

Peru: Public Expenditure Tracking Survey¹

Sampling Notes

José R. López-Cáliz

Latin America and Caribbean Region, Economic Policy Sector
World Bank, Washington, D.C.

Lorena Alcazar

Instituto Apoyo
Lima, Peru

Erik Wachtenheim

Instituto Apoyo
Lima, Peru

June 2002

¹ This excerpt comes from a larger World Bank – Inter-American Development Bank report *Peru: Restoring Fiscal Discipline for Poverty Reduction: Public Expenditure Review*, Report No.24286-PE, June 28,2002 (Annex D).

1. Sample Design

Measuring leakages is not an easy task since it involves two central problems. First, all parties affected by the leak have no interest in having it revealed. Second, leakages can occur at so many levels that tracing them all requires a complex methodology. Those are the two challenges that this report faced and, to a considerable degree, overcame.

The core of our methodology was to collect data at each stage in the transference of public funds from the top of the chain, namely that of the central government, down to the bottom, and namely that of the beneficiary. In order to gather data on each of these levels, the study carried out in Peru involved an extensive amount of fieldwork based upon a series of questionnaires. The questionnaires themselves are attached to Instituto Apoyo (2002). In this appendix, we briefly describe how we went about gathering the data.

The project began with a pilot study in Lima, Peru. The objectives of the pilot also included an assessment of the duration of the fieldwork and a test of its effectiveness for the purposes of the study (for example, the information collected in the fieldwork should be sufficient to rigorously estimate leakages). The pilot consisted of 20 districts of the department of Lima (out of a total of 177 districts). Each district included a survey for the municipality; 3, 4, or 5 surveys² for the VdL mother's committees and surveys for sixteen beneficiary households³ (4 per VdL committee). Additionally, Lima was selected for the pilot because it is considerably different from the rest of the country and therefore needed a separate treatment. The advantage to use was that we were then able to report comparisons between Lima and the rest of the country, which in many cases were quite large.

Based on the experience of the Lima sample, and after a thorough process of consultation, and with guidance from the INEI (Peruvian Institute of Statistics and Information), a sample selection methodology was agreed upon and the following departments were chosen to be representative of Peru (excluding Lima & Callao): Ancash, Arequipa, Cajamarca, Cusco, Loreto, and Piura. These departments gave us the broadest range of geography, population density and poverty distribution, while reducing our field costs to reasonable levels (i.e., we did not have the resources to include municipalities from all of Peru's provinces). We then selected a total of 100 municipalities in which the surveys were carried out. Our method of selecting the municipalities was focused on poverty as a central stratification variable since the Vaso de Leche program was meant to deal directly with poverty. The sample, then, represents Peru (when the Lima sample is included) and the 100 municipalities selected are stratified by level of poverty so that the efficiency of the sample would be maximized (stratification reduces sampling error). The sample is self-weighting, making it easy to work with when complex multivariate programs are employed. Our method of municipality selection followed these steps.

² For the Pilot the following rule was established: 3 glasses of milk committees if there were less than 30 committees total; 4 if the number of committees was between 30 and 70; and 5 if there were more than 70 committees.

³ When the pilot was carried out, the project did not formally include surveys to household beneficiary. A tentative instrument was tested on households to evaluate the importance and viability of including beneficiaries. Therefore, the survey was very short and different from the survey applied to beneficiaries during the final fieldwork.

Stratification according to poverty

A database consisting of the entire universe of districts in Peru excluding Lima & Callao (Total of 1,651 districts) was used as a starting point.

- The MEF's continuous index of poverty FGT2⁴ was used to calculate poverty population deciles.
- The deciles were arranged into three groups such that group 1 consisted of deciles 1-3, group 2 contained deciles 4-7 and group 3 had deciles 8-10. These three groups approximate the categories of "not poor", "poor" and "extreme poor" and were used to stratify the districts of our sub-population (Ancash and Piura) into three strata.
- The three strata represent 14 percent, 41 percent, and 45 percent of the districts in Peru (excluding Lima and Callao), respectively.
- In order for the sample to be self-weighted 14, 41, and 45 municipalities (total of 100) were chosen from each stratum, respectively, (from the sub-population of six departments). The selection within each stratum was done using PPS⁵ relative to district population.

