14).

In the face of rising electricity prices, households were more careful in their use of electricity (turning out lights when leaving a room, for example), wearing more clothing to reduce heating costs and substituting away from electricity. Table 7 (p.15) gives details of substitutes used. More than 60 percent of households stated that the primary substitute was wood and this was particularly the case among the urban poor (68 percent), and the Report again concludes (p.15) that the burden of rising electricity prices is likely to be highest for poor urban households as they face the highest priced substitutes for electricity. The potential environmental problems associated with increased wood consumption (deforestation and increased indoor air pollution, for example), are noted.

The 1999 tariff change is estimated to have represented a 47 percent increase in the price of electricity. It is estimated that total household electricity consumption fell by 17 percent. Total billings rose, but household payments failed to keep pace with billings and, as noted above, revenues rose by only 6 percent. Average household

consumption by the non-poor fell by 16 percent, while for poor households, it fell by 20 percent (26 percent for poor rural households and 13 percent for poor urban households).

Lampietti et al. (2001, p.19) argue that “The observation that average expenditures by poor households were more or less constant before and after the price change suggests that the poor cannot or will not spend more than they currently do on electricity”.

With respect to the impact of cash transfers, they conclude (p.23) that, although it is difficult to determine if in fact cash transfers offset the adverse impact of the tariff increase, they may well have prevented an even greater drop in consumption and increase in arrears among recipients.

Overall, the Report concludes (p.25):

“Looking forward, future electricity tariff increases should be closely coordinated with improved price response prediction and credible actions to mitigate the potential impact on the poor and the environment. This includes detailed consumer behaviour analysis and timing tariff increases with investments that facilitate access to clean, sustainable, and affordable sources of energy”.

Since 1999 tariffs have remained unchanged at 25 AMD per kWh. This is largely because of favourable movements in the exchange rate which have meant that generation costs have effectively fallen so that overall profitability of the sector has improved without any pressure on prices. The privatisation of the distribution networks in 2002 may also have reduced price pressure through the drive to raise compliance, lower network losses and improve cost discipline. There seems little pressure for further price increases in the immediate future.

Our hypotheses about the impact on the poor can be expressed in terms of income and price elasticities of demand. The initial collapse in sales of electricity to households shown in Table 12 is consistent with the dramatic falls in income in the early part of the transition.

Table 12: Efficiency indicators for electricity supply 1991-2002

	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
Available v installed capacity %	67	67	67	67	81	81	81	81	81	81	81	n/a
Net supply (GWh)	10.4	8.8	6.1	5.4	5.2	5.8	5.5	5.4	5.1	5.1	5.0	4.8
Sales GWh	9.0	7.6	5.1	3.2	3.1	3.8	3.9	3.8	3.6	3.6	3.5	3.4
Sales-households GWh	1.9	3.1	2.4	1.9	1.7	1.6	1.7	1.5	1.3	1.2	1.2	1.2
Metered consumption GWh	9.0	7.6	5.1	3.2	3.1	3.8	3.9	3.8	3.6	3.6	3.5	3.4
Technical losses% of net supply	14	13	14	14	16	14	14	16	17	17	18	16
Commercial losses as % of net supply	0	7	16	27	25	20	16	13	13	12	13	13
Collection rate: % of metered consumption	100	50	50	39	54	60	61	77	88	89	81	90
Sales to households as percentage of net supply	21.2	40.5	47.2	58.8	56.5	42.3	44.6	38.4	35.8	34.4	34.1	35.9

Source: Lampietti (ed) 2004, Annex E, p.60.

In 1991 net supply and sales began a long decline which continued until 2002. Sales to households also followed a similar pattern from 1992 onwards. It can be seen that

in 1991, prior to the collapse of the Armenian economy, households accounted for 21.2 percent of sales. Sales to households however, rose dramatically from 1.9 to 3.1 GWh although the collection rate as a percentage of metered consumption fell by 50 percent. Household sales in 2002 were only 63 per cent of what they were in 1991. It is important to note that households in 1991 only accounted for 21.2 per cent of sales. However, by 1994 this figure had risen to 58.8 per cent of net supply so that revenue from households had become the major component of the electricity utilities' sales revenue. A commitment to full cost recovery must fall proportionately more heavily on households.

Although overall economic growth resumed in 1994 onwards, inequality remained high and the benefits of growth were restricted and largely captured by the urban middle and upper income groups. By 1999 the effect of the rise in prices became clear. Lampietti (ed) (2004, p. 32-33) estimated that mean household consumption fell steadily from an average of 160 kWh a month in 1998 to 117 kWh a month in 2001. These levels of consumption are close to basic minimum needs, sufficient only for lighting and refrigeration. The median consumption for Armenia and Georgia was between 84-100 kWh a month in 2002.

Following Lampietti (ed. 2004, p. 33) we hypothesise that the outcomes for the poor can be captured in terms of a kinked demand curve for electricity. Up to the amount necessary to meet basic needs (OA) the demand is very inelastic with the demand schedule becoming very or even perfectly elastic demand at some lower price (below P_1 in Diagram I).

Figure 1: The Demand Curve for Electricity

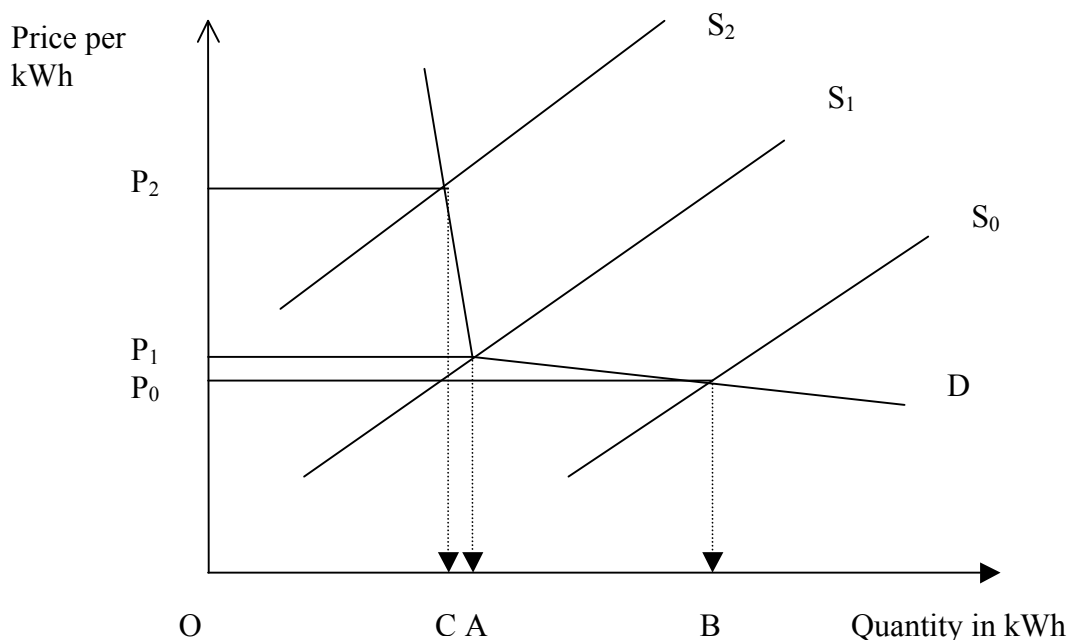


Diagram I illustrates the differing possible responses of the poor to tariff increases. If consumers are on the elastic section of the demand curve even a small increase in price leads to a large fall in quantity demanded, which would be reflected in sales to households. OA consumption represents the basic minimum needs and any further

rise in price, for example as implied by a shift from S_1 to S_2 , would mean, if metering is in place and payment enforced, the poor paying more for essentially the same level of consumption; their welfare would fall because of cutbacks elsewhere. They would be on a very inelastic part of the demand curve from D_1 to D_2 . This is consistent with the results reported by Hope and Singh (1995), who estimated the elasticity of demand for electricity to be between -0.08 and -0.32 for a range of poor and middle income countries.

This characterisation of the response of the poor is predicated upon a constant price and availability of substitutes. If either the availability or price changes then the position of the curve will shift.

In order to extend this investigation of the impact on the poor of the electricity price increases we have produced a series of estimates of the consumption baskets for different groups in Armenia based on successive National Statistical Service (NSS) surveys.

It is generally recognised that statistics derived from LSMS and HBS data are inadequate for a variety of reasons (Estache *et al.* 2001; Lampietti, ed., 2004) including crucially the fact that they do not record physical amounts of consumption. In addition, of course, especially in rural Armenia, a significant proportion of total consumption will not be mediated by market prices; in order to establish its value to estimate overall consumption a set of assumptions must be made about the appropriate price at which to value this consumption. For these reasons, we have re-estimated a number of the originally published results from the NSS because it was unclear how these had been generated from the original statistical data; this has the effect of making the new estimates somewhat different from those published by the NSS. However, for the most part the differences are small. Whenever possible both sets of estimates are given. The 2003 data had not been released at the time of writing so that re-estimates of the NSS figures could not be made.

The overall results of this exercise for Armenia, including both NSS and own estimates are shown in Table 13. Overall, consumer expenditure rose dramatically in 2003 by over 20 percent, which given quiescent inflation represented an extremely large increase in real terms. The consumption of non-food grew by 25.6 percent between 2002 and 2003 and services grew by 13.6 percent. The largest item in the consumption basket remained food products accounting for 67 percent of expenditure in 2003.

