



RE-387

*Resettlement processes and their
socioeconomic impact
Porce II Hydroelectric Project,
Colombia*

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ABBREVIATIONS

ADB	Asian Development Bank
ADD	Acute diarrheal diseases
ARI	Acute respiratory infections
BHP	Betania Hydroelectric Plant
CASEC	Comité Ambiental del Sector Eléctrico Colombiano [Environmental Committee for the Colombian Electric Power Sector]
CESI	Committee on Environment and Social Impact
CHP	Caldas Hydroelectric Plant
CORELCA	Corporación Eléctrica de la Costa Atlántica S.A. [Atlantic Coast Power Corporation]
CSR	Corporate social responsibility
CVC	Corporación Autónoma Regional Valle del Cauca [Cauca Valley Autonomous Regional Corporation]
DANE	National Administrative Department of Statistics
DNP	National Department of Planning
EEB	Empresa de Energía de Bogotá [Bogotá Power Company]
EIA	Environmental impact assessment
EMP	Environmental management plan
EPM	Empresas Públicas de Medellín [Medellín Municipal Utilities]
ESG	Environmental Safeguards Unit
ESR	Environmental and Social Impact Review Committee
ICEL	Instituto Colombiano de Energía Eléctrica [Colombian Electric Power Authority]
INDERENA	Instituto Nacional de los Recursos Naturales Renovables y del Ambiente [National Institute of Renewable Natural Resources and the Environment]
ISA	Interconexión Eléctrica S.A.
MAVDT	Ministry of Environment, Housing, and Territorial Development
OEO	Operations Evaluation Unit
OVE	Office of Evaluation and Oversight
SIEMSEC	Sistema de Información Económica, Social y Cultural [Economic, Social, and Cultural Information System]
SISBEN	Sistema de Identificación de Potenciales Beneficiarios de Programas Sociales [System for Identifying Potential Beneficiaries of Social Programs]
SMMLV	Current statutory minimum monthly wage
WCD	World Commission on Dams
WCU	World Conservation Union

I. INTRODUCTION

- 1.1 Latin America is relatively rich in water resources, which account for 69% of the electric power generated in the region (Millán, 1999). In past decades, hydroelectric projects have represented a significant percentage of both the IDB portfolio and the investment programs of a majority of the Bank's member countries. Although the trend toward financing hydroelectric power projects appeared to diminish in the 1990's, the region has witnessed a resurgence of hydroelectric projects in the following decade, and this trend is expected to continue.¹
- 1.2 These large infrastructure projects often involve the involuntary resettlement of the population in their area of influence.² Over the final two decades of the past century, forced population displacement arising from development programs is estimated to have affected approximately *200 million people worldwide* (Cernea et al., 2000). Moreover, the World Commission on Dams (WCD, 2000) estimates that *40 million of the 80 million individuals resettled due to hydroelectric projects have only in rare cases been able to recover their way of life*. Indeed, involuntary population resettlement is the most controversial issue associated with large dams.
- 1.3 Historically, resettlement processes undertaken by borrowing countries and multilateral institutions have failed. In many cases, this was due to resettlement planning limitations. These experiences carried a high economic and social cost that significantly affected the projects' rate of return, in turn prompting multilateral institutions to review their policies on the subject. Approaches for mitigating the social impacts caused by population relocation processes have evolved in recent years. While the sole option initially available was financial compensation, and then only for titled landowners, the need to restore and encourage comprehensive development of the impacted population as a whole has been gradually acknowledged. The World Bank pioneered this approach in 1990 through Operational Directive 4.30 (World Bank, 1990). It was only in 1998 that the IDB proposed a resettlement policy under these guidelines (Operational Policy OP-710).
- 1.4 This study assesses, within the context of the Porce II Hydroelectric Project (Antioquia, Colombia), the impact of the resettlement process on the affected population with respect to certain socioeconomic indicators by comparing it to an analysis of the same indicators for a control population not directly affected by the project. The purpose of this study is firstly to measure the impact of resettlement over time on the resettled population and map out a methodology for examining the social and economic impacts associated with population resettlement processes. Moreover, this study aims to inform policies and actions on the part of the IDB and government entities (at the national, departmental, and municipal levels). It seeks to contribute to the literature of ex post dam evaluations from the perspective of

¹ National Roundtable on Population Resettlement, 2004.

² Between 1960 and 1999 the IDB financed 140 projects involving dams, for a total of US\$9.4 billion (IDB, 2000). Of these, at least 120 projects, including hydroelectric projects, are estimated to have involved involuntary resettlement, affecting more than 650,000 people.

evaluating socioeconomic impact, long-term social sustainability of projects, and the building of social capital.

- 1.5 The following chapter reviews the resettlement issue at the IDB, the evolution of the resettlement issue in Colombia, and the bibliography for state-of-the-art population resettlement, particularly when resulting from hydroelectric projects. Subsequent chapters outline the methodology used and the main findings of the impact evaluation, as well as the study's conclusions and recommendations.

A. Resettlement policy at the IDB

- 1.6 The IDB made its first efforts toward institutional consideration of environmental and social impacts late in the 1970s. The first environmental policy was approved in 1979³ and contained only some general guidelines regarding environmental compliance, as well as four basic criteria to be considered in general environmental projects, development projects, and technical cooperation operations. In the mid-1980s, sector control lists were developed for considering social and cultural factors when preparing and executing projects. An Environmental Committee was created at the end of the decade to rate projects according to their environmental and social impact, and a strategy was developed to manage socioenvironmental impacts, with a primary focus on population resettlement and indigenous population issues.
- 1.7 In 1985, the IDB's Operations Evaluation Unit (OEO) submitted a report on the Bank's experience in financing hydroelectric power projects, based on a sample of six projects.⁴ The report concluded that *the contractual conditions stipulated by the Bank and the borrowers on social issues were not uniform in the sample cases⁵ [...] and that, with the exception of one successful case, compensation and relocation of the population were inadequate or insufficient*. Also during this period, the Bank conducted some isolated resettlement assessments due to the great deal of controversy surrounding certain projects it had cofinanced. Thus, in 1983, the IDB conducted an ex post evaluation of the Pueblo Viejo-Quixal hydroelectric project on the Chixoy river in Guatemala.⁶ This report highlights the degree to which the number of people to be displaced by this project was underestimated.⁷ It also points out that the IDB loan contract in 1976 made no mention of any resettlement plan. In 1977, the Bank approved a technical cooperation operation designed to identify

³ Environment and Safeguards Compliance Policy, OP-703.

⁴ IDB, 1985. Document GN-1551.

⁵ In two cases, the loan contracts made no mention of the resettlement issue, and it also was not examined in the project report. In another case, this type of clause did not form a part of the IDB loan document but was in fact included in a subsequent World Bank loan contract for the same project. In yet another case, the objectives and characteristics of the report on the resettlement program were not specified in the contract.

⁶ IDB, 1983 and IDB, 1994, in reference to the US\$341 million IDB loan to build the country's largest hydroelectric power plant.

⁷ It was estimated in 1975 at approximately 1,000 individuals (some 200 families), whereas the actual displacement affected some 3,500 individuals.

projects for developing the basin and develop population resettlement plans. However, the resettlement plan was eliminated from the 1978 terms of reference. The evaluation report points out that *by late 1983 very limited progress had been made on the resettlement process, which was deficient from the planning stage and did not provide for adequate participation by the affected communities.* It finally concludes that *the study conducted in the affected communities shows that the damage could become permanent and irreversible if prompt measures are not taken to complete and adequately refocus the resettlement process.*⁸

- 1.8 Another IDB report, prepared in 1991, analyzed the results of the environmental management of dam projects financed by the Bank between 1961 and 1989. This study included a desk review of Bank documents relating to 48 completed hydroelectric projects and an in-depth analysis of the quality of social and environmental evaluation in 8 case studies. The conclusion of the desk review was that *Bank documents mention environmental and social issues only occasionally and on an inconsistent and superficial basis.* The study revealed that only 20% of the loans had contractual clauses relating to environmental issues, and that the majority focused on population resettlement and occasionally on health considerations. In addition, this study indicated that most of the project completion reports for the sample projects lacked any information on environmental and social impacts, and only certain isolated cases included an ex post environmental and social study.
- 1.9 The study qualitatively reviewed the adequacy of environmental and social planning and evaluation in Bank reports for the case studies based on 12 environmental and social issues.⁹ The results showed that the baseline information and the environmental and social impact evaluation information in the design was deficient in most projects. However, this study indicates as a general conclusion that *[the sample] projects did not produce any environmental or social “disaster” because they were small and were conducted in advantageous climates and geographic locations.*¹⁰ By way of exception, two of the case studies were rated as very successful with respect to environmental and resettlement issues. Paradoxically, these were not the most recent projects in the sample; thus, this study refutes the hypothesis that the quality of environmental planning (including resettlement) improved during the 1980s in comparison to the two preceding

⁸ BID, 1983. *Comparative analysis of the IDB resettlement experience based on an evaluation of the Arenal and Chixoy projects.* Report prepared by the consultant William Partridge for the OEO.

⁹ The twelve environmental issues covered were: loss of land, biodiversity, biomass elimination, water quality, fisheries, seaweeds, public health, archaeology, communications, downstream impacts, erosion and sedimentation, basin management.

¹⁰ Consistent with subsequent World Bank studies (Ledec and Quintero, 2003), which conclude that the most environmentally benign hydroelectric dams are located on the upper basin's tributaries and have smaller reservoir surface areas in relation to the power they generate (minimizing habitat losses and the need for resettlement).

decades analyzed in this study, as shown in the World Bank reviews (1994, 2000, 2008).

- 1.10 In 1996, the IDB Environment Committee redefined its objectives and included issues relating to indigenous rights and involuntary resettlement, developing a more formal and explicit framework for preparing Resettlement plans. In 1998, the Bank approved an Involuntary Resettlement Policy (OP-710), formalizing the Bank's previous practice in this area. This policy acknowledges the great impact that involuntary resettlement can have on people's lives (impoverishment due to dismantling of the means of production and settlement patterns, rupture of social continuity and loss of people's sense of control over their own lives, threat to their cultural identity, etc.). The policy is based on the premise that good resettlement planning and implementation can prevent additional costs to a project and long-term consequences for the affected population and the region.
- 1.11 The policy's objective is to *minimize any damaging changes in the way of life of those who live in the project's area of influence, avoiding or reducing the need for physical displacement and ensuring that, if such displacement is necessary, those affected will be treated equitably and will, when feasible, participate in the benefits of the project that requires their resettlement*. Therefore, the best option is always to avoid or minimize the need for resettlement and, in the event it becomes necessary, to establish a resettlement plan based on the policy's objectives. In addition, the policy recommends encouraging community participation in the resettlement process, in line with the conclusions of various bibliographical sources on the subject (Scudder, 2003).
- 1.12 According to the policy, the general objective of resettlement should be to *improve the living standards, productive capacity, and income levels of the entire affected population, or at least restore these variables to their prior levels within a reasonable period of time*. Thus, the approach is not only to provide financial compensation but also an economic assessment that takes into account social costs such as the disruption of occupational patterns and loss of jobs.
- 1.13 The policy requires, as part of the baseline studies, conducting a risk (vulnerability) analysis that encompasses the risk of impoverishment not only for the physically affected population but also for the host population and other indirectly affected groups.¹¹ The policy recommends offering the population to be resettled a range of options, including not only financial compensation but also land-for-land exchanges, economic development programs, housing and financial compensation, or a combination of the above. It is also worth examining whether it is better to offer individual solutions or to resettle an entire community. Lastly, it points to the need to recognize informal custom-based rights to the land, forests, fishery resources and other natural resources, offering alternatives in the face of loss or

¹¹ These risks relate to loss of land, loss of job opportunities, loss of access to communal resources, marginalization, food insecurity, loss of housing, increased morbidity and mortality rates, disruption of social networks, loss of cultural heritage, interruption or loss of education (Cernea, 2000).

curtailment of access to these resources. With respect to the provision of economic opportunities for the displaced population, policy recommendations include conducting training, supporting organizations, providing equipment to microenterprises, or arranging for revolving credit, always as a function of the population's aspirations and abilities.