Once the above procedure was carried out, the individual municipalities were selected according to the normal PPS criteria, using a complete listing of all manicomios that were ordered within the strata by geographic order to allow a systematic selection that ensured geographic heterogeneity. Within each municipality, the field used the roster of Vaso de Leche committees and used systematic sampling to select four of those, unless there were fewer than four in a given municipality, in which case all were selected. The only restriction was that if travel time to a given committee would have required more than 24 hours, a substitute was used. This means that the sample slightly under-represents remote areas within the neighborhoods of the selected committees; the field team selected four households from the beneficiary lists that are maintained by each committee. Recalls were not made, but the next household on the list was used as a substitute when blanks were encountered.

The survey was carried out from February 3, 2002 through February 17, 2002. Descriptive statistics for the samples are provided in the full report. Within each municipality we interviewed the mayor, obtained municipal-level data from him/her, and also obtained the municipal roster of committees participating in the Vaso de Leche program. The committees were selected from the roster using a systematic selection. Once we met with at least one committee member and interviewed that individual with our survey instrument. We obtained from that member a list of individual beneficiary households, and interviewed four households in each committee catchments area, using the survey instrument intended for households in Arequipa, Cusco, Cajamarca, and Loreto.

⁴ $FGT_2 = \frac{1}{N} \sum_{i=1}^Q \left(\frac{PL - EXP_{pc_i}}{PL} \right)^2$ where PL=Poverty line, EXPpc=per capita household expenditures, Q=Number of poor, and N=Population

⁵ Probability Proportional to Size is a method used in sample selection whereby the probability that a given element enters the sample is proportional to some quantity (in our particular case the district's total population).

2. Description of Transfers from Central Government to Municipalities and Downwards

Municipal resources come from two primary sources: central government transfers and local revenues. Central government transfers are a very important source of revenue, particularly for small and rural municipalities, which have very little income collection possibilities. Central government transfers include FONCOMUN and Vaso de Leche (VdL) for all municipalities and Cañon Minero and Cañon/Sobrecanon Petrolero for some of them. Central government transfers represent an important percentage of total district-level income (for the districts outside of Lima in our sample, transfers, on average, represent 72% of total income and among the districts of the extreme poor stratum they can represent in excess of 90% of total income).

In 2001, these four major central government transfers totaled at the national level 1.9 billion Soles (roughly \$560 million) (Table D1).⁶ For these reasons the leakages, delays, volatilities, and inefficiencies associated with the execution process of these transfers have considerable impact on municipal-level finances and their understanding is, consequently, of paramount importance.

Table D1. Total Transfers to Municipalities in 2001
(in US Dollars)