Expenditure on all tariffs according to our own estimates amounted to only 3.6 percent of overall consumer expenditure in 1998/99. Tariffs had risen sharply by 2001 to 808 AMD (a 99 percent increase) and represented 6.8 percent of overall expenditure. In 2002 the figure fell to 6.1 percent. As noted above these figures are significantly lower than those presented by Lampietti *et al.* (2001). For electricity only, our own estimates indicate that payments for electricity as a percentage of total expenditure were 2.9 per cent in 1998/99, 4.9 per cent in 2001, 4.4 per cent in 2002 and, using NSS data for 2003, 4.3 per cent of consumer expenditure.

It can be seen from Table 13 that the estimated per capita expenditure on water was less than 0.25 percent in all three years and in fact fell in 2002.

Table 13: Consumer Expenditure Baskets: 1998/99-2003

	1998/99		2001		2002		2003
	NSS estimate	Own estimate	NSS estimate	Own estimate	NSS estimate	Own estimate	NSS estimate
Consumer Expenditure	11705	11392	11949	11967	11983	12228	14404
Food Products	7416	8037	7719	7720	7978	8304	9669
Cigarettes	574	569	626	626	624	624	696
Alcoholic Drinks	129	101	103	106	104	113	122
Non Food Products	1760	1581	1749	1768	1618	1531	2033
Services	1826	1102	1752	1740	1659	1635	1884
Total Tariffs	na	406	na	808	na	742	na
<i>Electricity</i>	na	329	591	591	535	535	623
<i>Gas</i>	na	3	na	29	na	45	na
<i>Central Heating</i>	na	3	na	8	na	2	na
<i>Water Supply</i>	na	9	na	30	na	18	na
<i>Telephone</i>	na	58	150	149	142	139	168
<i>Sanitary and Sewage</i>	na	3	na	4	na	4	na
Other Services	na	696	na	933	na	893	na

Tables 14 and 15 present similar data broken down into urban and rural households.

Table 14: Monthly Per Capita Consumer Expenditure of Urban Households in Drams: 1998/99-2003

	1998-99	2001		2002		2003
	Own estimates	NSS estimates	Own estimates	NSS estimates	Own estimates	NSS estimates
Total Consumer Expenditures	10815	12150	11931	12333	12194	16008
Food Products	7057	7607	7295	7889	7731	10042
Cigarettes	568	644	644	667	667	806
Alcoholic Drinks	76	98	94	104	109	132
Non Food Products	1666	1782	1816	1678	1619	2552
Services	1380	2019	2019	1995	1995	2476
Total Tariffs	585	na	950	na	938	na
<i>Electricity</i>	461	682	682	662	662	768
<i>Gas</i>	4	na	30	na	39	na
<i>Central Heating</i>	6	na	11	na	4	na
<i>Water Supply</i>	13	na	19	na	25	na
<i>Telephone</i>	96	207	205	208	203	252
<i>Sanitary and Sewage</i>	5	na	5	na	7	na
Other Services	795	na	1069	na	1057	na

Urban per capita expenditure was below the national average in 1998/99 but rose much more rapidly in subsequent years. Urban per capita consumer expenditure grew by 29.8 percent according to NSS figures between 2002 and 2003. The consumption of non-food products grew by 52 percent and services by 24 percent over the same

period. Food products were 62 percent of total expenditures in 2003. Services accounted for 15.5 percent.

Expenditure on all tariffs was 5.4 percent of consumer expenditure. This increased by 62 percent to amount for 8 percent of per capita expenditure. It then fell in 2002 to 7.7 percent of per capita expenditure. The figures for electricity alone were 4.3 percent in 1998/99, rising to 5.7 percent in 2001 and falling to 5.4 percent. For 2003 according to NSS data this proportion was 4.8 percent.

Table 15: Monthly Per Capita Consumer Expenditure of Rural Households in Drams: 1998/99-2003

	1998-99	2001		2002		2003
	Own Estimates	NSS estimates	Own Estimates	NSS Estimates	Own Estimates	NSS Estimates
Total Consumer Expenditure	12159	11535	12042	11468	12279	12080
Food Products	9341	7950	8591	8110	9145	9130
Cigarettes	571	588	588	561	561	536
Alcoholic Drinks	135	113	132	103	120	105
Non Food Products	1469	1681	1669	1530	1402	1282
Services	732	1203	1167	1164	1106	1028
Total Tariffs	168	na	515	na	456	na
Electricity	154	404	404	348	348	413
Gas	2	na	26	na	54	Na
Central Heating	0	na	0	na	0	Na
Water Supply	4	na	51	na	8	Na
Telephone	8	35	34	3	45	46
Sanitary and Sewage	0	na	0	na	0	Na
Other Services	564	na	651	na	651	na

Rural per capita expenditure was above the national average in 1998/99, but rose much more slowly in subsequent years, in fact falling according to NSS data between 2001 and 2002 and rising by 5.3 percent in 2003. This presents a startlingly different picture from the urban households. The proportion of rural per capita expenditure on food rose from 68.9 percent in 2001 to 75.6 percent in 2003. The consumption of non-food products was 12.1 percent of total per capita expenditure in 1999, rising to 13.9 percent in 2001 and falling to 9 percent in 2002 (own estimates). Services accounted for 6 percent in 1998/99, rising to 9.7 percent in 2001 (a rise of 435 drams; a 59 percent rise). In 2002 the proportion was 9 percent. The NSS estimate for 2003 was 8.5 percent.

Expenditure on all tariffs was 1.4 percent of consumer expenditure in 1998/99. This increased by 207 percent to amount for 4.3 percent of per capita expenditure. It then fell in 2002 to 3.7 percent of per capita expenditure. The figures for electricity alone were 1.3 percent in 1998/99, rising to 3.4 percent in 2001 and falling to 2.8 percent in 2002. For 2003 according to NSS data this proportion was 3.4 percent.

Payments for water supply as a proportion of per capita expenditure are negligible for all years.

The breakdown of consumption baskets for the different decile groups was also calculated. Figure 2 illustrates the different experience of the decile groups over the period of the three surveys. In all cases consumption by the upper deciles was considerably higher than for the lower deciles. However, as figure 3 illustrates, the rate of growth of consumption in the final period (2002-2003) using the NSS data was greatest for the bottom decile and lowest for the top.

Figure 2: Total Consumption spending by decile group

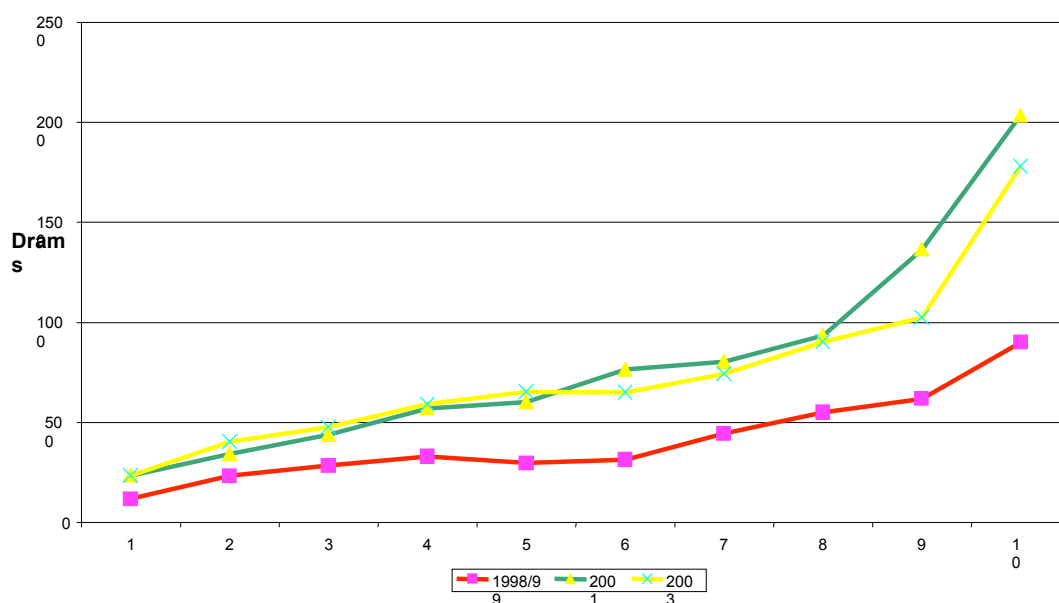
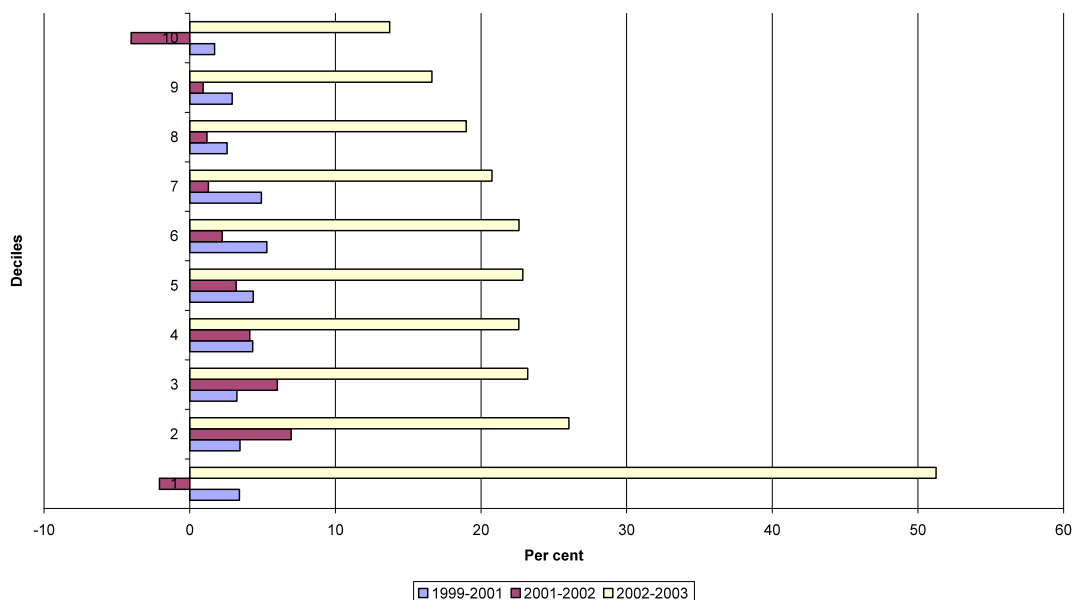


Figure 3: Growth of overall consumption by decile group (NSS data)



These data can usefully be discussed by presenting the evolution of spending on electricity and other utilities as a proportion of total consumption and of total money consumption respectively. These are shown below as Charts 3-10. The data on which these are based are given in Appendix 1 Tables 1-10.