- 1.14 Borrowers are responsible for preparing a resettlement plan for the affected population in the initial stages of the project cycle. This plan should clearly list the number and characteristics of the affected individuals, the cutoff dates for compensation eligibility, and the assets to be compensated. The plan is reviewed and authorized by the relevant authority in each country. Under this policy, the IDB, through its Committee on Environment and Social Impact (CESI),¹² reviewed and validated these studies to ensure each operation's consistency with the involuntary resettlement standards under OP-710. In addition, once the operation was approved, there was to be a follow-up on compliance with the social management programs and the resettlement plan previously agreed upon under the loan. In the wake of the realignment process undertaken by the IDB in 2007, the Bank's Environmental Safeguards Unit (ESG) and its Environmental and Social Impact Review Committee (ESR) perform the duties previously entrusted to the CESI, although the absence of a clearer institutional mandate still limits the quality of supervision of resettlement plans as part of the socioenvironmental management process during project implementation.

B. Evolution of the resettlement issue in Colombia

- 1.15 The framework for managing the social impacts resulting from large projects was established in Colombia in the 1970s and 1980s through the National Code of Renewable Resources and the Environment.¹³ This legislation made it mandatory to mitigate and compensate the affected population for land or business losses so as to restore the prior physical and spatial conditions of those affected. The Comité Ambiental del Sector Eléctrico Colombiano [Environmental Committee for the Colombian Electric Power Sector] (CASEC), created in 1987 by national government institutions and utilities,¹⁴ performed an essential role by structuring environmental policies, rules and procedures for the Electric Power Sector.¹⁵ In 1991, CASEC approved a policy for the resettlement of population displaced by

¹² The CESI replaced the former Environment Committee.

¹³ Specifically, Decree 2811 of 1974, the National Health Code (Law 9 of 1979), and Law 56 of 1981 and its Regulatory Decree 2024 of 1982.

¹⁴ Ministry of Mines and Energy, National Planning Department, INDERENA, ISA, ICEL, EPM, CVC, CORELCA, CHB, CHEC, EEB.

¹⁵ Thus, approval was secured for the Policy for Social Management with Community Participation (1990), which established principles governing relations between companies and affected communities, seeking active participation and consensus-building in analyzing problems and designing solutions.

Colombian Electric Power Sector projects.¹⁶ While the CASEC established guidelines for taking into account the interaction between the natural medium and the social medium and placed social issues front-and-center, true progress on environmental legislation was achieved in Colombia with the 1991 Constitution, which established that the environment is a basic right of all Colombians and established the right to citizen participation in any decisions affecting the environment. These constitutional precepts were consolidated by means of Law 99 of 1993 (Environmental Law), Law 134 of 1994 (Citizen Participation Law), and Law 143 of 1994 (Electricity Law), which provide that environmental impact assessments are the basic planning tool for decision-making in the context of sustainable development, and that citizen participation is the underpinning of the State's new social character and stronger participatory democracy, thus bringing about profound changes in the institutional framework. This new framework currently determines the environmental viability and sustainability of all development projects in the country.¹⁷

- 1.16 A National Roundtable for Population Resettlement, coordinated by the Universidad de los Andes in Bogotá and created at the initiative of the World Bank with the support of the National Department of Planning and the Ministry of Environment, Housing and Territorial Development (MAVDT), has been in existence since 1997.¹⁸ Participants in this forum include representatives of public- and private-sector companies that handle this type of process and government entities that need to establish policies for managing population displacement occurring for various reasons, including disaster prevention and care, development projects, and expansion of production processes. Roundtables are held periodically to exchange population resettlement experiences with a view to strengthening the knowledge acquired on this issue and sharing lessons learned from executed projects, providing potential idea paths to the government entities entrusted with establishing population resettlement policies, in accordance with national and regional realities.

¹⁶ The basic policy principles were the following: (a) obligation to design and execute a resettlement plan under the EIA, providing for resettlement alternatives and describing their ethnic, economic and sociocultural costs and implications for the population; (b) the resettlement program is the responsibility of the company sponsoring the project and should: (i) mitigate and offset the adverse effects of the involuntary displacement, establishing and improving the physical infrastructure and the basic sociocultural system of those being displaced; (ii) rely on knowledge of the adaptive strategies of the communities; (iii) be designed, executed and evaluated with the participation of the population to be resettled, the host communities, and the relevant authorities and institutions; (iv) help create conditions that allow the community gradually to take over the programs with the ultimate aim of achieving self-management; (v) assess the impacts of population resettlement on the host communities and the physical-biotic environment; and (vi) be compatible with the relevant local or municipal, regional, and national development programs; and (c) the company will perform an ex post evaluation of the resettlement with the participation of the resettled community, will analyze the results, and will determine the necessary action, as the case may be.

¹⁷ Velásquez and Villegas, 1998.

¹⁸ Advances made in this forum may be examined at <http://reasentamientos.uniandes.edu.co>.

C. Evaluation of resettlement processes

- 1.17 The scarcity of information on resettlement processes worldwide, and the lack of attention by governments and project authorities, have been widely recognized in various studies (World Bank, 1994). A thematic review by the World Commission on Dams (WCD) highlights *the surprisingly low number of ex post evaluations of the long-term impacts of completed dam projects [...] compared to the large number of studies that estimate the potential effects of projects during the planning and construction stages*. The review of various electronic databases and libraries conducted during the WCD study did not find any “exhaustive” ex post evaluation of large dam projects in South and Central America.¹⁹ Moreover, the quality and level of detail of this information are very limited. Only 18% of the 150 dams examined in a WCD verification survey in 2000 had adequate resettlement information. In a comparative study of 50 dams, only 54% mentioned this issue (Scudder, 2003). Consequently, there is a serious problem of underestimating project resettlement components, which leads to inadequate allocation of financial resources and personnel to handle the complexity of the resettlement process.²⁰
- 1.18 One of the most exhaustive studies of resettlement processes (Scudder, 2003) entailed a review of resettlement process outcomes in a sample of 50 dams. The general conclusions were that only 9% of the 44 cases for which sufficient information is available resulted in improved living standards for a majority of the population, while in 11% of the cases the process succeeded in restoring the living standards of a majority of the resettled population. Of the 10 Latin American dams included in the sample, the study determined that in 9 of these the resettlement aggravated the living standards of a majority of the population, while only the Arenal dam (Costa Rica) achieved good results, improving the quality of life of the resettled population. The study failed to find significant differences in results between projects involving larger-scale resettlements (in excess of 25,000 people) and those with a lower number of resettled inhabitants. Furthermore, it did not find significant differences in results between World Bank-supported projects and those

¹⁹ Another study (Wescoat, 1999) emphasizes that, in order for ex post evaluations of dam projects to yield useful lessons, studies must be *exhaustive, comprehensive, long-term, and mindful of cumulative impacts*. In other words, they must include environmental as well as social, economic and institutional impacts; analyze the interaction among various types of impacts; examine and adjust decisions in a context of changing environmental and social conditions; consider the impacts that may occur several decades after construction; and consider the impacts of different dams and other projects on the same basin. The study only mentions several partial studies of social impacts conducted in the region, notably: Lee, 1990 on project management performance in Argentina, Colombia, Peru, Chile; MacDonald, 1989 on the Uruguay river; Ribeiro, 1988 and Ferradas, 1990 on resettlement in Yacyretá; Goodland, 1974, Partridge, 1983, and Rose, 2005 on Chixoy in Guatemala and Arenal in Costa Rica; various authors and their isolated studies of hydroelectric projects in the Brazilian Amazon, and several degree theses and NGO information available on the Internet.

²⁰ According to a World Bank study (1994), in a sample of 62 projects that involved resettlement, the resettled population was 47% greater than initially estimated; in 2000, the WCD placed this figure at 35%, while the Asian Development Bank (ADB, 2005) placed it at 65%.

not having such support. Lastly, the study's results showed that participation by the resettled population has a significant influence in improving the results of the resettlement process.²¹ In addition, the conclusions point to better results to the extent that fewer institutional actors are involved in the process.²² Finally, this study emphasizes the importance of taking into account the sustainability of restoring living standards to their pre-resettlement levels²³ as well as certain unexpected outcomes, such as potential competition between the resettled families and the host or migrant populations.

- 1.19 The World Bank has conducted various evaluations of resettlement processes associated with hydroelectric projects.²⁴ In particular, it conducted a study in 1994 in which it reviewed 49 reports on completed projects since 1969, including 4 resettlement impact evaluations for completed projects,²⁵ and 146 active projects as of 1993. This study (World Bank, 1994) concludes that *most borrowers fail when implementing the Bank resettlement policies*. It also underscores the lack of adequate data collection, thus foreshadowing the results obtained by the WCD in its 2000 study. In 2005, the Asian Development Bank performed an evaluation ten years after the approval of its Involuntary Resettlement Policy. This evaluation analyzed the effectiveness of results on the resettled population based on 16 case studies, most of them in the transportation industry, with power infrastructure projects accounting for only 7% of all evaluated projects. The study underscores the issue of transaction costs associated with the resettlement processes.²⁶
- 1.20 In 2000, the IDB conducted a study focused on hydroelectric projects, taking a sample of 54 dam projects that involved population resettlement. The study examined whether Bank documents mention issues relating to environmental and social evaluation and rates the type of study performed in each case. This study found some improvement in the number of Resettlement plans in projects in process. However, it indicated difficulties in determining the number of plans

²¹ Examining in each case the level of participation in selecting the resettlement location, housing size, social services, and economic development options offered.

²² On the other hand, the lack of personnel is also often identified as an impediment to obtaining good resettlement results (World Bank 1994). However, certain cases indicate that it is not only a matter of numbers but of expertise (for ex., 84 professionals worked in Zimapán in Mexico, but they lacked sufficient field experience: Aronsson, 2002 quoted in Scudder, 2003).

²³ For example, by analyzing the duration of the jobs created, the success of training efforts, and the sustainability of the new economic activities.