	Foncomun	Canon Minero	Canon / Sobrecanon Petrolero	Vaso de Leche	Total
Peru	\$400,023,180	\$23,765,654	\$37,461,817	\$97,148,245	\$558,398,895
Lima	\$72,466,783	\$714,003	NA	\$33,753,411	\$106,934,197
Urban	\$69,482,021	\$691,650	NA	\$33,359,639	\$103,533,311
Rural	\$2,984,762	\$22,353	NA	\$393,772	\$3,400,887
<i>No. Observations</i>	<i>177</i>	<i>171</i>	<i>NA</i>	<i>177</i>	<i>N.A.</i>
Rest of Peru	\$327,556,397	\$23,051,651	\$37,461,817	\$63,394,833	\$451,464,698
Not Poor	\$76,066,085	\$5,692,301	\$9,924,653	\$15,642,446	\$107,325,483
Poor	\$132,062,598	\$8,603,523	\$17,670,749	\$24,705,129	\$183,041,999
Extreme Poor	\$119,427,714	\$8,755,827	\$9,866,416	\$23,047,259	\$161,097,216
Urban	\$152,245,705	\$9,629,748	\$20,840,016	\$30,939,959	\$213,655,428
Rural	\$175,310,692	\$13,421,902	\$16,621,801	\$32,454,874	\$237,809,270
Small	\$65,758,919	\$3,206,004	\$3,916,796	\$8,990,266	\$81,871,986
Medium	\$50,188,784	\$3,515,896	\$5,744,644	\$10,333,395	\$69,782,718
Large	\$211,608,694	\$16,329,751	\$27,800,377	\$44,071,173	\$299,809,994
More accessible	\$239,125,681	\$17,287,765	\$22,227,123	\$46,727,882	\$325,368,452
Less Accessible	\$88,430,716	\$5,763,885	\$15,234,694	\$16,666,951	\$126,096,246
Non-Provincial capital	\$188,468,161	\$11,999,547	\$18,319,805	\$41,422,875	\$260,210,387
Provincial capital	\$139,088,236	\$11,052,104	\$19,142,013	\$21,971,958	\$191,254,311
<i>No. Observations</i>	<i>1641</i>	<i>1296</i>	<i>142</i>	<i>1641</i>	<i>N.A.</i>

1/ Information based on national official statistics

Source: MEF

⁶ Using MEF statistics at the national level.

Of these four transfers, only the Cañon Minero is not variable month-to-month. In theory, the VdL transfer should not be variable month to month but as the following table shows this is not true in practice. Foncomun and the Cañon/Sobrecañon Petrolero are percentages of a variable quantity (primarily the national sales tax in the case of Foncomun and the ad-valorem petroleum production in the case of the Cañon/Sobrecañon Petrolero). The implicit volatility in these two transfers is a source of hardship for municipalities, which depend heavily on them for the internal finance of long-term projects

Month-to-month percent changes in amounts for each of the four major transfers were calculated. The volatility of the transfer was defined as the standard deviation of these month-to-month changes. The following Table details the volatilities of Foncomun, Cañon/Sobrecañon Petrolero, and Vaso de Leche in the year 2001.⁷ The measure of dispersion is the degree to which the volatilities vary within each of these sub-classified categories. The volatility of the Cañon/Sobrecañon Petrolero transfer is the combination of the variations in world petroleum prices as well as the variability of local production and is, on average, twice as high as that of the Foncomun transfer. Foncomun's volatility is not considerably different between urban/rural districts or between poverty strata but is twice as high in larger districts (as measured by their projected 2001 populations). The volatility of the Cañon/Sobrecañon Petrolero, on the other hand, is quite a bit higher in poor, rural, remote districts of Peru. The former finding is quite interesting given that the assignment formula does not vary within the year. Therefore a percentage change in the sales tax revenue (and/or any other component of the Foncomun) should imply an equal percent-wise change in the amounts allocated to the districts across the board. However we see that the standard deviations of the month-over-month percent changes are not equivalent. This is partly due to the fact that these transfers have a built-in floor (15,600 Soles) and therefore the variations are asymmetrical. The VdL transfer, surprisingly enough, also suffered from considerable volatility in the year 2001 in the districts outside the department of Lima. The poorest districts were the most affected with a standard deviation of percent changes on the order of 15 percentage points for the year. This figure is in sharp contrast to the average volatility of 0.3% experienced by the 177 districts of Lima & Callao (Table D2).

FONCOMUN

The Fondo de Compensación Municipal (FONCOMUN) is mentioned in subsection 4 of article 193 of the Constitution of the Republic of Peru. It is comprised of 2% of the Federal Sales Tax, 8% of gasoline sales, 5% of recreational embarkations, and 25% of the net income generated by casinos and other gambling establishments. The contribution from the sales tax accounts for approximately 93% of the FONCOMUN and therefore provides the main source of variability in the FONCOMUN. The law which permits the redirection of a portion of the federal sales tax under the name of "Impuesto de Promoción Municipal" is dictated by article 86 of Legislative Decree 776 of the Law of Municipal Taxes.