The same relationship is evident in all four cases; there is a non-linear relationship between the expenditure by the decile groups on tariffs in general and electricity relative to both overall consumption expenditure and money expenditure.

With respect to total tariffs as a percentage of either consumer expenditure or monetary (cash) expenditure (shown in Figures 4 and 5), the very poorest households, that is, the bottom decile (I), have a lower share as compared to the richest households, that is, the top decile (X).

Figure 4: Tariff expenditure as proportion of total consumption by decile group

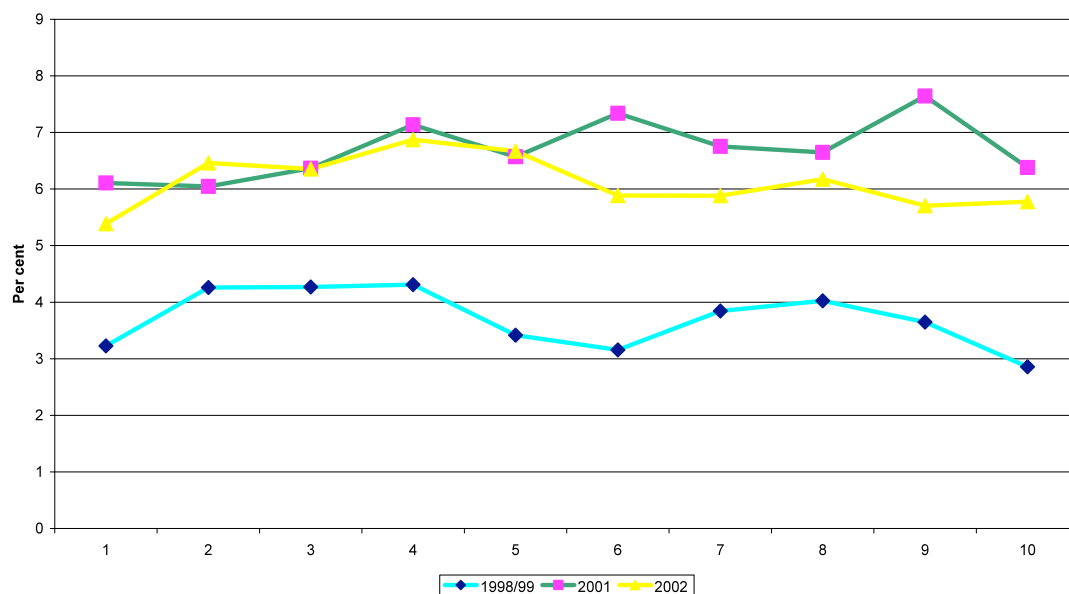
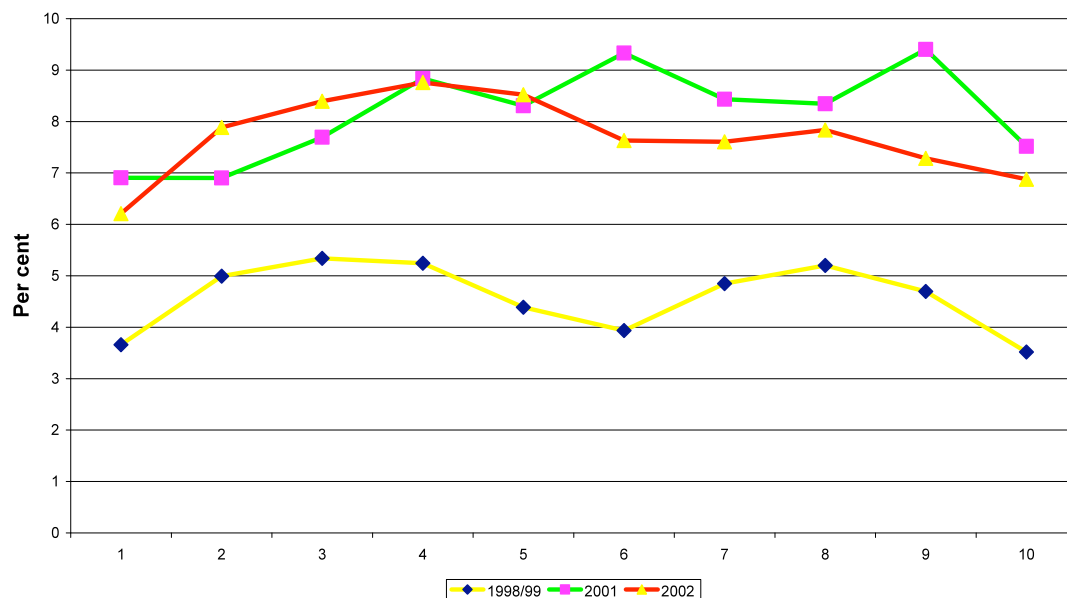


Figure 5: Tariff expenditure as proportion of money consumption by decile group



With respect to payments for electricity (shown in figures 6 and 7) however, on both measures the share of the very poor is higher, consistent with the findings of Lampietti (ed.) (2004, p.31). But on both measures, the share for deciles II to V is

even higher, indicating that it is the poor, rather than the very poor (to use conservative estimates as to which households fall into these categories) that are most vulnerable to higher prices.

Figure 6: Electricity expenditure as proportion of Total Consumption by decile group

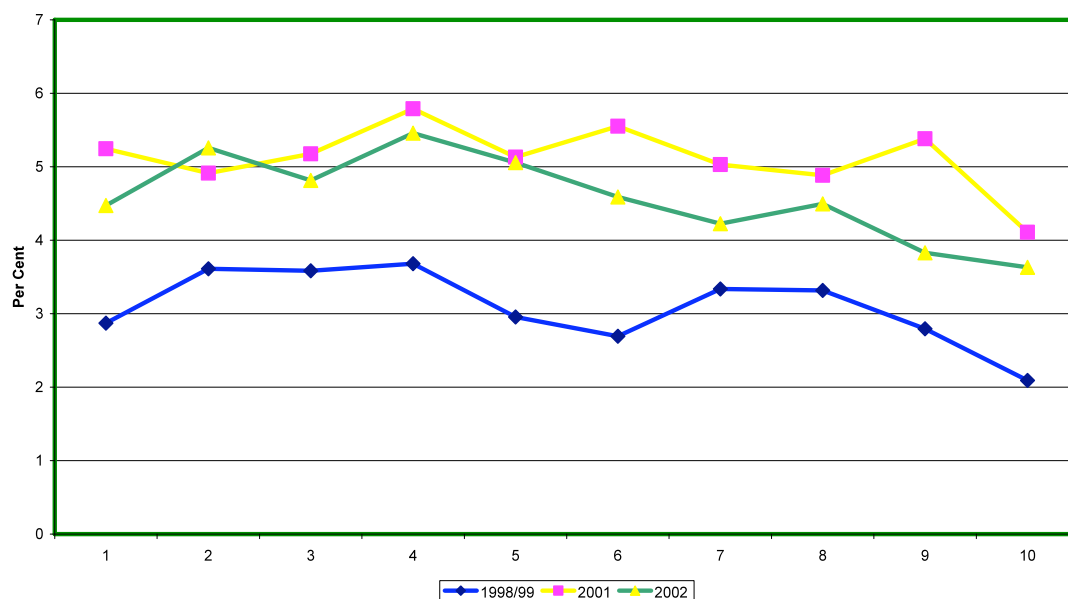
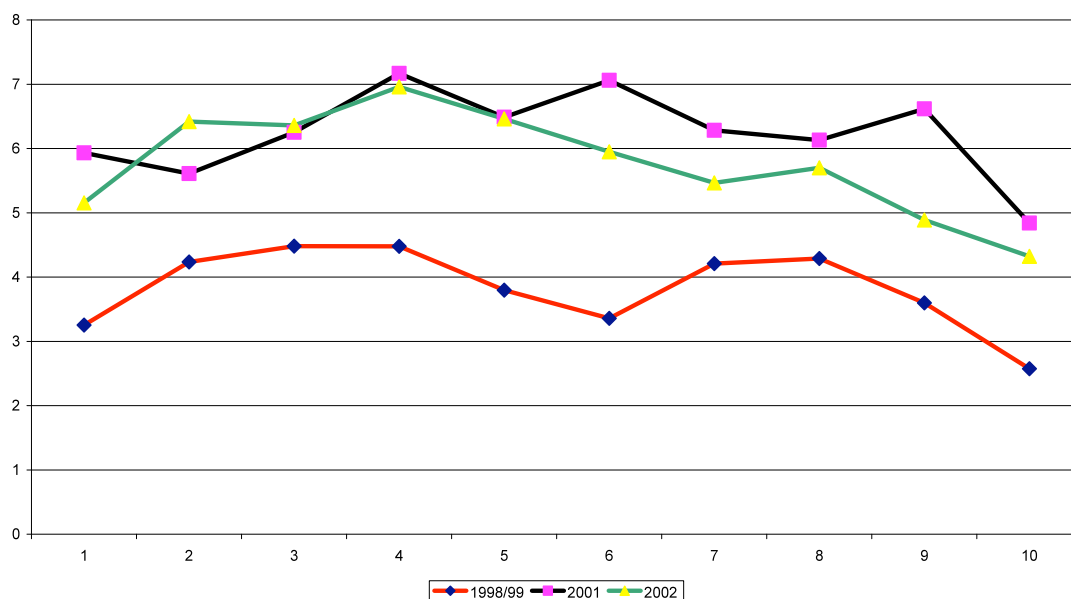


Figure 7: Electricity Expenditure as a proportion of money consumption by decile group



The conclusions that we draw from the breakdown of the data by deciles are consistent with the argument already presented. The very poor face a budget constraint and ration their consumption of electricity. Above some given price, demand becomes very inelastic. We can assume that the poor are already consuming the minimum amount of electricity consistent with their basic needs, and although we are asserting a very inelastic demand schedule, nevertheless, further price rises will at some point (if not already reached) push consumption below basic needs. Problems of non-payment and/or the illegal acquisition of electricity must be taken into account.