²⁴ Study of the Shuikou Hydroelectric Plant, China (published in 1998: World Bank, 2000b); World Bank, 1994 *Resettlement and Development: the Bankwide Review of Projects Involving Involuntary Resettlement 1986-1993*; Studies of the Operations Evaluations Department of the World Bank in 2000.

²⁵ *Khao Laem hydro project* in Thailand (1979), *Kpong hydro project* in Ghana (1977), *Karnataka Irrigation Project* in India (1978) and *Second Maharashtra Irrigation Project* in India (1979).

²⁶ The high costs of consultants, the cost of socioeconomic surveys designed to determine the vulnerability level and the need for rehabilitation, the additional costs of replacing land value in relation to those of the country, compensation for structures and loss of income for those who did not have title to land.

prepared for previously completed projects. Of the 54-project sample, it found no information on the impact of resettlement plans in 31 completed projects. Of the 23 completed projects for which information was indeed available, only five had results deemed satisfactory (restoration or improvement of living conditions for the affected population). The study also highlights the challenge posed by the private financing of large hydroelectric projects by the Bank with respect to social and environmental issues, since IDB involvement in the later stages of the project cycle limits the Bank's action to a monitoring of environmental and social mitigation measures during construction and operation rather than also during the selection of alternatives or design phase.

- 1.21 An impact evaluation of the resettlement plan for the Yacyretá hydroelectric plant in Argentina and Paraguay, financed by the IDB, was presented the same year. In this case, control groups were used to distinguish the impoverishment trend in the area under the effects of the 7500-family relocation process. The evaluation concludes that *roughly 20% of those relocated show limited ability to face the challenges of relocation in areas far from the employment center with which they had been associated, resulting in a reduction in family income with little possibility of improvement in the short term.* It further concludes that this relocation process does not take into account the diversity of circumstances of the target families, leaving a portion of the families in a more vulnerable position.²⁷ The controversy surrounding the analysis and mitigation of this project's environmental and social impacts activated the Independent Investigation Mechanism due to civil society claims of violation of the Bank's Environment and Safeguards Compliance Policy (OP-703) and Involuntary Resettlement Policy (OP-710).²⁸

II. ANALYSIS OF SOCIOECONOMIC IMPACT IN THE PORCE II RESETTLEMENT PROCESS

A. Study rationale and objectives

- 2.1 The international experience in the study of the impacts of dam projects tends to focus on the ex ante planning stages, a project's potential impacts, or the construction stage. By contrast, evaluations of the longer-term impacts of completed projects (ex post) are few and far between (Wescoat, 1999).²⁹ In general, the ex post methodologies for evaluating resettlement processes focus on restoring the living conditions of the resettled population, comparing its situation before and

²⁷ Scombatti and Carvalho, 2000.

²⁸ Other projects involving resettlement processes that activated the IIM included the Gulf Thermoelectric Project (ME-0218), the Caña Brava Hydroelectric Project (BR-0304), and the Emergency Flood Rehabilitation Program (AR-0242).

²⁹ WCD and World Bank, 1997.

after the relocation, primarily through surveys.³⁰ However, few evaluations and studies of the results of resettlement arising from IDB hydroelectric projects have used impact evaluation methodologies that compare the population directly affected by the resettlement to a control group in order to isolate the resettlement impact from other factors. This is the type of evaluation that the Office of Evaluation and Oversight (OVE) and Empresas Públicas de Medellín (EPM) sought to perform with respect to certain socioeconomic indicators under the Bank's Ex Post Evaluations Policy mandate.³¹

- 2.2 The objective of this study is to measure the socioeconomic changes in the population resettled in Villanueva in comparison with the control population, El Brasil, which is located within the project's area of influence and has not been affected by the resettlement process. A quantitative and qualitative analysis of spatial, sociodemographic, economic, and political/organizational variables is performed by charting changes in the means of these variables for the resettled population in comparison to those for the control population and the results of the ethnographic study. An econometric analysis is also performed in order to assess the impact on socioeconomic variables for the resettled population as compared to the non-resettled control population.³²

B. Background of the study

1. Location of the Porce II project

- 2.3 The Porce II hydroelectric power plant, with 405 MW of installed power, is located in the northeast of the Departamento of Antioquia, Colombia, in the middle valley of the Porce river, on the border between the municipios of Amalfi, Gómez Plata, and Yolombó, some 120 km from the city of Medellín. The power plant was partially financed by the Bank³³ and is managed by EPM. This project occupies a surface area of 5,900 hectares, 1,000 of which are taken up by the reservoir. The power plant was built between 1994 and 2000, and commenced commercial operations in April 2001.

³⁰ Variables typically include: (i) family composition; (ii) productive situation; (iii) income; and (iv) existence of basic infrastructure (water, electricity, roads, health and education services, telecommunications, and retail facilities).

³¹ This study is part of a larger OVE impact evaluation that includes an analysis of the environmental and social quality control process in IDB operations, based on a sample of electric power sector projects.

³² See Annex A, "Description of the formulation of the econometric model and estimators."

³³ CO-0221 Porce II Hydroelectric Power Plant (1993), for an initial approved amount of US\$328 million, with an estimated environmental cost of US\$22.6 million, financed with local counterpart resources (US\$277.4 million).

Figure 1. Location of the Porce II Hydroelectric Project, Antioquia, Colombia



Source: EPM, 2008.

Photo 1. Panoramic view of Villanueva



Source: EPM photo archive

2. Vulnerability analysis

a. Socioeconomic and demographic characteristics

- 2.4 Between 1987 and 1994, EPM conducted an initial socioeconomic characterization of the population in the Porce II Project's direct area of influence according to a series of variables that indicate the population's vulnerability before the project's intervention: spatial, demographic, economic, cultural, and political/organizational. This made it possible to classify the population based on the potential direct or indirect impact resulting from the hydroelectric project. The population directly affected was that which, having to be displaced, lost its housing and main source of income (mining). This group included the population in the Guacabé and Cancana communities, or "veredas," in the municipio of Yolombó; Picardía in the municipio of Amalfi; and the vereda of Garzón in the municipio of Gómez Plata.³⁴

³⁴ In this last community, while housing was not affected by the reservoir, inhabitants did lose their source of income and their relationship network with neighboring communities that had to be relocated.

Table 1. General characteristics of the Yolombó, Amalfi, and Gómez Plata municipios, 2005

Indicators	Municipios		
	Yolombó	Amalfi	Gómez Plata
Associated communities	Guacavé, Cancana, Villanueva	Picardía	Garzón, El Brasil
Population census (inhabitants)	20,099	20,482	11,229
% men	51.5	50.2	50.5
% women	48.5	49.8	49.5
Number of communities	71	54	25
Main economic activity	Livestock and sugar cane	Livestock, timber, sugar cane, and coffee	Sugar cane, coffee, and livestock
Poor population (level 1 and level 2) (%)	88.9	80.8	90.5
Economic dependency index (%)	66.9	77.5	65.7
Working-age population (%)	72.3	71.0	70.8
Illiteracy rate (%)	11.9	18.0	12.9
Potential illiteracy (%)	44.2	47.7	37.3
Gross education rate (%)	75.3	74.3	69.0
Covered by social security (% coverage)	85.9	88.3	78.5
Violent death, homicide rate (per 100,000 inhabitants)	102.8	79.7	22.4
Primary cause of death (%)	Violence, 16.5; ischemic heart diseases, 11.3; chronic respiratory diseases, 11.3	Ischemic heart diseases, 12.5; violence, 12.5; hypertensive diseases, 8.0	Ischemic heart diseases, 30.9
Housing, piped water coverage (%)	43.6	59.4	74.4
Housing, drinking water coverage (%)	0.0	54.9	9.4
Housing, sewer coverage (%)	17.4	56.2	62.5
Housing, electricity coverage (%)	78.3	78.7	97.6
Housing, gas coverage (%)	0.0	0.0	0.0
Housing, telephone coverage (%)	22.2	29.6	43.0
Housing, sanitation coverage (%)	33.9	52.3	55.6

Source. Antioquia Administrative Planning Department. Office of Indicator Systems, 2005.

2.5 The population directly influenced by the project was particularly affected by the migration of foreign populations to the area and its concomitant effects, as well as by the spatial-physical changes in its environment.³⁵ In 1993, it was initially established that 132 families (623 individuals) would be directly affected by the project. Of these, 111 of were classified by EPM as permanently affected, and 21 as temporarily affected. The impacted population consisted of families engaged in alluvial mining and, to a lesser extent, occasional day-labor, farming, and

³⁵ Economic competition, redistribution of natural wealth, availability of public services (health, education) and infrastructure, etc.

commercial activities, with income below two times the minimum wage.³⁶ The directly impacted population included a permanent population with deep roots and traditions in the area (landowners or population present in the area as possessors of land parcels for more than three years), and a transient population originating in other places but tending to settle in the area because of interest in the project (EPM, 2004).

b. Resettlement: options and location

- 2.6 In this case, confirming the conclusions as to underestimating the population affected by these processes, 217 families were displaced³⁷ and were offered the following alternatives: (a) resettlement (including housing and associated infrastructure) or (b) financial compensation (referred to by EPM as direct sale or negotiation).³⁸ Following an information, awareness-raising, training, and follow-up process by EPM, 119 families chose resettlement, while 98 opted for direct sale or compensation.³⁹
- 2.7 Regarding the 119 families to be resettled, EPM proposed a group- and nuclear-type comprehensive resettlement. This consists of a planned resettlement, which is conducted in progressive and participatory fashion, based on the construction of housing, community service centers, restoration of productive activities, and reestablishment of social and cultural networks and relations, in keeping with equity and sustainability principles. This approach takes into account not only the infrastructure and socioeconomic and cultural conditions existing at the time of the census update for the population directly affected by the project, but also the characteristics of the land use management plans and land development plans for the resettlement area. This involves coordinated interinstitutional and intermunicipal management that contributes by introducing this new dynamic in the relevant towns and regions with a view to viability and sustainability.
- 2.8 EPM designed guidelines for compliance with the Bank's Involuntary Resettlement Policy and the relevant national regulations. These were aimed at ensuring: (a) *community restoration, whenever possible preserving prior settlement patterns*

³⁶ By 2004, the legal minimum monthly wage was 358,000 Colombian pesos (exchange rate: US\$1 = 2,163.00 Colombian pesos).

³⁷ The IDB loan document (CO-0221) pointed out that, of the 150 families (734 individuals) residing in the area of the dam, only 83 families (382 individuals) would need to be resettled. Another 16 families (91 individuals) would be eligible for compensatory measures because, while not being resettled, they would lose their mining jobs. Yet another 45 families (233 individuals) residing in the vicinity of the reservoir need not be made eligible for compensatory measures since their economic activities would not be directly affected by the project.

³⁸ Based on a value assessment of their economic activity and years in the trade, equipment, housing, and size of the land parcel (even if they were non-titled possessors or squatters at the time of the socioeconomic survey).

³⁹ The follow-up of the families that chose this option was conducted only for the first years, and the available data is insufficient for an evaluation.

and family and neighborhood networks, improving quality of life in terms of housing and communal infrastructure, public and social services (education, health and recreation); as well as (b) restoring the economic base of the families involved, taking into account the shift in economic activities into other production sectors.