⁷ The volatilities are estimated by calculating the standard deviation of the rate of change of the monthly amounts for each of the three transfers.

Table D2. Volatility of Transfers to Municipalities 2001

1/

	Foncomun		Canon/SobreCanon Pet.		Vaso de Leche	
	Volatility	Dispersion	Volatility	Dispersion	Volatility	Dispersion
Lima	4.9%	4.1%	NA 2/	NA	0.3%	1.6%
Urban	5.5%	4.2%	NA	NA	0.2%	1.2%
Rural	2.9%	3.2%	NA	NA	0.5%	2.6%
<i>No. Observations</i>	177		NA		177	
Rest of Peru	6.3%	3.4%	13.4%	6.9%	11.6%	30.3%
Not Poor	6.1%	3.8%	9.2%	3.1%	10.0%	56.8%
Poor	6.0%	3.6%	11.6%	4.7%	8.1%	22.2%
Extreme Poor	6.5%	3.2%	18.8%	8.4%	15.4%	23.9%
Urban	5.7%	3.8%	10.4%	4.1%	5.2%	19.5%
Rural	6.5%	3.2%	15.7%	7.7%	14.7%	33.9%
Small	4.0%	3.1%	13.2%	5.0%	10.7%	34.9%
Medium	8.2%	1.7%	15.5%	9.4%	15.3%	26.3%
Large	9.4%	0.8%	12.4%	5.7%	10.5%	21.7%
More accessible	6.8%	3.3%	10.3%	5.0%	9.5%	27.5%
Less Accessible	5.5%	3.5%	16.4%	7.2%	14.2%	33.3%
Non-Provincial capital	5.8%	3.4%	13.4%	6.8%	12.1%	28.9%
Provincial capital	9.6%	0.5%	13.8%	7.4%	7.7%	39.7%
<i>No. Observations</i>	1642		142		1642	

Source: National Official Statistics, MEF

1/. Standard Deviation of the percent changes month-over-month 2001

2/. The department of Lima does not receive Canon/SobreCanon Petrolero

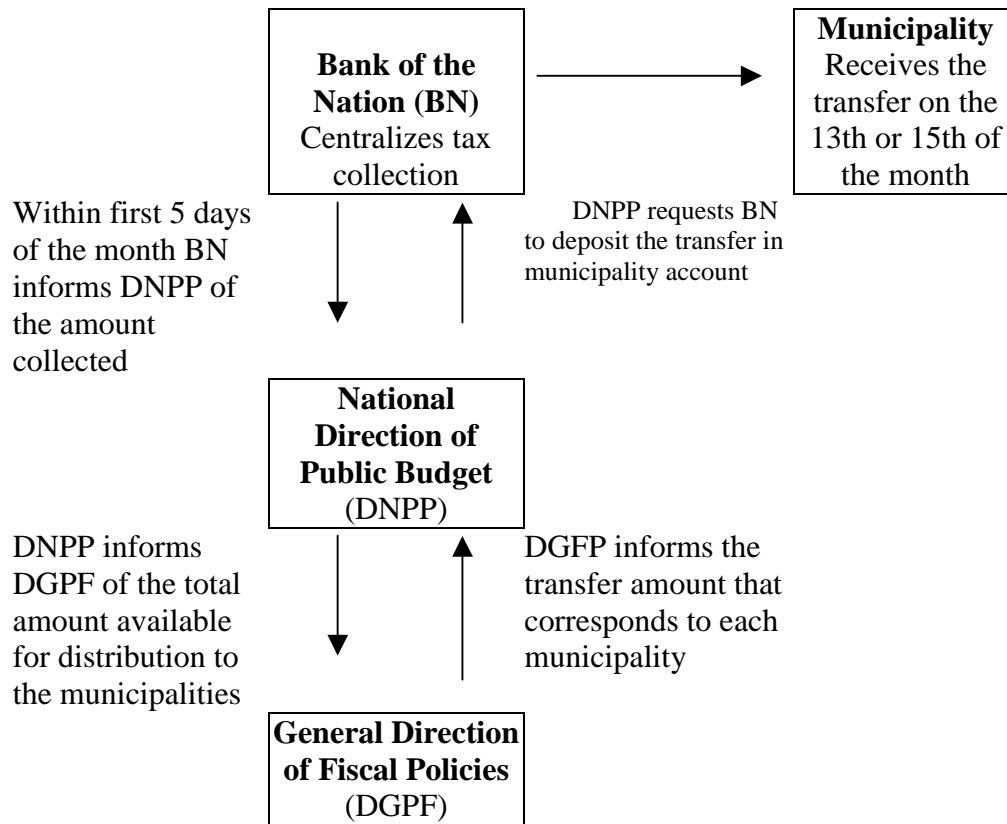
The Fund is calculated on a monthly basis and is distributed with monthly frequency to all the municipalities, based on a predefined allocation formula of the Ministry of Economy (MEF). The process for disbursing the transfer from the central government to the municipalities is the following. The collection of the funds is centralized in the Banco de la Nación (BN). Within the first five days of each month, the BN informs the National Direction of Public Budget (DNPP) of the MEF regarding the amount collected. This office in turn informs the General Direction of Fiscal Policy (DGPF) of the MEF, which is in charge of estimating the amount to be distributed to each municipality. Once the distribution is determined, the DGFP informs the DNPP, which issues the transfer order to the BN. Finally, the BN deposits the money in the account of each municipality which should be available to the municipality on the 13th to 15th day of the month (see diagram).