A similar situation arises with the poor (deciles II to V) although this group spends more on electricity in both absolute terms and as a proportion of consumer expenditure (both measures). From decile VI onwards, with only one slight hiccup between deciles VII and VIII, the share of electricity in either measure of expenditure falls. Wealthy households (decile X) on either measure, spend a relatively small amount on electricity.

There are very large discrepancies between the results reported by Lampietti et al. (2001) and those reported in the NSS based tables. The Lampietti results, although high, are consistent with results from studies from other countries and are also more consistent with prior judgements. In addition, we would expect the poor to spend a higher proportion of their income on energy or electricity. Are we able to reconcile these apparently conflicting results?

First, it is important to distinguish between the impact effect of electricity price rises and the longer run adjustment of consumption to these prices. The Lampietti et al. survey was conducted shortly after the large price rises in 1999. It is likely that the initial impact would have been to push up expenditures in the short run with a longer term adjustment in terms of lower consumption.

Second, the Lampietti et al. (2001) survey excluded those households which had no registered use of electricity. However, the NSS survey includes all such entries. The inclusion of numerous zeros will, of course, reduce the mean consumption levels. If we assume the census returns are accurate there are two possibilities which must be considered. First, it is possible that households are consuming no electricity. Second, it is possible that they are consuming electricity but not reporting their consumption and/or not paying for it.

In conclusion, the impact on the poor has two dimensions. First, there is evidence that the expenditure of the poor on electricity has risen. There are no data on physical consumption but on the generally well supported assumption that the demand curve of the poor will be highly inelastic we can infer that the poor adjust to higher prices by restricting their consumption of electricity. The large fall in the overall use of electricity is consistent with this and also consistent with a large number of consumers, presumably predominantly the poor, who are not connected to the system. This would also be consistent with the mismatch between the various studies cited earlier. Second, our results suggest that the impact of further price increases on the poor, represented by deciles 2 to 5 may be considerable. A higher proportion of their expenditure is accounted for by tariffs. An implication of considerable importance for any poverty alleviation strategy is that the poor are not homogeneous and the different characteristics require different policy responses. For those living in extreme poverty, who perhaps no longer consume electricity or piped water, requires a different poverty package from those who remain connected to the utility networks but who remain very vulnerable.

The decline in electricity usage suggests an increase in the use of substitutes. There are no data but we infer that the use of wood as a form of heating has increased. This is likely to lead to a number of deleterious effects on household health, pollution and environmental degradation.

Of course, the major part of the change may well have been the large increase in real incomes over the period that, given that electricity prices have not increased, means that the effective impact of the higher electricity prices has been ameliorated.

Domestic Water Supply

Lampietti et al. (2001) reported that although connection to piped utility water was common among Armenian households, service was often unreliable and households spent considerable time transporting, pumping and storing water. Pre-reform, water prices were set very low and system maintenance was not closely linked to revenue from households. Revenue was primarily generated by higher priced industrial consumption, but this changed in the late-1980s. Industrial water consumption fell by about 50 percent and domestic consumption increased from approximately 60 percent to over 90 percent of utility production in a short period (p.26).

At the same time, the GoA initiated major changes in the water tariff structure. Between 1995 and 1999, real domestic tariffs in Yerevan increased by almost 100 percent, although non-domestic tariffs fell. Thus the water utilities have become far more financially dependent on revenue from domestic consumers and non-payment has become a major problem. Bill payment enforcement is almost nonexistent because system characteristics make it difficult to deny access to individual households and because consumption is not metered (p.26).

Lampietti et al (2001) argue that the Armenian water utilities are caught in a low-level equilibrium trap, characterised by decreasing service quality and falling revenue.

According to the Lampietti et al (2001, p.27)) survey data, 40 percent of respondents report general dissatisfaction with their water service. Water service is unreliable, network maintenance is poor, and the quality of water is low (high sediment and chlorine levels). The rural poor have significantly less access to running water in their homes compared to rural non-poor and urban households, and they have the lowest level of satisfaction with the service provided (p.29).

The study by Lampietti et al. (2001) also reported that less than 1 percent of households had water meters and that self-reported water consumption was significantly under-reported, especially for those with reliable tap water (p.31), with the average household thinking it consumed 23 litres per capita per day (LCD). This provided a common justification for not paying bills as households did not think that they received the water that they were supposed to (between 200 to 250 LCD depending on location). The data on unpaid bills are given in Lampietti et al. (2001) Table 14, p.32. However, the very rapid increase in metering in Yerevan and its extension into the countryside are likely to have a dramatic impact on payment compliance and make inferences based on this survey unreliable.

From their own survey data, Lampietti et al (2001, p.33) estimate that if payments were fully enforced, expenditure by households on water would represent 8 percent of monthly expenditure of the poor as compared to 3 percent of monthly expenditure of the non-poor. For those households that pay their bills regularly every month, water represents about 3 percent of monthly household expenditures of the non-poor and 7 percent of the poor. The modelling exercise suggests that the quantity of water consumed is negatively correlated with price and positively correlated with income

and household size. The poor are significantly more sensitive to price when quality is improved than are the non-poor (p.36). We have a demand curve which is very inelastic for higher water prices and becomes elastic at some price (estimated at 5 ARD per 10 liters (or about \$1 per cubic meter).

Our results are consistent with the Lampietti et al. (2001) study; despite the reported level of tariffs for both domestic water and sewage, the data indicate an extremely small expenditure by all decile groups. This strongly supports the evidence of significant under-reporting of usage and/or non-payment.

The crucial issues are whether the water utilities can monitor what people actually consume and, quite separately, enforce payment for what is consumed. The first of these depends on the extension of metering, as noted in section 4; this is proposed in the PRSP.

We would envisage a similar response to that discussed with respect to electricity. Many poor households will reduce their consumption to the basic minimum. If payment is enforced they will suffer a welfare loss as other items of expenditure are cut in favour of the need for water. If on the other hand they cut consumption below the basic minimum by, for example, seeking alternative, perhaps less healthy sources of supply this raises further fundamental public health issues.

7. The Impact of increased irrigation tariffs on rural Poverty

In common with other countries in the Commonwealth of Independent States, Armenian agriculture saw a radical transformation after the break-up of the Soviet Union. Agriculture was de-collectivised in 1991 through a comprehensive programme of land privatisation. This resulted in the creation of about 335 thousand (now standing at 337 thousand), privately owned family farms, which currently account for over 95% of agricultural output. These farms are small, in the main between 1 and 2 hectares, and they are the units of a system of peasant agriculture.

The early years of transition in Armenia were characterised by a process of de-industrialisation and a marked rise in poverty levels. Even now, it is estimated that about half of the rural population, which accounts for 35% of the total population, is poor. The structural changes which took place in the agricultural sector during the 1990s allowed for a shift in cropping patterns towards subsistence crops, mainly in favour of grains and potatoes and away from fodder crops, fruits and grape production; this shift halted the rising poverty levels from affecting the level of staple food supplies available in the country. Unfortunately, a decade later, this farm structure is not conducive to the commercial exploitation of agriculture and it certainly does not provide the revenue to fund the investments needed to change the Soviet-era infrastructure into one that serves the needs of Armenia today.

Not least among these investments is the rehabilitation of Armenia's irrigation system which is in disrepair and does not provide the level of service which a productive agricultural sector requires, despite much work already carried out through World Bank and IFAD financing. The Government of Armenia, with the support of the FAO (MA of RA, 2002), has developed a strategy for the sustainable development of Armenian agriculture which seeks to address the challenges that face the sector

ranging from infrastructure to the training of the agricultural labour force. This plan builds on structural reforms already under way which we will review shortly. It is necessary to review these policy proposals because the success of any rationalisation of the use of water resources depends on them. Before that, and drawing from the government's strategy document, the next section will give a very brief description of the natural resource base of the republic of Armenia and its agricultural sector. The third part of this section will turn to the production statistics of Armenian agriculture and will discuss them in the context of the changes in irrigation charges and water use. The lack of any reliable data on the use of irrigation water at the marz level makes it impossible to quantify the potential effect of further rises in water tariffs on agricultural output. However, given the close association of poverty with rural areas, and particularly the least productive areas at higher altitudes, it is possible to discern the potential social disruption which significantly increased agricultural production costs would cause.