- 2.9 The resettlement induced by Porce II was deemed particularly complex because it involved a mining, semi-itinerant population for which there were not many benchmarks around the world. One of the main challenges was to generate a productive vocational change for this population through sustainable income-producing alternatives. The resettled families were located in the subdivision, or “corregimiento,” of Villanueva, within the jurisdiction of the Yolombó municipio, which lies 118 km from the city of Medellín. The urban area is approximately one-half hour away from the corregimiento of Villanueva by public transportation.⁴⁰
- 2.10 EPM also designed a monitoring system (SIEMSEC) to follow up on the resettled population. This system was used as a basis for designing the ex post evaluation conducted by EPM in 2004. Moreover, the analysis of Villanueva’s evolution prepared for this report was based on data obtained from SIEMSEC in addition to information updated as of 2008.
- 2.11 The 119 families resettled in the corregimiento of Villanueva (municipio of Yolombó) in 1998 originated in the veredas of Guacavé and Cancana (municipio of Yolombó), the vereda of Picardía (municipio of Amalfi), and the vereda of Garzón (municipio of Gómez Plata). Following an ethnographic study, it was determined that 70 of these families were still present in 2008.⁴¹

C. Methodology of the study

- 2.12 In 2007, OVE and EPM’s Social Unit jointly conducted a comparative pilot study of certain socioeconomic indicators on a sample of the resettled population and a control population. This pilot study helped in designing an impact evaluation using quasi-experimental methods, that is, through the construction of a control group (equivalent population that has not been resettled) that would be used as “counter-

⁴⁰ Villanueva became a corregimiento in 2000, two years after the resettlement of the families, taking over eight veredas of the municipio.

⁴¹ Of the total of 119 families, 49 were excluded: 13 families that never lived in the resettlement and did not develop comprehensive (spatial, sociodemographic, economic, cultural and political/organizational) ties with it as conceived and targeted under the policies of the executing company; 11 resettled families who lived in Villanueva but sold their homes; 12 resettled families who lived in Villanueva and leased their homes; nine resettled families who still have their homes but do not permanently live there; and one family that gifted its home to a relative and excluded itself because it did not form a part of the resettlement policy. The final number of families to be surveyed was 73. Information could only be taken from 70 families since the three others were absent during the weeks when the survey was conducted.

factual” and would respond to the question: what would have become of the population had it not been resettled?⁴²

- 2.13 The study of the resettlement’s impact on the population of Villanueva was conducted through the use of two evaluation methods:

Comparative statistical method: analysis by dimension (spatial, sociodemographic, economic, and political/organizational) and comparison of mean changes in the resettled population and the control population. This method is supplemented by ethnographic methods through workshops and interviews with focus groups.

Econometric (quasi-experimental) method: Impact evaluation using matching and simple difference techniques.⁴³

1. Dimensions of the study

- 2.14 The study’s comparative analysis was based on the same dimensions used for the vulnerability studies conducted by EPM in the initial design stages of Porce II:

Spatial dimension: Location of the communities, jurisdictions to which they belong, settlement patterns, holding of land parcels and dwellings, habitational issues, infrastructure, and community services.

Sociodemographic dimension: Identification of the studied population according to family type and composition, characterization of population groups by age, gender, civil status, mobility, etc. This dimension also includes family health and education issues.

Economic dimension: Main and ancillary economic activities, whether formal or informal, participation by the population in productive activities, job market, land use, income, expenses, savings, net worth, etc. Financial sustainability of the family group.

Political/organizational dimension: Historical organizational characteristics of the population, community groups and organizations, forms of communication and participation, internal disputes and alliances, prospects and constraints to resolving

⁴² Once the control group was established, a series of socioeconomic indicators was compared for a sample of 13 families in the population resettled in Villanueva and 6 families in the control population of El Brasil. The pilot study was based on the assumption, subsequently proven in this study, that the veredas of Guacavé, Cancana, Picardía and El Garzón, impacted by construction of the dam and currently resettled in Villanueva, had, immediately prior to their resettlement, similar and comparable socioeconomic characteristics to the non-resettled vereda of El Brasil. In other words, when the baseline was established, both communities had, on average, similar characteristics; thus, the changes over time in the analyzed socioeconomic indicators for El Brasil are comparable to the hypothetical changes that would have occurred in such indicators for the veredas of Guacavé, Cancana, Picardía and El Garzón, had these not been resettled.

⁴³ See Annex A, “Description of the formulation of the econometric model and estimators.”

these, ability to build confidence and social capital,⁴⁴ etc. The vulnerability or strength of these populations in the face of threats and risks arising from the armed conflict in Colombia are also identified.

2. Selection of the control population

- 2.15 The control community (vereda of El Brasil) was established as such on the basis of its territorial and economic similarities, family and neighborhood links, and shared spatial, habitational, and cultural issues with the resettled veredas (base year 1994) (see Table 1). As a differentiating criterion, the control community, despite being in the area of influence of the Porce II project, was not dismantled either territorially or socially since it did not need to be displaced and resettled.
- 2.16 The selection was performed during the pilot study, based on an analysis of the information gleaned in the field by the EPM experts (1994) and the company's documents on file regarding the characterization of the original communities and the project's indirect area of influence.⁴⁵ According to this baseline characterization, the original populations of Villanueva (La Cancana, Garzón, Picardía, Guacabé) and El Brasil shared the following characteristics:
- Economic activity based on alluvial mining on the Porce river.
 - Roots, family and neighborhood links.
 - Spatial and cultural issues related to the river.
 - Territorial and social influence of the Porce II project.
 - Presence of armed conflict.
 - Levels of informal economic activity.
- 2.17 Moreover, following the 2008 census study, which included an analysis of the socioeconomic characteristics available through a retrospective survey and workshops conducted in the community of El Brasil, it was concluded that the population's characteristics were stable over time and had not undergone any substantial socioeconomic change that would negate the assumption that its evolution is comparable to that which the resettled population would have experienced without the project.

⁴⁴ This study particularly reflects the ideas of Robert Putnam (1993) and Fukuyama (2004), who posit that social capital is expressed in the form of trust among the various social actors, their degree of associativity, and respect for the rules of civil behavior (taxpaying culture, care of property, and use of public services, among others), which contributes to the collective welfare. In a society in which the values of social capital prevail, information flows more quickly and consensual rules and sanctions are developed on the basis of collective, rather than individual, interests.

⁴⁵ There is a series of limitations on the selection of a control community, since there are some differences among the characteristics of the three municipios of origin of the resettled population, and there is no single community that matches them all. In the area under study, El Brasil is the community with the most similar characteristics.

- 2.18 The control population of El Brasil, consisting of 50 baseline families (1994), is located in the municipio of Gómez Plata, in the Northeast Subregion of the Department of Antioquia, Colombia. In 2008, only 26 of these families were found for the ex post study.⁴⁶

3. Information collection tools

- 2.19 For purposes of evaluating the socioeconomic impact of the resettlement, information collection tools were structured on the basis of the population census through a survey in the two communities (Villanueva and El Brasil), along with ethnographic methods (workshops, discussion groups, unstructured interviews) targeting specific groups: community organizations, institutional leaders, religious and educational groups, etc.⁴⁷ In addition, a review was conducted of area studies (degree theses, among others) and municipal, departmental, and national statistics, particularly for analyzing the armed conflict within the study's political/organizational dimension.

4. Surveys

- 2.20 The survey was conducted via a family socioeconomic datasheet and an individual socioeconomic datasheet. The survey targeted heads of household in families belonging to the resettled and control communities, and was divided into modules: general information, family composition, housing, education and training issues, health, and economic and social capital issues (i.e., participation in groups and networks, trust and solidarity, cooperation, cohesion and social inclusion, information and communications, empowerment, political action).
- 2.21 In addition to the socioeconomic datasheet for heads of household of each of the surveyed families and the individuals comprising them, a module was included for the resettled population on the impact of the production projects initiated by EPM during the resettlement process, as well as a module of retrospective questions for the control population for purposes of learning certain historical aspects of the community (baseline reconstruction). The essential purpose of this baseline reconstruction for El Brasil was to confirm that its historical characteristics (socioeconomic, spatial, and organizational) were indeed comparable to those of the resettled community before resettlement. This baseline was built using data from the surveys and workshops.

5. Ethnographic methods

- 2.22 Ethnographic methods were used to measure organizational variables in both communities—Villanueva and El Brasil—and the baseline was reconstructed for

⁴⁶ Of the total of 50 families, 24 were excluded: 11 families residing but having no roots in the area, 10 nonresident families deemed to be tourists (recreational use of the dwelling), and three families that were temporarily not in the vereda.

⁴⁷ Annex B, "Information collection tools," lists the primary and secondary information used for the 2008 census (family socioeconomic datasheet, infrastructure and services form, institutional capacity form, etc.).

the control community. Workshops and interviews were conducted at the community organizations in both populations for the purpose of collecting information on the structure of the leading organizations, their work and monitoring plan, community participation and its development in recent years, the main reasons for participating in community organizations, decision-making, interorganizational networks, empowerment and political participation, relationship with institutions, trust and solidarity among inhabitants, conflict management in the community, etc.

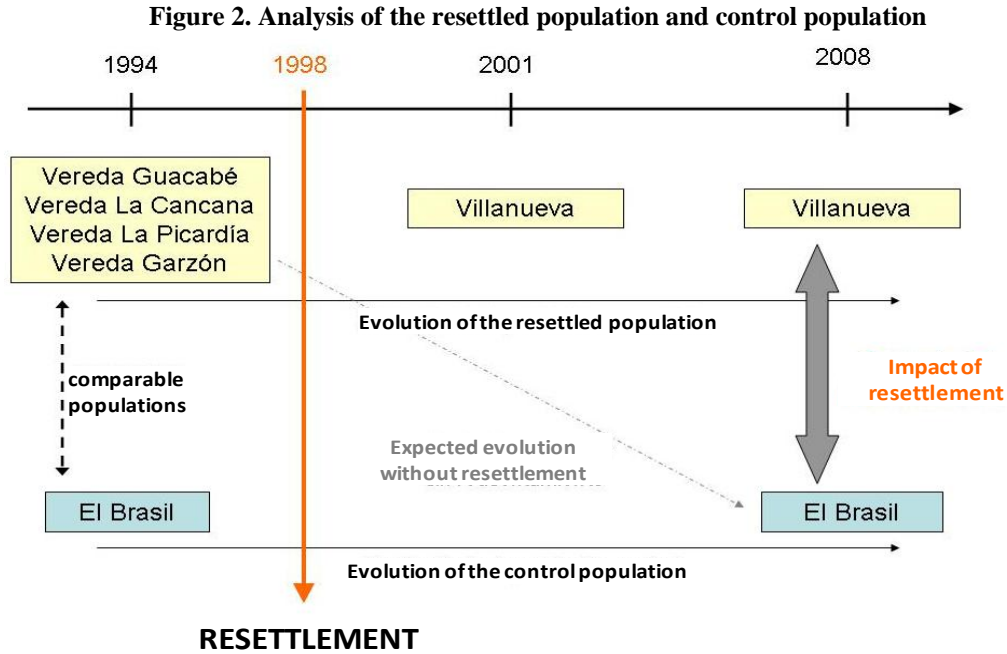
Photo 2. Community workshop in Villanueva



Source: EPM photo archive.