According to the MEF personnel our team interviewed, the process is automatic and should not take any longer than the terms established.⁸ The distribution criteria do not change very frequently although there are certain minimums established which require a complicated re-allocation if there is a downturn in the fund resources for a given month. Nonetheless, as the results of the fieldwork indicate, the municipalities do face some delays. In principle, the transfer process funds from the central government to the municipalities is straightforward and does not suggest ex ante that there will exist a leakage in this segment of the chain. At this stage, the process is quite systematic and the Treasury (BN) serves a limited function: electronically transferring funds from one account to another and issuing arrival notifications.

⁸ The Foncomun transfer as well as the other municipality transfers and finances in general are still not incorporated in the Administrative Financial Integrated System. At the time, this project was under elaboration, the SIAF office was working with a sample of municipalities on how to integrate them.

The DGFP office of the MEF has a formula used to calculate the way it will distribute the total amount of funds to each municipality. For the districts outside of Lima and Callao, the formula allocates amounts to each province based on the infant mortality rate and the total population of the province. The formula further assigns amounts to the districts based on district-level populations with a bias towards rural populations (rural inhabitants count twice as much as urban inhabitants do). For Lima and Callao the objective is to prioritize urban marginal districts. The allocation criteria considered are the following: population; illiteracy rate for those older than 15 years old; households with at least one child attending school; households without a water connection in the home; households without sewerage; households without electricity; households that occupy makeshift homes; households with three or more inhabitants per room. All these indicators are provided by the national institute of statistics (INEI) and are based on the 1993 census. Until December of 2001 (December 29th), the law established that only up to 30% of FONCOMUN could be used to for current expenditures. At least 70% of the fund had to go toward capital expenditures. Since January of 2002, the Foncomun is not subject to the 70-30 ratio any longer and can be freely utilized as the municipalities best see fit.

FONCOMUN TRANSFER PROCESS



Cañon Minero

Dictated by supreme decrees 88-95-EF and 041-97-EF, the Cañon Minero is a Central Government transfer, which distributes a portion of the mining sales to the localities in which the mineral ore was extracted. A 20% chunk of the income tax paid by the mining companies is distributed among the municipalities in the following manner: 40% for provinces and districts in the region or regions⁹ in which the ore was extracted or in which the mining company's economic headquarters are located; and 60% for provinces and districts in the department or departments in which the ore was extracted or in which the mining company's economic headquarters are located (in addition to the 40%).