Armenia is a landlocked country with limited natural resources. It covers 2.9 million hectares of land in the Caucasus region and the average elevation is 1650 m. The climate is continental with hot summers and cold winters and annual rainfall ranging from 300mm in the Ararat plains to about 600mm in the rest of the country. Pastures are characteristic at higher altitudes. The low-lying areas, such as the Ararat plains, have rich and deep soils, but at higher altitudes and on steep slopes, soils tend to be shallow. Table 1 in Appendix 2 shows the total land areas in Armenia. Only about 4 percent of the area is suitable for agriculture and of this total, half of total arable and perennial areas, or about 20 percent of all the agricultural area, needs irrigation. Armenia also suffers from the serious ecological degradation of its land resources. The main reasons are the absence of sustainable grazing management, the absence of drainage systems and a high incidence of salinity in many valleys. Armenia can be divided into four agricultural zones: *the valleys*, where no cropping is possible without irrigation; *the pre-mountainous regions*, where low-yielding wheat and alfalfa can be grown under rain-fed conditions; *the mountainous regions*, which are similar to the previous zone but less fertile and *the subtropical regions*, where no rain-fed cropping is possible, but where optimum conditions exist for growing high value crops with supplementary irrigation.

The relatively poor natural resource base, the fragmented farm structure, a lack of access to markets for the products of agriculture, the lack of an industrial base to supply inputs to agriculture and the need for specific training for the agricultural labour force are the challenges which any development strategy will need to address. But despite these problems, in the short and medium term, agriculture still stands as the only sector capable of providing a supply of staple food to which the poor have access, and the potential to create rural employment and savings to fund future investment. Government estimates suggest that between 60 and 70% of total household consumption in Armenia is accounted for by food. Armenia is also a net food importer, traditionally of grain, sugar, vegetable oil and livestock products. In the medium term and long term, therefore, domestic demand represents the biggest outlet for agricultural production.

It is, therefore, of some concern that analysis of the results of the Household Surveys (HS) of recent years (1996-2003) shows that, despite significant growth in the agricultural sector, rural farm incomes have declined very markedly and the level of

rural poverty has remained unchanged. Minasyan and Mkrtchyan (2005) describe the problem and provide some evidence that shows that part of the benefit of agricultural growth is actually being realised in urban areas, although they are unable to fully explain the apparent gap between agricultural output and farm incomes. The reasons behind these results are probably varied, but the fact that a market economy needs a strong institutional framework, in terms of secure property rights and reasonably efficient markets as well as some cultural understanding of the market mechanism, goes a long way to explain why in Armenia, where these conditions are not fully developed, the expected outcomes in the agricultural sector following land privatisation have not materialised. Our starting point therefore will be a review of the progress of the agricultural reforms which began with the privatisation of agricultural assets in 1991, as reported to the World Bank by C. Csaki et al. (2003).

A Brief Review of the Progress of Economic Reform in Armenian Agriculture

The reforms that have been put in place in the agricultural sector aim to create the right policy and economic environment in which market forces will be able to deliver economic growth. Needless to say, economic growth will not automatically deliver distributional objectives, as the evidence from the HS study shows. However, the reform process does not amount to changes in law and policy only; it is a process of adjustment and learning on the part of the economic agents in Armenia. The management of the changes is vital given the high levels of poverty in rural areas and the absence of alternative employment opportunities outside agricultural production.

The programme of land privatisation is complete with only 15% of arable land held in state reserve; this land can be leased for grazing or bought at auction by farmers. Pastures and meadows are owned by state and municipal authorities and are also leased. This is the only way in which farmers have increased the effective size of their holdings until now.³ A property registration system has been established and it is being automated so that it can be used as the information base for land management and transactions. Given the low productivity and profitability of the fragmented farming system in Armenia it is not unreasonable to expect a process of farm consolidation to take place given secure and transferable property rights and a land market. However, this has not happened yet. This could be because in an insecure economic environment access to agricultural land is probably the best insurance available to many families and they are, therefore, reluctant to sell. On the other hand, the infrastructure and input supplies (including finance), on which a profitable agricultural sector would depend, are not yet in place and farm consolidation at this stage would be premature. Furthermore, the markets for agricultural products, be it agro-processing industries or exports, have not developed sufficiently to drive the process of structural reform through increased and sustained demand either.

There are no price controls for agricultural products in Armenia and the only subsidies that remain in place are those covering the losses of the irrigation water system by the state-owned water company. However, it should be noted that agricultural products are effectively subsidised by being, for the most part, VAT exempt; this exemption will be removed in 2009 to ensure WTO compliance.

³ Data on real estate transactions, however, show that there has been no significant amount of land transfers, either through sales or leases, in recent years. (Minasyan, 2005).

During 1994-2000 the budgetary resources allocated to the agricultural sector represented less than 5 percent of total state expenditures. In 2002 and 2003 this share rose to around 6 percent (1.2 percent of GDP). In fact, the vast majority of the budget allocated to the Ministry of Agriculture is spent on water infrastructure and irrigation services. The reason that this level of support to irrigation is needed is that, on government estimates, only 45 percent of farmers pay for their water use, the rest pay less than half and mostly in kind (Ministry of Agriculture of the Republic of Armenia, 2002); there are no significant penalties for non-payment. Moreover, fees do not fully reflect the cost of supplying the water. The cost recovery target for 2003, under Armenia's structural reforms, was 44percent but that was not reached; recoveries amounted only to 31percent. Clearly, the GoA would like to see these expenditures disappear from its budget and redirected to other aspects of reform, and there is pressure from international institutions to step up tariff increases to reach full cost recovery by 2007 (IMF, 2004, para. 36). Whether this is possible depends on the ability of the institutional bodies created to manage the country's water resources to increase the level of payment by farmers. Although central responsibility for water supply in Armenia was given to the State Committee for Water Management in 2001, irrigation water is supplied to farmers by the village councils or local water enterprises through tertiary canals reaching about 50percent of farmers. It is widely accepted that lack of ownership of the system is the major reason for lack of maintenance, inefficient use of water and very high transmission losses. Water Users Associations were introduced in 1996 on a pilot basis to test the transfer of operation and maintenance of tertiary irrigation systems to private water users.

However, the WUA pilots have not been successful in improving water delivery mechanisms. There are many reasons for this; according to the Ministry of Agriculture's strategy paper the WUAs receive no technical support but are required to manage the existing system of tertiary irrigation systems that are in a state of disrepair and are often not functional. In addition, in most cases, village councils and village heads select their leader rather than farmers themselves. The paper concludes that the most immediate requirement is for a national water plan with a phased investment programme. The irrigation system in Armenia, built originally to service the large Soviet farms (of 50-400 ha), has to be transformed to serve the new farm structure. If this does not happen it is not difficult to see how farmers may be less than forthcoming in meeting their water charges when their source of water is unreliable, they are largely ignorant of the marginal benefits of irrigation use on their farming systems and receive no technical support in planning water use plans.

The GoA's strategy for the agricultural sector includes fairly detailed responses to the needs listed above. These include the technical training of farmers to help them adjust their choice of agricultural enterprises according to the land resources available to them, rational use of scarce inputs and diversification into cash crops, such as vegetable oil crops, pulse crops and cotton, short-maturing crops which can provide for double cropping in irrigated areas, and forage crops which provide for needed improvements to livestock nutrition and soil improvement. Furthermore, the strategy recommends the development of realistic assessments of the production responses likely to be achieved by small scale commercial farmers in order to determine the returns on the adoption of these technologies for all crops in all major production areas. Given that the yields of major crops currently grown are believed to be only 50

percent to 60 percent of their potential, there is plenty of room to increase productivity in this sector even before new crops are introduced. This information is needed for the development of a long term national water plan leading to the profitable use of irrigation water.

The Impact of Increased Water Charges on Agricultural Production

In the short term, however, Armenian farming systems are as described above, and we now turn to the impact of higher irrigation charges on them. The last PSIA on “Water Sector Reform in Armenia” (Roe *et al.*, 2003) based its quantitative estimates of the effect of increased water tariffs on farm profits on production costs and output prices for the period 1995-2000, and on the results of the 1998 survey of Armenian family farms (Lerman *et al.*, 1999). The authors derive their results using an estimated production function to project future profits, by crop for each marz, under two scenarios: one in which only water tariffs are allowed to increase, and the second one in which output prices are assumed to increase by an arbitrary amount as a response to water tariff increases. Unfortunately the paper gives very few details about the first set of data, but they are not based on published results and, as such, there are many questions which are left unanswered regarding the assumptions made in the construction of a Cobb-Douglas production function described in Annex 2. In fact, the authors acknowledge the limitations of their quantitative estimates and they present their results as indications of the likely direction of movement in profits rather than as accurate profit forecasts.

Their conclusions point to a worsening situation in fodder production (due to the high irrigation costs involved) in the relatively productive marzes of Shirak, Armavir, Ararat and Gegharkunik, but positive profits for most of the other crops. The situation in the other, less productive marzes (where poverty levels are higher), was found to deteriorate under the restrictive assumptions of the model used. However, there is evidence, quoted in the paper, of significant changes in cropping patterns following the increases in irrigation charges which would perhaps have protected the erosion of farm profits. Furthermore, results from the Agricultural Survey of 2003 show that the share of irrigation costs in total production costs has fallen dramatically compared to the 1997 results. Given that water charges have increased in that period, this means that either farmers have cut their use of irrigation water or other costs have risen far more than water charges. However, the drop in the value of the share of irrigation costs is so marked that the only reasonable explanation is a fall in consumption. On the other hand, there is also evidence, presented in the paper by Minasyan and Mkrtchyan (2005), of significant negative changes in agriculture’s terms of trade in Armenia since 1993 which would have had an adverse impact on the farm incomes of rural households. All these developments highlight the limitations of the econometric approach to assessing the impact of water charges on farm profitability under simple, restrictive assumptions. It follows that, given the uneven nature of the agricultural statistics available and the rapid nature of the structural and other changes taking place across economic sectors in Armenia, it is very difficult to perform econometric analyses which are able to isolate the individual effect of water tariff changes on farm profits in a reliable manner.