- 2.23 Guides were also designed for conducting workshops with focus groups both in Villanueva and in El Brasil through group application of the semistructured dialogue technique.⁴⁸ Workshops were conducted with representatives of community organizations, women's groups, and groups of various age brackets (youth, children, seniors) to encourage greater population representativeness.
- 2.24 These information collection tools were used as a basis for analyzing changes in the resettled population in comparison to the control population, as well as the impact of resettlement on the resettled population (see Figure 2).

⁴⁸ Workshops were conducted for the control population in El Brasil to construct a baseline through activities designed to induce the telling of stories by inhabitants from as far back as before the 1950s and, with greater accuracy, starting in the 1980s.



Source: Developed internally.

D. Results of selected indicators by dimension

1. Changes in Villanueva (1994-2008) and comparison of means with El Brasil (2008)

2.25 The resettlement process at Villanueva has been documented by EPM through its SIEMSEC evaluation and monitoring system, which holds data for the years 1994 and 2001⁴⁹ from the Ex post Environmental Evaluation performed in 2005 as well as from other reports.⁵⁰ This effort has been supplemented by the survey conducted in 2008 by OVE and EPM. This section provides an analysis of changes in Villanueva from the first available observation (1994 baseline) in comparison to the last observation in the 2008 survey.⁵¹ The 2008 survey data for Villanueva and El

⁴⁹ Despite certain limitations due to the age of the database, changes in the information platform and some design problems, SIEMSEC has been an essential component for evaluating the changes undergone by the population resettled in Villanueva.

⁵⁰ Some of the EPM reports relating to the Porce II resettlement process include: Socioeconomic aspects of the area of influence of the Porce II project. 97 pp. (1989), Socioeconomic report on mining activities. 135 pp. (1992), Socioeconomic management plan for the population inhabiting the direct impact area. 18 pp. (1992), Socioeconomic impact study. 112 pp. (1993), Ex post evaluation of the population resettlement plan for the Porce II Hydroelectric Project (paper presented at the International Congress on the Environment and the Energy Industry, CIMAIE 2005) (2005).

⁵¹ The evolution of Villanueva 1994-2001-2008 is found in Annex C. The comparative analysis was conducted between 1994 and 2008 in order to work with data on a fully resettled population (it was thought that the 1998 resettlement process had not yet stabilized in 2001 and it would be too early to measure its impact).

Brasil are also compared. A series of indicators covering various dimensions of the populations: spatial, sociodemographic, economic, and political/organizational, is analyzed. Data with the 1994-2008 comparative results of the main indicators analyzed in both population samples are shown in Annex D.

a. Spatial dimension

2.26 The workshops conducted in 2008 with various groups of the Villanueva resettlement show general satisfaction with the change in living conditions in terms of housing and community and surrounding infrastructure as compared to conditions prior to resettlement. In fact, in relation to the housing conditions between 1994 and 2008, these changes are important because this is one of the pillars of EPM's resettlement action. Improvements are observed in construction materials, number and use of home spaces, and other factors. These improvements are reinforced by home expansions and renovations undertaken by the resettlement inhabitants themselves, indicating a degree of acceptance of their environment. In the control population of El Brasil, dwellings continue to exhibit features of the resettlement's original population. Thus, there is still a high percentage (close to 35%) of wooden shacks and huts, with cement, wood or dirt floors and zinc, asbestos, or straw roofs. This difference in housing materials is typically associated with improvements in the comfort, safety, and habitability of dwellings.

Photo 3a. Homes, El Brasil



Source: EPM photo archive.

Photo 3b. Homes, Villanueva



Source: EPM photo archive.

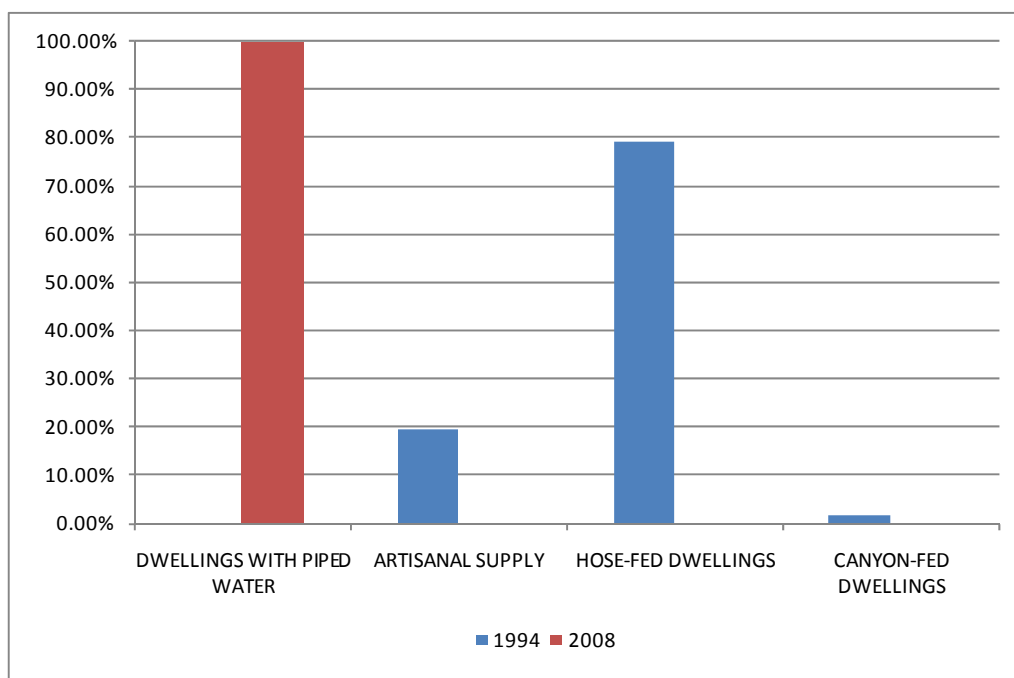
Photo 4. Social areas in the home, Villanueva



Source: EPM photo archive.

- 2.27 Regarding home possession, results show that the 70 families in Villanueva under review in 2008 continue to hold the property titles obtained during the resettlement process and to pay the applicable property tax.⁵² On the other hand, in El Brasil they are all possessors, and only one of the 26 surveyed families is a tenant.
- 2.28 The service infrastructure associated with the resettled population's homes also improved considerably between 1994 and 2008 in terms of access to electric power, natural gas, drinking water, and sewer services.⁵³ Providing infrastructure services was also an essential component of the resettlement action. On the other hand, El Brasil does not have good infrastructure; moreover, supply methods are more makeshift and there is no sewer service (see Figure 3).⁵⁴

Figure 3a. Water supply. Changes in Villanueva (1994-2008)



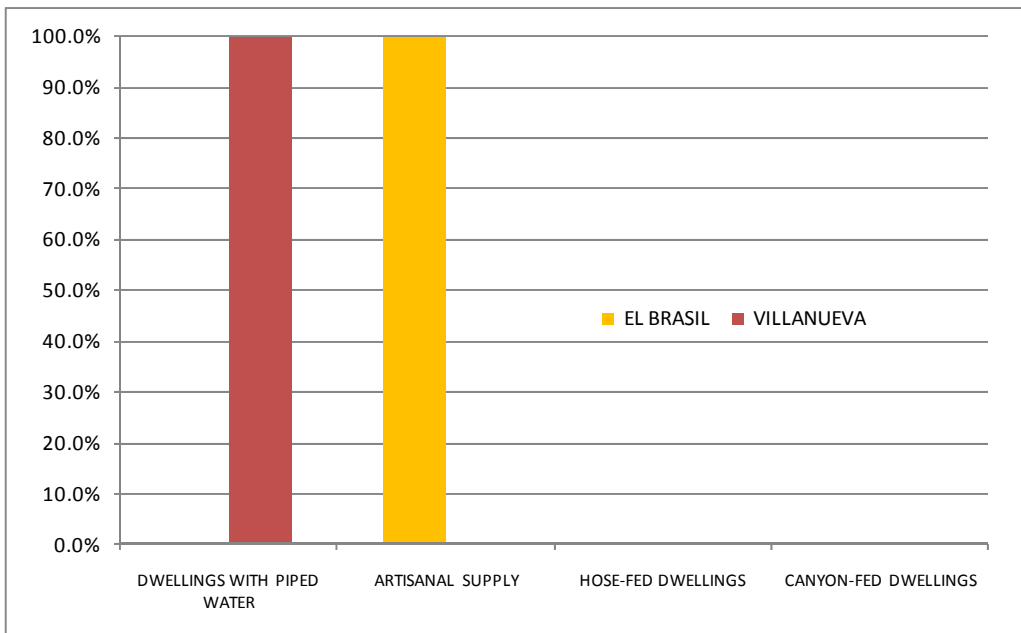
Source. Developed internally.

⁵² However, it is worth noting that, in recent years, some families have squatted on land in Villanueva meant for public use or owned by the municipio of Yorombó, putting up shacks built of disposable materials and thus changing the legal possession and land use situation in the corregimiento as a whole.

⁵³ However, in 2008 there was a return to the use of firewood, which appears to reflect a cultural preference for using it to cook certain foods as well as an effort at household savings.

⁵⁴ The majority of the population disposes of human waste in open fields or water sources.

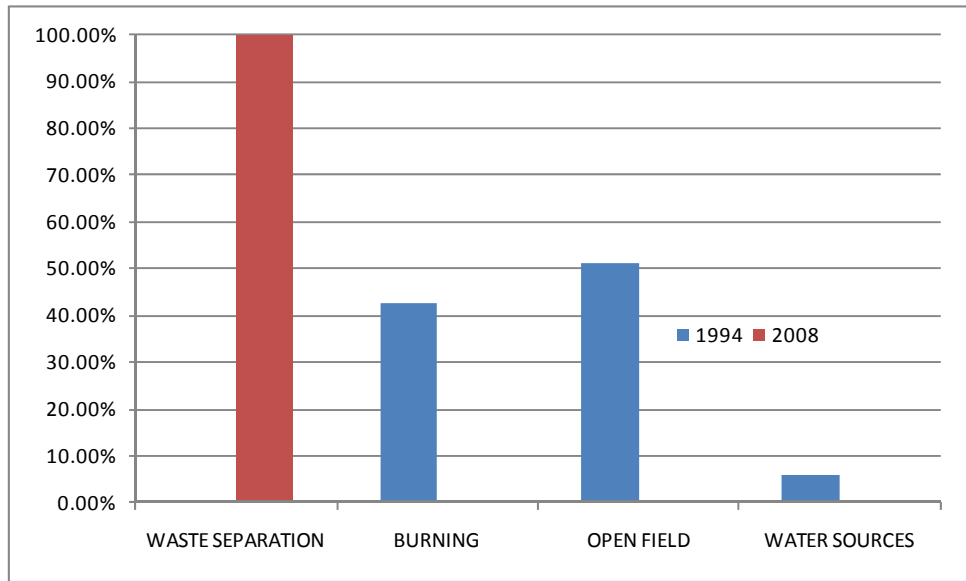
Figure 3b. Water supply. Comparison Villanueva - El Brasil (2008)



Source: Developed internally.