The total amount allocated to a set of municipalities is then distributed by the MEF according to a formula similar to that used for the FONCOMUN. Within a region, the allocation to provinces is based on the Infant Mortality Rate and the total population of the province. Of that amount, 20% remains at the Provincial Municipality (provincial capital) and the remaining 80% is distributed among the municipalities of the Province based on their respective populations (once again giving a two-to-one preference to rural populations). For Lima and Callao, where the objective is to give priority to the urban-marginal districts, the additional criteria used in the distribution of the FONCOMUN are also used for the Cañon Minero. The process of disbursement of the Cañon Minero is simple. The tax agency, SUNAT, deposits the taxes collected in a special account in the BN. The DNPP then distributes the total amount among the municipalities (following the criteria mentioned above) in twelve equal monthly installments made by the BN by way of electronic deposits. Once again, as was the case with the FONCOMUN transfer, it is not a segment in the execution chain, which is prone to leakage. There is a restriction in place governing the usage of the Cañon Minero funds. Municipalities are only authorized to use the resources obtained through this transfer to cover capital expenditures.

Cañon y Sobrecañon Petrolero

These transfers were established by Law Decree 21678 in November of 1976 and are comprised of a percentage of the ad-valorem petroleum production. The Cañon is 10% of the ad-valorem petroleum production and is distributed among the districts within the department where the petroleum was extracted. The Sobrecañon is 5% of ad-valorem petroleum production and is distributed among the districts that are not within a department that produces petroleum but are within the same region. The Cañon/Sobrecañon is equally distributed among the provinces¹⁰ in the department and then distributed to the district level based on indicators such as population, geographic area, whether it is a Provincial or departmental capital, and whether the population is greater than 100,000 inhabitants.¹¹

⁹ Under the administration of Alan Garcia regions (several adjacent departments) were created.

¹⁰ The departments of Loreto and Ucayali, the distribution at the province-level is in proportion to their share of production. In Piura and Tumbes the distribution makes no distinction between the provinces.

¹¹ In the case of the province of Puerto Inca, Huánuco, the distribution among districts is simply in equal parts.

Glass of Milk (Vaso de Leche)

The Glass of Milk program was started by the Mayor of Lima in 1984 for the Metropolitan area and as its name reflects it consisted of distributing glasses of milk to school-aged children. Since then, the program has grown to national coverage (in 1985), is not only restricted to milk products, and has become one of the most significant transfers from the central to local governments (only second to FONCOMUN). It came to its current form under Law 24059 and Article 7 of Law 27470 (2001). Although the spirit of the program remains the same, the organization has undergone considerable change due to the increased coverage. By law, the intended primary beneficiaries are children 6 years old or less and pregnant and breastfeeding mothers. Priority is given to those showing clear signs of malnutrition or tuberculosis. The law also establishes that if there are resources left over after attending the needs of the primary beneficiaries then attention may be provided to the secondary beneficiaries: children between 7 and 13 years old, the elderly, and those suffering from tuberculosis.

The goal of the program, is to improve the nutritional level of infants, small children, and pregnant or breastfeeding mothers and also to improve the quality of life of the poorest segments of the population. Given the empirical evidence, which identifies milk as an important nutritional source, the choice was made to distribute milk and milk-related products. Unfortunately, organizational hurdles, inefficiencies, leakages, and the often times low nutritional value of the products chosen for distribution limit the effectiveness of the VdL program to accomplish its original goals. Because of the nature of the program's organization and the way in which it functions, there are no effective mechanisms that guarantee that these priorities are maintained