The qualitative results of the 2003 PSIA, on the other hand, are based on discussions with relevant focus groups in Armenia and they identify a very wide ranging set of risks associated with the reform of the irrigation water sector; these are as follows:

- *Poverty will increase as more farms close or struggle financially. This risk could undermine the programme and even economic development in some regions more generally. Although higher water charges will be only one of several causative factors, it is likely to be one of the most prominent.*
- *Increased out-migration from rural areas will increase social tensions in the urban areas and could make economic development more unbalanced.*
- *De-population of rural areas near the borders may heighten security risks*
- *Further waves of outward migration may complicate existing demographic imbalances.*
- *The increased polarisation of rural communities will exacerbate social tensions. Armenia already has the highest Gini coefficient in the CIS.*
- *There may be additional health and environmental risks. Farmers may, for instance, switch to extensive use of drainage and drain water, even if it does not match the required standards for using waste water.*
- *Price hikes in the cost of food will undermine the food security of some of the poor. (Roe et al., 2003, p.54).*

The second agricultural survey mentioned above was conducted in 2003 along the same lines as the first in 1998 and, although some of its results are included in this paper, neither the data collected nor their detailed analysis was made available to us. Unfortunately, this has prevented us from conducting a more formal study of farm level changes in profitability and water use in the period between the two surveys, during which water tariffs have increased. An updated breakdown of production costs by crop and by marz was made available to us and these results have been included in our analysis (see Table 15 Appendix 2). If the survey data had been available it would perhaps have been possible to construct a simple profit function model of agriculture by marz in order to estimate the likely effect of increased water charges on farm profits, partially replicating the work of the previous PSIA. But there would still have been significant drawbacks with this approach relating to the quality of the data and the little understood nature of the detail of the structural changes taking place in the agriculture and food sectors in Armenia, as discussed above.

Therefore, given the information available for this analysis all that will be done here is to describe the changes in agricultural land use that have occurred since 1998 and the associated changes in agricultural output and water tariffs. We will then marry these observations with our knowledge of the irrigation needs of the different crops and the availability of irrigation water by marz, to ascertain whether there was a continued move towards the production of staple crops, with expected low market returns, or a

return to traditional cash crops. If the former is the case, we would expect the shift to be associated with lower profits than if the move had been towards higher value cash crops and, therefore, also associated with an increase in the potential for rising poverty. Unfortunately, it will not be possible to quantify the production response of any crop to increased irrigation charges, or their effect on profit margins.

Table 1 in Appendix 2 presents a statistical summary of Armenian agriculture by marz (Yerevan is excluded from this analysis). The three major contributors to total agricultural product are Ararat, Armavir and Gegharkunik, behind them are Lori and Shirak. The first three also have large rural populations (64 percent and over) as does Aragatsotn which only accounts for 7 percent of gross agricultural product. Table 2 provides a description of land use in Armenia by crop type and livestock numbers and Tables 3-12 provide the same information for each marz. The most salient trends in the period, covered in Table 2, are the move towards grain production and the falling areas devoted to vineyards. There have also been significant increases in the numbers of livestock. The devastating effect on crop yields of the drought of 2000 can also be seen in the figures. The last two highlighted rows in Table 2 provide indices of gross output at constant and current prices. The rise in the volume of agricultural production in the five years shown is encouraging. Table 14 and 15 also show that these production increases have been associated with falls in the total area of irrigated land in Armenia, a 5 percent drop in the water provided to the network, a 25 percent drop in the water supplied to customers and a steady rise in water tariffs.

The production of legumes and oil crops in Armenia is marginal at the moment, so the increases in the area devoted to grain and legume production describes the increase in the production of cereal crops, in the main wheat, for home consumption. Although this is a reasonable response to food insecurity and rising poverty levels, the production of cereals is barely profitable in Armenia. In the longer term, Armenia can source its grain requirements in international markets much more competitively than through home production. At the moment grains are grown in all the marzes of Armenia and the yields are very low. Potatoes, on the other hand, are a food staple and a cash crop. Potato areas increased by 45 percent during the 1990s, but the areas sown to the crop fell slightly between 1999 and 2003 while yields increased. This trend was common to all marzes except Gegharkounik which showed an increase of 38 percent in the area sown to potatoes during the same period with production increasing by 69 percent in volume terms. 10 percent to 15 percent of the potato crop is accounted for by early potatoes which are grown under irrigation in the low-lying areas of the Ararat plains. Early potatoes have good export potential and provide an opportunity to develop a domestic potato processing industry.

Vegetables are the traditional high value crop in Armenian agriculture. They are grown throughout the country and the overall yields are good. Between 1999 and 2002 national areas sown to vegetables remained stable with yields showing a small increase. However, this masks a 48 percent increase in the area sown in Ararat between 1999 and 2003 (see Table 4) and a 77 percent increase in the volume of production.

The areas planted to water melons and fruit and berries, also potential cash crops, remained fairly stable during the same period, although yields have shown great

variability. Fruit is grown mainly in the low-lying lands of the Ararat Valley, Ararat and Armavir marzes, and Meghri in Syunik.

Finally, we have already mentioned that vineyard areas dropped substantially throughout the 1990s. Between 1981 and 1985 Armenia had 30 to 35 thousand hectares of vineyards, by 1998 the area had dropped to 15.8 and 13.0 thousand hectares by 2002. 80 percent of the vineyards are found in the Ararat valley, Vayots Dzor and Tavoush. The production of grapes has suffered from a lack of markets, the replacement of labour for machinery use, lack of disease control and low yields given that the plants are not covered during the winter.

Livestock production is widespread in Armenia. Over half of all the farms keep cattle, 11 percent keep pigs, 25 percent sheep and 36 percent poultry (more than 10 animals). However, the average number of cattle per farm is 2.3 head. Between 1999 and 2002, Table 2 shows an increase of 14 percent in the number of cattle, 10 percent increase in the number of sheep and goats and a 30 percent increase in the number of pigs. The productivity of the livestock sector is very low by any standard and an adequate level of animal health and hygiene in the production process has to be achieved in order to be able to market animal products. During the 1990s Armenia lost its sources of feed and, as a consequence, the standard of livestock nutrition has suffered. At the same time, the areas planted to forage crops dropped dramatically and at the moment the high cost of seed is a barrier to increased production. Only a few large farms produce and store silage or other forage which means that most bovine and ovine production is grass-fed. The problem here is that pastures, as water resources, can be rented from the local councils or the state authorities but there is no management system in place to prevent their overgrazing and soil erosion. Remote summer pastures are more productive and have natural or artificial irrigation systems, but they are not used to their full potential. The development of the livestock sector, of course, offers and additional opportunity to develop small scale processing industries, but the animal and public health problems need to be addressed at state level in order to ensure access to markets.

Table 15 shows gross agricultural output volume indices against the rising water tariffs by marz. In every marz, except for Aragatsotn, agricultural output increases between 1999 and 2002. In Ararat and Armavir, however, this increase is very small, by 9 percent and 8 percent respectively. In contrast, Vayots Dzor performs very well in volume terms and, looking at Table 12, the increase seems to be generated in grain production. Given the low average productivity of Armenian agriculture it would not have been surprising to find far more impressive growth levels. Unfortunately it was not possible to obtain irrigation figures by marz, but the general drop in the use of irrigation water at the national level, coupled with the increased tariffs could be, at least in part, responsible for the inability of the sector to improve its output yields. In fact, Table 15 shows the share of irrigation costs in the total costs of production of the main crops we have considered by marz; these figures were estimated using results from the 1998 and 2003 survey of private farms. In most cases the share of irrigation costs in total costs falls. The exceptions are grape production in Aragatsotn and Kotayk, although the production figures at the marz level do not show any indication of rising yields or larger areas planted to vineyards.

Conclusions

Given the limited availability of statistical data it is impossible to provide a quantitative assessment of the effect of increased water tariffs on Armenian agriculture. Furthermore, given the high levels of non-payment it could be argued that, for many, the increased tariff levels were of limited consequence. However, if we assume that, in future, the government is able to enforce payment in some manner, given the low productivity of agricultural production, there is little doubt that households without an off-farm source of income with which to subsidise their agricultural production could not meet the full costs of water supply. The earlier PSIA discussing the agricultural sector (*Roe, 2003, p.48*) quotes official estimates of the percentage of farming families who do not have cash income as 25.6 percent with a further 31 percent receiving a cash income of less than US \$500 annually. Clearly these groups would suffer following any increases in cash demands. The danger in charging the full cost of water supply to the agricultural sector in its current state is twofold. It may cause a rationalisation of the sector with a significant cost in terms of rising poverty (extreme poverty in rural areas is found among the landless), but it will also prevent the development of the government's strategy for sustainable development which aims to use the natural resources in Armenia in an appropriate way, including the large proportion of the labour force (46 percent in 2003) employed in agriculture and forestry. In the years from 1999 until 2003 examined above the statistics show no significant moves by farmers to more productive agricultural systems or management practices. Neither is there a clear move to the production of more cash crops and away from low yielding subsistence grain crops. At the same time, evidence from the HS analysed by Minasyan and Mkrtchyan shows that the proportion of total farm income arising from sales of agricultural products by rural households fell from 13.1 percent to 11.8 percent in 2003 compared to 1999, despite rising aggregate agricultural output. On the other hand, the proportion of total farm income accounted for by sales of agricultural products by urban households increased from 1.9 percent to 9.8 percent in the same period. We could not find a single reason explaining the statistics, it appears that, through a variety of causes, rural households are not being able to translate the growth of the agricultural sector into higher incomes.