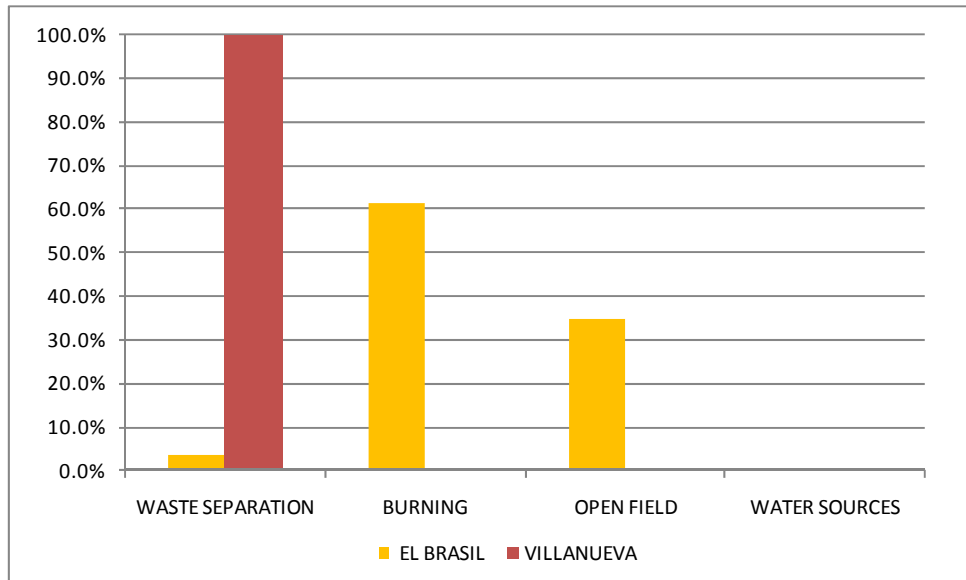
2.29 A similar situation obtains with the disposal of solid waste, which is separated and treated in Villanueva, whereas in El Brasil it is mostly left to accumulate in the open or is burned (Fig. 4). Regarding telephone usage, more households have landline telephones in Villanueva (14% compared to 4% of families in the control group), whereas mobile phones in El Brasil are proportionately more numerous than in Villanueva by more than 10%.

Figure 4a. Final solid waste disposal. Changes in Villanueva (1994-2008)



Source: Developed internally.

Figure 4b. Final solid waste disposal. Comparison Villanueva - El Brasil (2008)



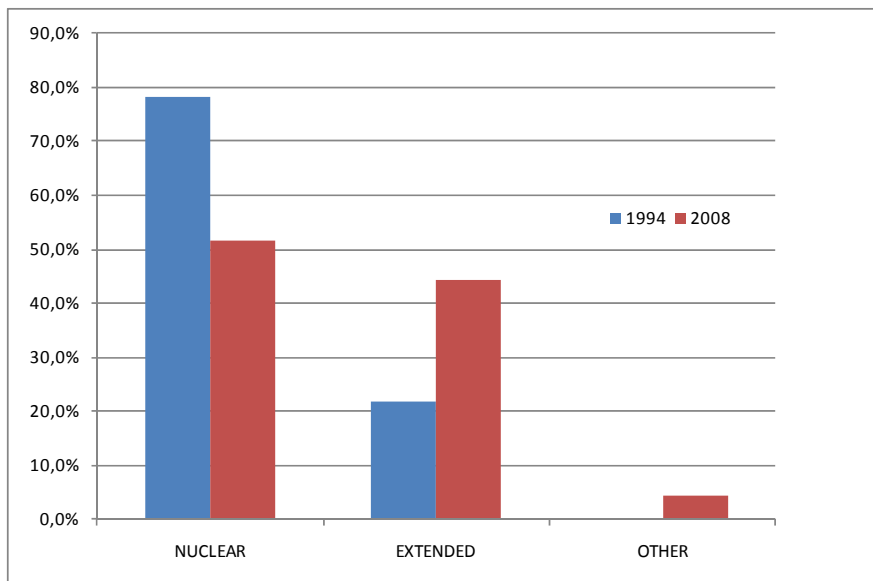
Source: Developed internally.

b. Sociodemographic dimension

2.30 In demographic terms, the upward trend in the number of persons per family in Villanueva is confirmed, without thereby creating overcrowding in the

households.⁵⁵ In 2001, the explanation for this trend seemed to lie in the arrival of family members from other towns or the return of families that had opted for economic compensation and were joining relatives. By 2008, there is also a possible increase associated with the marital unions of offspring and their own children, all of whom remain under the same roof, creating extended families. In Villanueva, the percentage of extended families is greater than the percentage of nuclear families (44.3% versus 34.4%),⁵⁶ while in El Brasil, 50% of families are nuclear families and 23% of all families consist of a single individual.

Figure 5a. Family types. Changes in Villanueva (1994-2008)

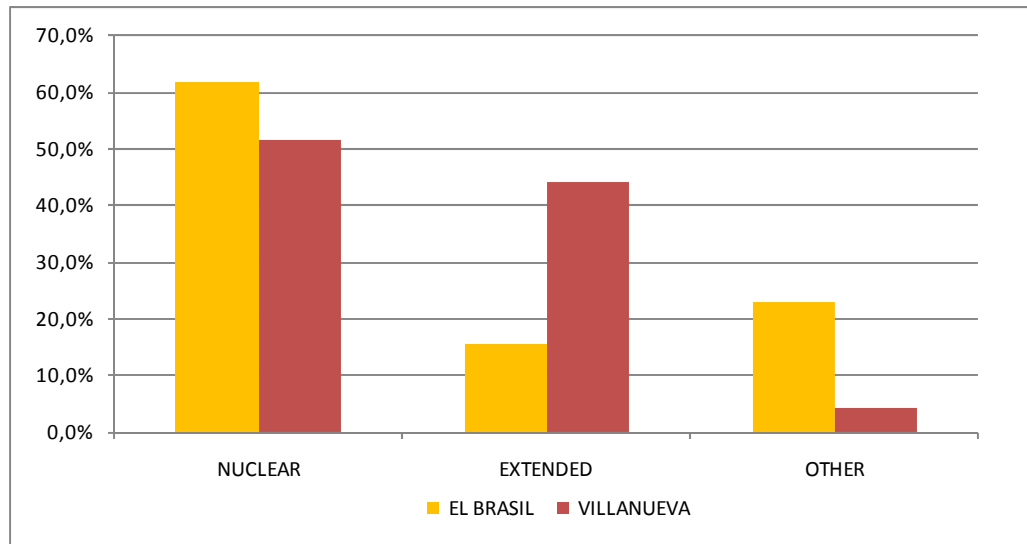


Source: Developed internally.

⁵⁵ In 1994, the average number of persons per family was 3.6. By 2001, this figure had increased to 4.1 and in 2008 stands at 5.1. Overcrowding is deemed to exist when there are more than three persons per bedroom. In Villanueva the ratio is 1.5 persons per bedroom.

⁵⁶ Nuclear families are comprised of parents and children or a parent and children, whereas extended families are comprised of aged parents, parents, and children.

Figure 5b. Family types. Comparison Villanueva - El Brasil (2008)



Source: Developed internally.

- 2.31 The population pyramids of the two communities show marked differences. In Villanueva, the distribution approaches a normal pyramid,⁵⁷ and there is an increase in persons above the age of 45, denoting a certain aging process in the resettled population and a drop in the birth rate.⁵⁸ In the case of El Brasil, several age brackets are not represented among the 83 members of this population.⁵⁹ Viewing the population by gender, the study shows that in 2008 the female population predominated in Villanueva (53.4%), while in El Brasil the male population was predominant. These data begin to give shape to a theory arising from this study that posits the urbanization of Villanueva, since urban areas in Colombia are marked by their predominantly female population. By contrast, El Brasil follows a pattern more closely resembling that of Colombian rural areas.
- 2.32 With respect to education levels, the data show that, in the period between 1994 and 2008, the percentage of individuals in Villanueva with some form of education (primary, secondary, or higher) rose from 69% to 77%. In addition, the survey data reflect a drop from 11% to 4% in the number of children under 6 who cannot read, as well as an increase in the enrollment rate at both the primary and secondary

⁵⁷ Despite the fact that the male population aged 25-35 is lower than expected, as well as the population of both genders between the ages of 45 and 60.

⁵⁸ There is also a change with respect to 1994 in the gender balance, since by 2008 the female population already exceeds the male population. It would be relevant to consider the demographic effect of the murder of 13 men during the armed conflict.

⁵⁹ For example, men aged 50-54 and 60-65, and women older than 65.

levels, and incipient entry into the higher levels of the education system.⁶⁰ By comparison, the average number of years of schooling of the resettled population (4.3 years) is slightly greater than in El Brasil (3.8 years) and is closer to the national average for rural areas (4.8 years) according to the 2000-2005 National Education Progress Report.

Photo 5a. Education center in El Brasil



Source: EPM photo archive.

Photo 5b. Education center in Villanueva



Source: EPM photo archive.

2.33 These changes in education levels are due to an increase in the existing education offerings in the resettled community. The Villanueva school, built in 2001 during the resettlement process, can accommodate 300 students and includes preschool through tenth grade.⁶¹ The student population has increased in recent years, and the school currently has an expansion project in place.⁶² The education infrastructure in Villanueva is considered adequate according to criteria such as average students and the number of teachers per classroom, the number of restrooms at the educational center, the existence of a piped water system, telephone line, photocopier, etc. On the other hand, the community in El Brasil has an educational institution able to accommodate 80 students from first to fifth grade. The rest of the grades are covered by nearby schools, primarily the school in Villanueva.⁶³

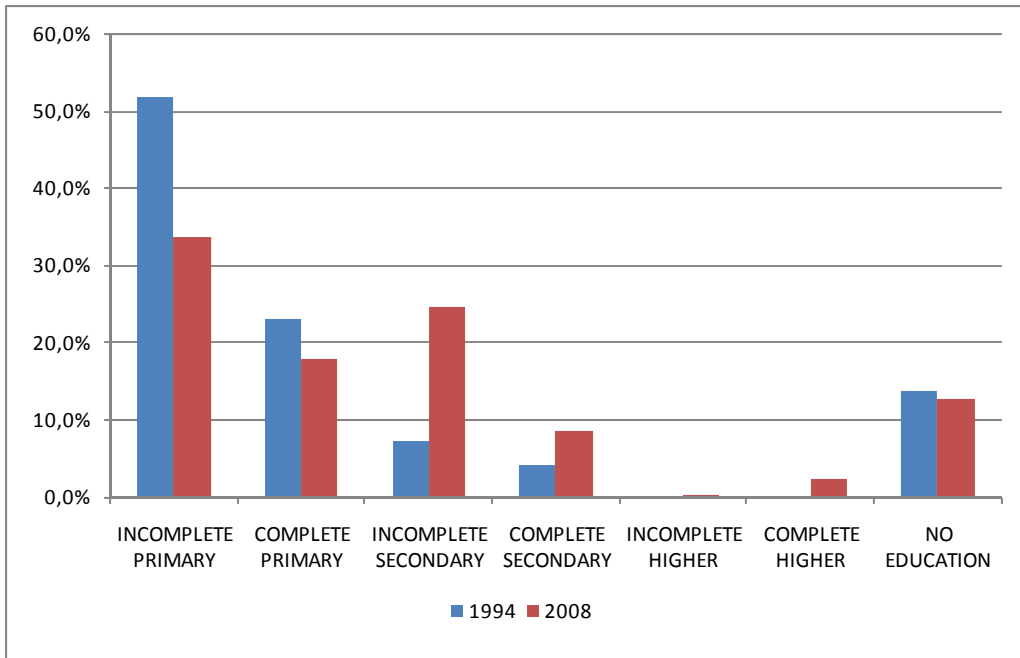
⁶⁰ Between 1994 and 2008, the percentage of individuals with secondary education rose from 9.1% to 33.3%, while the percentage of individuals with higher education rose from 0.0% to 2.5%.