Currently, the MEF, through an assignment formula based on poverty levels and beneficiary populations makes monthly transfers to municipalities for use in the Vaso de Leche Program. The transfer amounts are calculated by the MEF using distribution indices that are based primarily on poverty and demographic criteria, supplied by the National Institute of Statistics. The local governments are solely responsible for the operation of the Vaso de Leche program in their jurisdiction and have autonomy, except for the definition of the beneficiaries, from the Central Government as far as the product they wish to distribute and other operational details. However, two important restrictions are placed upon the municipalities by the Central Government. First, 100% of the Vaso de Leche funds must go toward the purchase of the product(s) to be distributed. Second, the product(s) should have a minimum of 90% of national inputs (up to 100% in the areas in which the local supply can cover the entire demand). The products distributed can be milk in any form and/or milk substitutes, and/or other products such as soybean, oatmeal, quinoa, kiwicha or other.¹² In addition, the Central Government requires that the municipality for an Administrative Committee have a certain membership composition, which includes a representative from the Ministry of Health and representatives from the pool of beneficiaries. Thus, by law each local government must have an Administrative Committee made up of: mayor, a municipal employee, a representative from the Ministry of Health, three representatives of the Mother's

¹² Recently, a new law has been passed that requires that the distributed product have a minimum of 207 calories. The mothers however, are not pleased with the new requirement because it implies that milk substitutes will be distributed and they do not like them. The mothers made protests demanding evaporated or fresh milk.

Associations (elected by the mothers following the rules established in their own statutes), and a Representative of the local agriculture/farming association duly accredited by the Ministry of Agriculture.

By law also, the municipalities or committees should not charge anything to the beneficiaries for the products distributed. However, some municipalities and many committees charge some money (or require that in-kind contributions be made) to cover some of the expenses that the program implies. Requests for contributions are more common in poor municipalities that need to cover distribution expenses and in committees that prepare the product on-site and need to pay for things such as fuel and other inputs. In general, larger districts have an entire office dedicated to the Vaso de Leche including a director and other full-time employees. In smaller districts, often times, the mayor himself or one of his regidores¹³ administers and directs the Vaso de Leche program. It is quite noteworthy to mention that the beneficiaries (the mothers) organize themselves into Comités/Clubs de Madres (mother's associations), which have noticeably increased the social capital of the communities. These mothers associations span the entire country, including the most remote areas, and together form a huge national network. The social network that results from the mother's associations has become a way for these rural and impoverished communities to gain a voice at the local level including matters unrelated to the Glass of Milk program.

The transfer process takes on the following scheme:

- The municipality receives the transfer from the Central Government. A monthly transfer is deposited in the Banco de la Nación (Treasury) local branch office and the Municipality is notified. The monthly amount does not vary in a given year except in very particular situations and the transfer usually arrives around the same day each month.
- The Product is chosen and, in most cases, a public bidding process is used to select a provider, normally for a year and for the whole municipality jurisdiction. The selection of the product or products is done differently in different districts. In some cases the mother's have a direct say in the choice of product via surveys or direct vote. In other cases the Administrative Committee makes the decision. Finally, in some cases it is the Mayor's decision.
- A roster of all the beneficiaries in each committee by category (children from 0 to 6 years, pregnant or breastfeeding mothers, etc.) is elaborated. The mothers committees normally do this process and it is supposedly closely supervise by the municipality. This roster should also be frequently revised. However, in most cases these rosters are not revised frequently and the municipality does not supervise the process. Using these registers, the municipality determined the product allocation to each mothers committee of its jurisdiction.
- The municipality (or the provider) distributes the product to the Mothers Associations. Mothers associations usually cover a given neighborhood and can have a variable number of beneficiaries. A president, a vice-president, treasurer and secretary usually lead them. The officers are voted into office for extended periods of time and they are rarely voted out of office unless problems arise. Depending normally on the size of the

¹³ Municipal council member.

municipality, the products are directly distributed to the committees or to intermediate instances: groups of committees or “centros de acopio” (special locations where the products are collected by areas and from where the committees pick up their allocations). The mothers committees should follow the rosters of beneficiaries to determine the allocation per household or beneficiary but in most cases, the rosters are only “referential” and they followed other criteria.