This only highlights the absolute need for a successful rural development strategy to unlock the existing potential to increase productivity levels and to direct the introduction of quality standards that will open, at the very least, domestic markets to Armenian agricultural output. This process should lead to the creation of a profitable agricultural sector with links to the rest of the economy upstream and downstream from the farm, capable of paying all its costs. But the high productivity levels will not materialise in Armenia until the irrigation system is reliable and accessible to the areas to which production of profitable crops is suited. If the system of financial services for private agriculture were operating efficiently, it could provide the resources to develop the infrastructure, releasing the government to support appropriate research and development and extension. Unfortunately, this does not appear to be happening. However, it is only through a successful development strategy that looks to base the success of the rural economy on efficient production, that the resources available to Armenia in its rural areas, including its labour force, will produce the return necessary to alleviate current poverty levels.

8. Policy Issues

We take it as given that the GoA will pursue its policies of the restructuring and selective privatisation of utilities provision with the objectives of moving to full cost pricing and the elimination of public subsidies, while at the same time moving towards full compliance with respect to payment of utility bills by consumers. Final prices will reflect real resource costs, independent of their distributional implications.

The position of the GoA is that poverty alleviation should be achieved through the social security/benefits system rather than attempted through the manipulation of utility tariffs. However, the evidence reported here indicates that the present system is neither designed nor in fact operates to achieve this objective. The social benefit system provides effective family support only for those living in extreme poverty below the food poverty line; social benefits, pensions and other transfers do not contribute significant help to the large numbers of people who are poor but not extremely poor. In fact, the system is explicitly designed to target only those in extreme poverty, with increases in benefits planned against the fall in numbers below the extreme poverty line.

In addition, the analysis conducted here shows that changes in electricity prices impact most heavily on the consumption and incomes of the poor, rather than those in extreme poverty. This effect is likely to be replicated for domestic water as payment compliance rises with significant effects on income and consumption levels. This means that the presumption by the GoA that the social benefit system, as presently constituted, represents an effective device for ameliorating the impact of higher energy prices on the poor is incorrect; the larger number of those who are poor but not in extreme poverty will not be protected against the welfare reductions implicit in these rises.

It is clear that this conclusion re-opens the debate as to how vulnerable households who do not fall below the extreme poverty line can and should be safeguarded. In the case of electricity, for example, the debate is between lifeline tariffs which subsidize an initial block of electricity for all users, and direct income transfers. Proponents of direct transfers argue that lifelines are not targeted and thus encourage inefficient energy use while opponents argue that transfers through the social security system fail to reach a large proportion of the poor because of inadequate targeting (Lampietti, Ed. 2004, pp.36-38).

Lampietti (Ed, 2004, p.38) argues that income transfers tend to be well targeted in countries with low degrees of poverty (less than 10 per cent of the population below the poverty line), with sufficient funds to finance the administration of social assistance and with a small informal sector that makes means testing easier. Armenia, with its widespread poverty, insufficient budget resources and limited capacity to means test, does not meet these criteria. The case for a lifeline tariff is thus stronger, as long as there is the political will to keep the size of the block small and to reimburse the utility for its costs.

Drawing on a variety of experiences in Latin America, Estache et al (2001) argue that linking welfare programmes to changes in the utilities industries is complex for a number of reasons. For example, it is difficult to isolate the impact of changes in

utilities on the poor from the impact of all other changes that are occurring simultaneously. In addition, welfare programmes aimed at utility consumers will not reach the unconnected poor who may well account for a substantial proportion of vulnerable households. Although there are strong arguments against utility regulators having social and welfare objectives in their statutory duties, nevertheless Estache et al (2001, p.1189) pose the question as to whether it is realistic to expect that governments will be able to put together general welfare policies that will “support” privatization. They answer their own question thus:

“...while long-term efforts should be geared to improve the welfare system, addressing poverty problems directly in the infrastructure sectors may well be more efficient in a second-best sense than relying on the current welfare structure in many countries”.

To re-emphasise the point they further argue that “...there is a case for adverse distributional effects to be addressed directly in the utility industries with measures aimed at lowering the financial burden on vulnerable households that consume the services” (Estache et al, 2001, p.1190).

The regulatory framework and its associated institutions that is a necessary complement to the restructuring and/or privatisation of utilities in part determine the impact of utility reforms on the poor. The ways in which markets are restructured, the means by which competition is introduced and maintained and the manner in which regulatory commitments are implemented, together determine to what extent economic reforms will be beneficial to poor households (Estache et al, 2001, p.1194). The weaker the regulatory structure, the less likely is it that the interests of the poor will be given priority.

Access to and affordability of utility services are the key issues for the poor. It is unlikely that the poor will be able to consume sufficient piped water or sufficient power without some element of subsidy and attention has thus focused in particular on two forms of cross-subsidy – Obligatory Service (OS) and Universal Service Obligation (USO).

OS is appropriate when supply costs are higher in some locations than in others and when the availability of certain privately supplied services is lower than the socially desired level (Chisari et al, 2001). Under OS, utility operators must allow access to their services to all users who wish to join the supply system at the prevailing tariff, even if this incurs a loss to the supplier. USO includes the issue of affordability and arises when the product is essential and there are groups of consumers who cannot gain access to a product or service unless tariffs are adjusted to meet their ability to pay (Chisari et al, 2001). USO is intended to give all households access to the product or service but additionally controls tariffs so that an “acceptable” level of consumption is achieved, that is there is tariff adjustment until the voluntary service consumption reaches a socially desirable level (Chisari et al, 2001, p.9). Access to water and sewage facilities is highly desirable, for example, and self-exclusion (non-consumption) is potentially harmful to society. The situation is similar with respect to access to electricity, where the use of alternatives (for example, wood) may exacerbate health and environmental problems.

The risk of self exclusion and thus the importance of Universal Service Obligations is particularly important for countries with high levels of persistent poverty and unemployment, as is the case in Armenia. It is also important to note that, given the vulnerability of an economy such as Armenia to exogenous macroeconomic shocks and the inability of the poor to protect their livelihoods in such conditions, tariffs must ideally be computed so that in times of crisis, heavy penalties for late payment and delinquency (non-payment and the build up of arrears) will not lead poor households to disconnect from the networks (Chisari et al, 2001, p.14).

Chisari et al (2001, p.14) identify four financing system to meet the Universal Service Obligations, namely, cross-subsidies among consumers and/or among products, direct transfers either to consumers or through company disbursements, the setting up of a specific fund, financed by suppliers or the government and extension of the concession to the company(ies) concerned. As we have already noted above, there may well be a conflict between the dictates of economic theory and the real world practicalities of designing and implementing an efficient, effective and fair social security programme as part of the poverty alleviation effort. Some system must be devised that protects the interests of the most vulnerable and ensures that they receive a “fair share” of the benefits of reform in the short-run. In the words of Chisari et al (2001, p.20): “An ideal scheme maximises the benefits for the target group, while minimising the efficiency losses through distortion which any such mechanism inevitably involves”.

Such a scheme is described by Lampietti (ed., 2004, pp. 36-39). A block tariff provides such a mechanism. The objections to this device are that having different tariffs for any of the utilities provides scope for households receiving the service at a cheaper rate to re-sell in an informal market. However, the very wide coverage of meters, at least for electricity and now increasingly for domestic water, makes this much less persuasive. In addition, the cost effectiveness of such a scheme is dependent on identifying accurately the ‘kink’ in the demand curve which separates the inelastic part of the schedule, when price increases have high welfare costs, from the elastic portion. Once again, this can be addressed through the information provided through metering. The existence of metering provides a method of establishing accurate physical consumption data which, in principle, could be linked to other characteristics of the household. The collection and estimation of such a consumption level in the case of the major utilities is an urgent priority. This is the challenge that faces the GoA.

The policy issues raised by the prospective increases in irrigation tariffs are more complex and, given the paucity of data, more contestable than those for domestic utilities. At present, the very high levels of non-payment mean that tariff increases have no real effects on the poor and non-poor alike. The crucial issue is therefore one of identifying the likely consequences of raising payment compliance.

A number of plausible possible effects have been identified. First, is that increased compliance will weigh very heavily on those households with little access to outside cash income, raising poverty among these households. Second, is the likelihood of some rationalisation with the further growth of landless households, amongst whom rural poverty is concentrated. In short, a successful drive to raise payment compliance is likely to raise rural poverty, although its extent is extremely difficult to gauge. As

with the impact of domestic tariffs, it is unclear what proportion of this will be compensated through the social benefit system, given its concentration on extreme poverty.

Further policy issues are raised by the interaction between the drive to raise compliance and the concomitant commitment to sustainable development in Armenia. Sustainable development and poverty reduction require an increase in productivity which depends on the existence of an efficient, reliable irrigation system and, there is no doubt, considerable rationalisation of farms in terms of size and distribution. There is an evident sequencing problem for policy makers.