⁶¹ Until 2009, the school offered courses through the ninth grade.

⁶² In 2008 there was a growing demand for education in the resettlement's corregimiento. Between 2001 and 2008, the number of students from adjacent communities rose (from 13.9% to 24.7%) relative to the number of students from the resettlement (which fell from 86.1% to 75.3%).

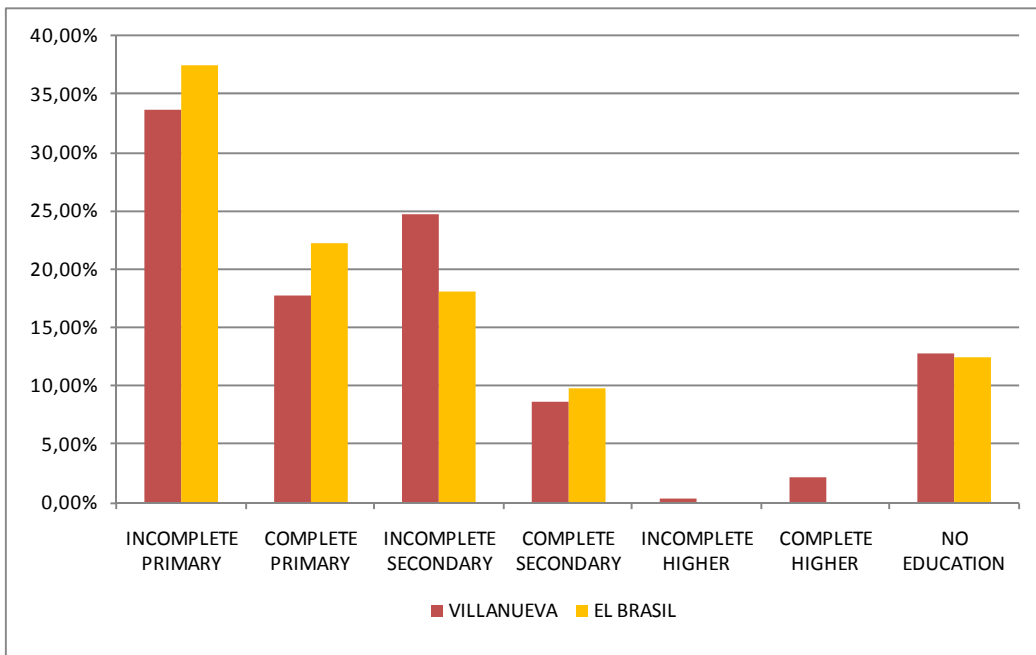
⁶³ In 2008 a serious conflict was identified between the teacher and the community which brought the school's daily activities to a halt, without any mediation by the authorities.

Figure 6a. Education levels. Changes in Villanueva (1994-2008)



Source: Developed internally.

Figure 6b. Education levels. Comparison Villanueva - El Brasil (2008)



Source: Developed internally.

- 2.34 Training for the workplace, which by 2001 formed a part of the resettlement's social organization processes, declined in 2008 as EPM ended its direct follow-up of the community in the framework of implementing production projects and ensuring adaptation to the new habitat.⁶⁴ Neither the municipio nor the community organizations developed alternative offerings. The educational alternative is the national rural education program known as Sistema de Aprendizaje Tutorial [Tutorial Learning System] (SAT). The SAT is not well-regarded by potential students, who believe that only onsite methods can ensure quality in educational services. Until 2002, 75% of the resettled families received some form of training, while in El Brasil the percentage was a mere 12% of families (3 families). However, between 2003 and 2008, it was the control population that received comparatively more training courses for the workplace and for human development (31.0% vs. only 11.4% in Villanueva). This is evidence of the lack of alternative offerings on the part of the Yolombó municipio (where the resettlement is located) and its community organizations.
- 2.35 The population's health insurance has improved since 1994 as a result of the government's public policies, which require the entire population to have coverage, whether under the contribution-based system, subsidies, or SISBEN. In 1994, only 8.4% of Villanueva inhabitants were covered; by 2008, the figure had risen to 96.0%. The implementation of these public policies also had an influence on El Brasil, where health coverage reached 91.6% of the population by 2008.
- 2.36 With respect to health care services, there is a health station that provides coverage for the Villanueva population and adjacent veredas. However, the quality of medical care has diminished along with the number of personnel on duty at the health station.⁶⁵ In El Brasil there is no health station. According to data from the study conducted in 2008, the main cause of morbidity for both populations under study is influenza (54% for Villanueva, 48% for El Brasil), followed by hypertension (24% for Villanueva, 19% for El Brasil). The prevalence of acute respiratory infections (ARI) and acute diarrheal diseases (ADD) is greater in

⁶⁴ Between 1998 and 2002, 52 families indicated that their members had received training in various areas: 58 in farming techniques, 54 in crafts and trades (driving, mechanics, hairdressing, culinary, dressmaking, Christmas arrangements, business secretarial skills, electricity, and electronics), 33 in business administration (enterprise management, human development, business culture, and accounting), and 1 in systems. For the 2003-2008 period, only 8 families were given a total of 11 courses, 3 in farming techniques and the others in trades and crafts. Families remain interested in receiving training; 57 families stated they would pay for training.

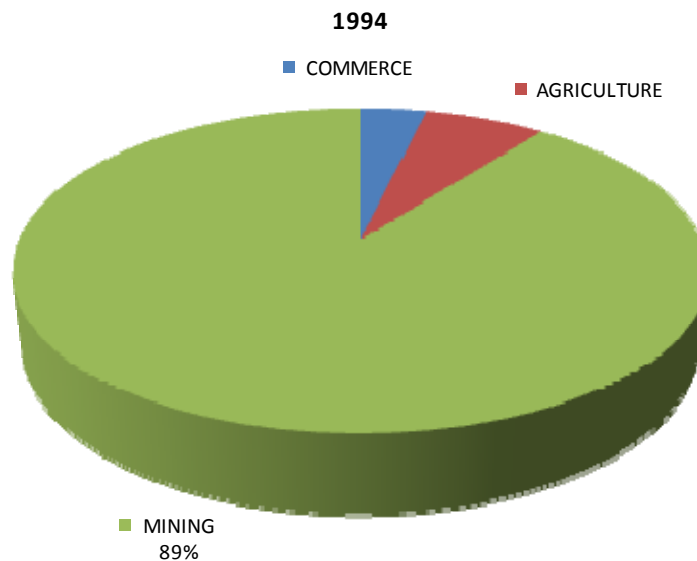
⁶⁵ Decree 1011 of 2006, which establishes a mandatory quality control system for health care under the General Social Security System, in the case of Villanueva resulted in restrictions on the provision of certain types of services due to technological requirements, medical protocols, and scientific ability. Under this decree, health stations are entrusted with implementing the prevention and promotion programs provided in the Basic Health Plan, while health care per se falls exclusively within the domain of hospitals.

El Brasil than in Villanueva; this is possibly related to the health environment in the homes.⁶⁶

c. Economic dimension

2.37 The challenge of resettlement was how to reconvert the productive activity of the original populations, which in 1994 were mostly (89%) engaged in alluvial mining as self-employed workers.⁶⁷ In 2008, the occupation and economic activity profile shows greater diversification, with 40.5% in the primary sector, 25% in the secondary sector, and 34% in the tertiary sector. The new occupational profile is noteworthy in that significant percentages of the population are engaged in construction (20%), commerce (15%), agriculture and fishing (14%), and community and social services (12%), among other activities. This is far different from the situation in many rural areas of the country, where the population is mostly employed in the primary (63%) or tertiary (29%) sectors.⁶⁸ In 2008, conditions in El Brasil are very similar to pre-resettlement: the majority of activities are still associated with the primary industries. Agriculture accounts for 32% of jobs, and mining for 27%. Cattle farming and construction are also significant, with close to a 10% share.

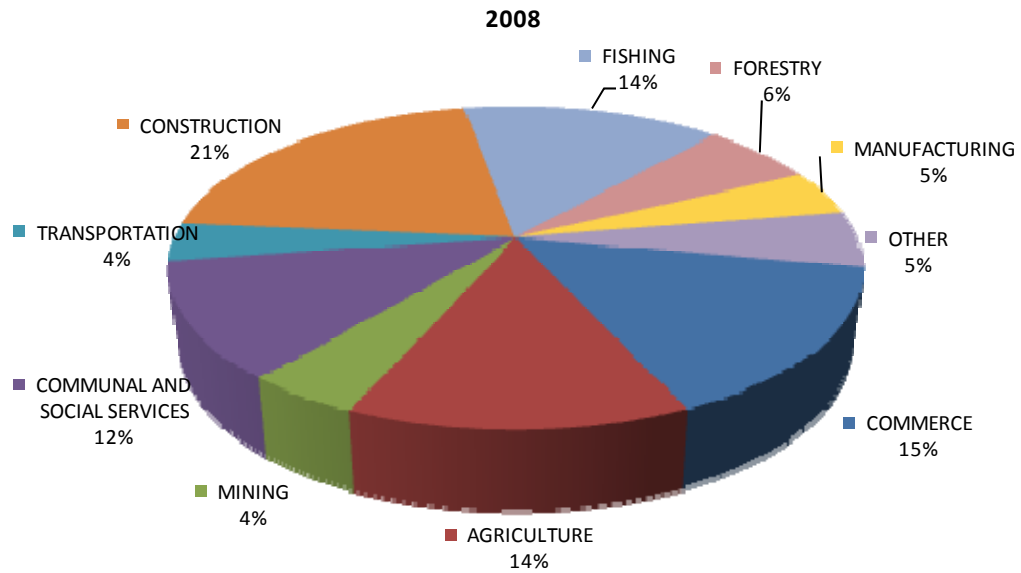
Figure 7a. Economic activities. Changes in Villanueva (1994-2008)



⁶⁶ ARI and ADD are the third most prevalent diseases in El Brasil, accounting for 16% of the total. In Villanueva, urinary tract infections are the third most prevalent, accounting for 11.4%.