- The mothers (or the intended beneficiary) pick up their ration(s) at the Mothers Association headquarters. Usually the headquarters is the house of the President of the Mothers Association and there is a certain time of the day/week/month that the distribution is made depending on the frequency with which the product is distributed to the beneficiaries. The committees either distribute the product already prepared to the beneficiaries or in its raw form. The decision may depend on the type of product, on the resources availability, or on the geographical dispersion of the beneficiaries. In the cases in which the products are not prepared by the committee, the mothers uses them at their home at their total discretion (distributing the products among all children or household members).

3. Technical Definitions of Leakages in the Vaso de Leche Program

Leak 1. From the central government to the municipalities. Leak 1 is defined as the percentage of the transfer reported by the MEF that is unaccounted for by the municipality. We compare the amount the Ministry of Finance reports as outgoing with the amount the municipality reports to have received. This leakage was estimated with municipal-level data.

$$\text{Leak}^1 = 1 - \left[\frac{\text{Amt. Municipality Reported}}{\text{Amt. MEF Reported}} \right]$$

Leak 2. Within municipality. This leak is defined as the percentage of the amount transferred to the municipality from the Central Government for the month of December 2001 that is unaccounted for by the total expenses of the municipality for that month (in terms of products purchased for the VdL program). Leak 2 is zero if the municipality spends the entirety of the resources available in December 2001 under the Glass of Milk program on products to be distributed by the program. This leakage was estimated based on municipal-level data

$$\text{Leak}_{\text{MUN}}^2 = 1 - \left[\frac{\sum_i (\text{Quantity}_i \times \text{Price}_i)}{\text{Transfer Amount}_{\text{MUN}}} \right]$$

Leak 3. From municipality to vdL committees. This leak is defined as the percentage of the amount listed in the municipal not accounted for by the VdL committee. This leakage was estimated using municipal and committee data and was computed at the committee-level. It is important to note that this leakage indicates how much is lost in this segment of distribution but does not allow one to attribute it to one of the two parties involved at this stage. In other words, we can estimate the leakage from the municipality to the individual VdL committees but will not know if the leakage is a result of misappropriation or inefficiencies of the municipality, the VdLC, or both.

$$\text{Leak}_{\text{COM}}^3 = 1 - \left[\frac{\text{Amount Received}_{\text{COM}}}{\text{Amount listed in Municipal Roster}_{\text{COM}}} \right]$$

Leak 4. From vdL committees to beneficiaries/households. Leak 4 is the loss due to the difference between what VdL committees receive according to beneficiaries registered and that they actually distribute to households. The estimation of the leakage at this level was done by calculating the monetary value of each of the products (using municipal price figures) and adding these up. This allows a comparison of the monetary value of the amount of all the products received by the VdL committee per beneficiary with the monetary value of the amount received by the individual households per beneficiary (excluding the committees that distribute prepared products). The first variable would be obtained from the quantities declared by the mothers' committee representative in the VdL committee survey (in the four committees surveyed in each municipality). The second variable would be obtained from the quantities declared by the beneficiaries' household representative in beneficiary household survey (in the four households surveyed for each VdL committee).

$$\text{Leak}^4 = 1 - \left[\frac{\left(\frac{\sum_i (\text{Quantity}_i \times \text{Price}_i)}{\text{Beneficiary}} \right)_{\text{HH}}}{\left(\frac{\sum_i (\text{Quantity}_i \times \text{Price}_i)}{\text{Beneficiary}} \right)_{\text{COM}}} \right]$$

Leak 5. Inside the household. This leak is attributed to beneficiary dilution at the household level. It is defined as one minus the percentage of household members who consume *Vaso de Leche* products, which are official beneficiaries. This leakage was estimated using household-level data.

$$\text{Leak}_{\text{HH}}^4 = 1 - \left[\frac{\text{Beneficiaries}_{\text{HH}}}{\text{Consumers}_{\text{HH}}} \right]$$

References

Apoyo Instituto (2002), "Central Government Transfers to Municipalities in Perú." Background Paper for the Public Expenditure Review. Processed.

M:\PS Document Library\PSwebsite\Peru PETS\Peru.Samplingnotes.sep10.2002.doc
September 10, 2002 11:37 AM