Appendix 1:Expenditure by Decile Groups

Table 1: Monthly Average Consumer Expenditures by Decile Groups

	1998-99		2001		2002		2003
	NSS Estimates	Our Estimates	NSS Estimates	Our Estimates	NSS Estimates	Our Estimates	NSS Estimates
Total Average	11705	11566	11949	11979	11983	12353	14404
Decile 1	3220	3630	3330	3871	3261	4347	4932
Decile 2	5133	5460	5310	5668	5680	6259	7159
Decile 3	6452	6644	6661	6885	7062	7491	8701
Decile 4	7661	7648	7992	8018	8322	8598	10202
Decile 5	8961	8683	9352	9179	9650	9796	11857
Decile 6	10414	9943	10965	10446	11209	11061	13743
Decile 7	12411	11541	13022	11913	13190	12612	15927
Decile 8	15325	13661	15719	14067	15906	14617	18926
Decile 9	19660	16949	20234	17851	20420	17933	23815
Decile 10	37013	31501	37645	31874	36131	30812	41090

Table 2: Expenditure by Decile Group 1

	1998-99		2001		2002	
Total Consumption	3220.0	3630.2	3330.0	3870.5	3261.0	4346.6
Food Products	na	3114	2676	3151	2596	3576
Cigarettes	na	175	202	178	179	177
Alcoholic Drinks	na	11	9	9	6	9
Non Food Products	na	151	153	204	182	264
Services	na	179	290	328	298	321
<i>Of which Tariffs</i>	na	117	na	236	na	234
<i>Electricity</i>	na	104	na	203	na	194
<i>Gas</i>	na	0	na	3	na	7
<i>Central Heating</i>	na	0	na	0	na	0
<i>Water Supply</i>	na	0	na	2	na	2
<i>Telephone</i>	na	13	na	28	na	31
<i>Sanitary and Sewage</i>	na	0	na	1	na	1
Other Services	na	61	na	91	na	87

Table 3: Expenditure by Decile Group 2

	1998-99		2001		2002	
Total Consumption	5133.0	5459.9	5310.0	5668.5	5680.0	6259.4
Food Products	na	4537	4119	4561	4444	5004
Cigarettes	na	294	336	325	312	287
Alcoholic Drinks	na	14	16	14	15	17
Non Food Products	na	233	342	296	378	370
Services	na	381	497	473	531	581
<i>Of which Tariffs</i>	na	233	na	343	na	404
<i>Electricity</i>	na	197	na	279	na	329
<i>Gas</i>	na	0	na	6	na	6
<i>Central Heating</i>	na	0	na	0	na	6
<i>Water Supply</i>	na	1	na	4	na	5
<i>Telephone</i>	na	32	na	53	na	57
<i>Sanitary and Sewage</i>	na	2	na	0	na	2
Other Services	na	149	na	130	na	176

Table 4: Expenditure by Decile Group 3

	1998-99		2001		2002	
Total Consumption	6452.0	6644.3	6661.0	6885.3	7062.0	7491.5
Food Products	na	5409	5091	5398	5411	5885
Cigarettes	na	402	336	363	400	367
Alcoholic Drinks	na	28	29	18	22	22
Non Food Products	na	342	506	454	504	521
Services	na	462	699	651	725	697
<i>Of which Tariffs</i>	na	284	na	438	na	476
<i>Electricity</i>	na	238	na	356	na	361
<i>Gas</i>	na	0	na	12	na	31
<i>Central Heating</i>	na	0	na	1	na	0
<i>Water Supply</i>	na	8	na	9	na	9
<i>Telephone</i>	na	36	na	57	na	73
<i>Sanitary and Sewage</i>	na	2	na	3	na	2
Other Services	na	179	na	213	na	220

Table 5: Expenditure by Decile Group 4

	1998-99		2001		2002	
Total Consumption	7661.0	7648.3	7992.0	8017.6	8322.0	8598.2
Food Products	na	6181	5947	6144	6219	6602
Cigarettes	na	437	458	418	483	486
Alcoholic Drinks	na	49	44	28	38	27
Non Food Products	na	468	680	568	657	615
Services	na	514	863	861	925	867
Tariffs	na	330	na	572	na	591
Electricity	na	282	na	464	na	469
Gas	na	0	na	19	na	23
Central Heating	na	0	na	4	na	0
Water Supply	na	7	na	13	na	12
Telephone	na	37	na	70	na	83
Sanitary and Sewage	na	4	na	2	na	3
Other Services	na	184	na	288	na	276

Table 6: Expenditure by Decile Group 5

	1998-99		2001		2002	
Total Consumption	8961.0	8682.7	9352.0	9179.5	9650.0	9796.0
Food Products	na	7040	6663	6844	7057	7344
Cigarettes	na	482	568	534	634	598
Alcoholic Drinks	na	53	52	52	57	46
Non Food Products	na	556	915	813	839	812
Services	na	552	1154	937	1063	996
<i>Of which</i> Tariffs	na	297	na	603	na	653
<i>Electricity</i>	na	257	na	471	na	495
<i>Gas</i>	na	3	na	19	na	30
<i>Central Heating</i>	na	1	na	3	na	0
<i>Water Supply</i>	na	5	na	24	na	12
<i>Telephone</i>	na	27	na	84	na	114
<i>Sanitary and Sewage</i>	na	3	na	2	na	2
Other Services	na	255	na	334	na	343

Table 7: Expenditure by Decile Group 6

	1998-99		2001		2002	
Total Consumption	10414.0	9943.2	10965.0	10445.7	11209.0	11060.8
Food Products	na	7931	7783	7546	8158	8237
Cigarettes	na	548	621	586	676	696
Alcoholic Drinks	na	77	77	61	57	67
Non Food Products	na	816	1253	1040	1105	949
Services	na	571	1231	1213	1213	1111
<i>Of which</i> Tariffs	na	314	na	766	na	651
<i>Electricity</i>	na	268	na	580	na	508
<i>Gas</i>	na	1	na	28	na	35
<i>Central Heating</i>	na	3	na	0	na	1
<i>Water Supply</i>	na	6	na	31	na	10
<i>Telephone</i>	na	36	na	123	na	94
<i>Sanitary and Sewage</i>	na	0	na	5	na	3
Other Services	na	257	na	446	na	460

Table 8: Expenditure by Decile Group 7

	1998-99		2001		2002	
Total Consumption	12411.0	11540.9	13022.0	11912.6	13190.0	12611.9
Food Products	na	8891	8925	8509	9217	9212
Cigarettes	na	614	815	636	793	683
Alcoholic Drinks	na	75	88	78	89	93
Non Food Products	na	1073	1686	1349	1480	1247
Services	na	888	1508	1340	1611	1376
<i>Of which</i> Tariffs	na	444	na	804	na	742
<i>Electricity</i>	na	385	na	599	na	533
<i>Gas</i>	na	0	na	52	na	49
<i>Central Heating</i>	na	1	na	5	na	0
<i>Water Supply</i>	na	3	na	19	na	19
<i>Telephone</i>	na	52	na	125	na	137
<i>Sanitary and Sewage</i>	na	2	na	4	na	4
Other Services	na	445	na	536	na	634

Table 9: Expenditure by Decile Group 8

	1998-99		2001		2002	
Total Consumption	15325.0	13660.9	15719.0	14067.0	15906.0	14617.1
Food Products	na	10020	10396	9619	10868	10083
Cigarettes	na	732	913	783	829	793
Alcoholic Drinks	na	101	162	113	162	155
Non Food Products	na	1551	2094	1791	2033	1778
Services	na	1258	2154	1761	2014	1809
<i>Of which</i> Tariffs	na	550	na	935	na	903
<i>Electricity</i>	na	453	na	687	na	657
<i>Gas</i>	na	2	na	42	na	57
<i>Central Heating</i>	na	4	na	1	na	0
<i>Water Supply</i>	na	8	na	51	na	20
<i>Telephone</i>	na	81	na	148	na	166
<i>Sanitary and Sewage</i>	na	1	na	6	na	3
Other Services	na	708	na	826	na	907

Table 10: Expenditure by Decile Group 9

	1998-99		2001		2002	
Total Consumption	19660.0	16948.6	20234.0	17851.4	20420.0	17933.0
Food Products	na	11660	12261	10987	13132	11985
Cigarettes	na	820	1097	1019	1026	936
Alcoholic Drinks	na	171	246	241	250	233
Non Food Products	na	2671	3263	2855	3158	2508
Services	na	1626	3367	2750	2854	2271
<i>Of which</i> Tariffs	na	618	na	1365	na	1023
<i>Electricity</i>	na	474	na	960	na	687
<i>Gas</i>	na	7	na	42	na	102
<i>Central Heating</i>	na	19	na	31	na	8
<i>Water Supply</i>	na	15	na	54	na	28
<i>Telephone</i>	na	98	na	272	na	189
<i>Sanitary and Sewage</i>	na	4	na	6	na	10
Other Services	na	1008	na	1386	na	1248

Table 11: Expenditure by Decile Group 10

	1998-99		2001		2002	
Total Consumption	37013.0	31500.9	37645.0	31873.6	36131.0	30812.0
Food Products	na	15603	18845	14520	18279	15337
Cigarettes	na	1187	1392	1418	1340	1222
Alcoholic Drinks	na	434	451	450	513	460
Non Food Products	na	9587	9031	8291	8414	7259
Services	na	4690	7926	7196	7585	6534
<i>Of which</i> Tariffs	na	900	na	2034	na	1780
<i>Electricity</i>	na	659	na	1309	na	1118
<i>Gas</i>	na	21	na	64	na	112
<i>Central Heating</i>	na	6	na	32	na	9
<i>Water Supply</i>	na	37	na	91	na	66
<i>Telephone</i>	na	167	na	530	na	462
<i>Sanitary and Sewage</i>	na	11	na	8	na	11
Other Services	na	3789	na	5162	na	4754