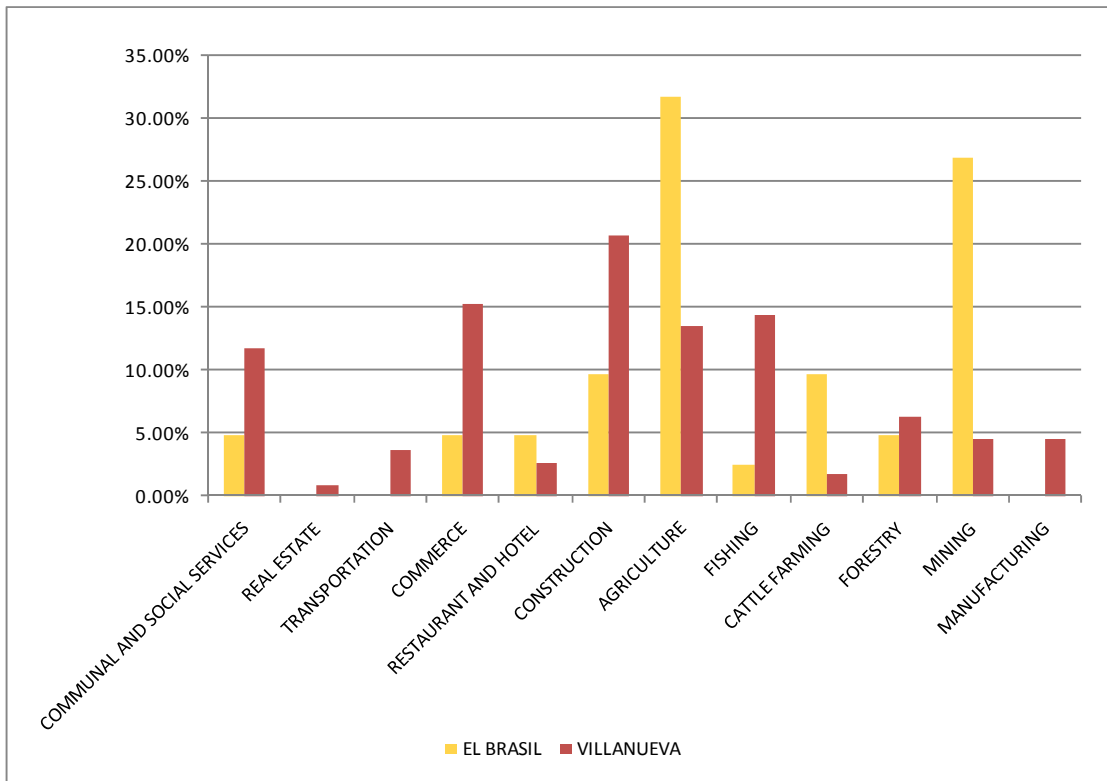
⁶⁷ Of the nonmining remainder of the population, 7% worked on farms, and 4% worked in commerce.

⁶⁸ DANE National Household Survey (November 2007).



Source: Developed internally.

Figure 7b. Economic activities. Comparison Villanueva - El Brasil (2008)



Source: Developed internally.

- 2.38 Self-employed workers are predominant in both populations (14.6% in Villanueva, 33.7% in El Brasil). In the case of Villanueva, the percentage of day laborers (1.7%) is lower than in the control population (2.4%), and the percentage of employees (4.8%) is higher than in El Brasil (2.4%). These data could indicate a certain trend toward formal employment in the resettled population.
- 2.39 The diversified occupational structure in the resettlement is partially attributable to a process of promoting production projects, undertaken as part of EPM's economic reconstruction program for the resettled population. Indeed, of the 10 current activities in Villanueva, three were introduced through this program: commerce, social and community services, and forestry.⁶⁹ The other activities are the result of demand associated with the concentration of population in the resettlement, for example, fishing for food consumption and transportation-related services.

Photo 6a. Economic dimension – Shop in El Brasil



Source: EPM photo archive.

Photo 6b. Economic dimension – Market in Villanueva



Source: EPM photo archive.

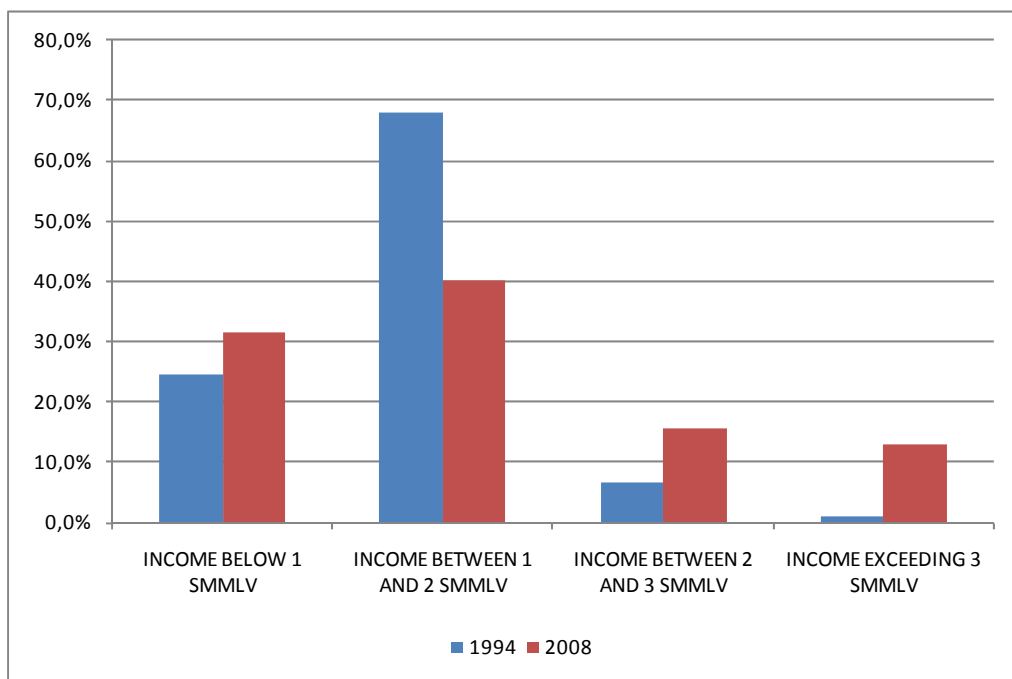
- 2.40 The 2008 data for the resettled population mark the appearance of unemployment, a phenomenon that did not exist in previous years. The 2008 unemployment rate in Villanueva is 17.2%, twice the mean for Colombian rural areas (9.2%). In the case of El Brasil, the unemployment rate in 2008 was 2.4%.⁷⁰ In the case of the resettled population, it should be noted that this study attempted to differentiate underemployment and occasional employment data that had not been measured with similar accuracy in the 1994 and 2001 studies. These data could explain the current job market limitations in Villanueva, just as certain effects of the armed conflict in previous periods limited various EPM-promoted production projects in the area.

⁶⁹ The 51 additional activities whose development was encouraged by EPM during the economic reestablishment process for the resettled population in the framework of 114 projects in the commercial, CDT, transportation and farming sectors, account for 13% of the corregimiento's economy.

⁷⁰ 2001-2006 Ongoing Household Survey conducted by DANE.

2.41 Regarding family income levels, an increase has been observed between 1994 and 2008 in the percentage share of families with income ranging from 2 to 3 times the current statutory minimum monthly wage (SMMLV) and exceeding 3 SMMLV, which rose, respectively, from 6.7% and 0.8% in 1994 to 15.7% and 12.9% in 2008.⁷¹ There has also been an increase in the share of families that earn less than 1 SMMLV (from 24.4% in 1994 to 31.4% in 2008).⁷² The above means that, while there has been a slight improvement in income for some families in Villanueva (as the share of families with income exceeding 2 SMMLV grew by 21%), the income gap with the population and families earning less than 1 SMMLV has also widened.

Figure 8. Family income. Changes in Villanueva (1994-2008)



Source: Developed internally.

2.42 According to the 2008 survey of the resettled population,⁷³ the average income per head of household is 0.92 SMMLV but the income per worker is 0.84 SMMLV, which means that the income earned by working individuals other than the head of

⁷¹ The current statutory minimum monthly wage (SMMLV) for 2008 is 461,500 Colombian pesos (exchange rate: US\$1 = 2,163.00 Colombian pesos).

⁷² While these data on the rising percentage of families earning less than the minimum wage (indigent families) could reflect an underreporting bias of the Villanueva population for speculation on new EPM programs, these data also show a certain trend toward impoverishment and a deepening of the economic differences in the resettled population.

⁷³ In this case it was decided that three families in each of the populations would be excluded from the analysis because their behavior was atypical with respect to their neighbors' and could distort the results of a study of relatively small populations (70 families in Villanueva and 26 families in El Brasil).

household is significantly lower than the latter's, pointing to precarious demand in the Villanueva labor market. On the other hand, work-related income per family was 1.28 SMMLV, and Other Income, i.e. income from leases, subsidies, assistance, or other sources was 0.24 SMMLV, for a consolidated family income of 1.51 SMMLV. As compared to the control population, the census shows that income both per head of household and per worker is slightly higher in El Brasil (1.04 SMMLV and 0.89 SMMLV, respectively). Moreover, work-related income per family is higher in El Brasil, with a mean of 1.35 SMMLV versus 1.28 SMMLV in Villanueva. However, Other Income in El Brasil is only 0.15 SMMLV per family versus 0.24 SMMLV in Villanueva. Overall, total income per family is similar in the two populations, with 1.52 SMMLV in Villanueva and 1.50 SMMLV in El Brasil. Regarding per capita income, 2008 data for Villanueva show a figure of 0.30 SMMLV versus 0.49 SMMLV in El Brasil, due to a lower number of individuals per family in the control population.

- 2.43 A net worth comparison shows that Villanueva real estate (homes, land) and other assets (furnishings in commercial spaces, transportation and livestock) have higher value than in the control population.⁷⁴ Family wellbeing indicators (such as the use of household appliances) are also higher in Villanueva than in El Brasil. Results show that 90% of surveyed families in Villanueva had a refrigerator at home, while almost 35% of families in El Brasil lacked this appliance that makes it easier to store and preserve perishable foods. Also indicative is the greater percentage of families in Villanueva that use clothes washers (41.4% versus 7.7% in El Brasil), which can reduce the amount of time required to do housework for women and children (who in rural areas normally take care of these chores). Lastly, the use of ovens, microwave ovens, computers and printers shows greater financial capacity on the part of some families in Villanueva, in contrast to the absence of such devices in El Brasil.

d. Political/organizational dimension

- 2.44 This dimension examines issues relating to community equipment, its use and consumption, community participation, institutions and programs, citizen safety and security, groups and networks, trust and solidarity, information and communications, social cohesion and inclusion, empowerment, and political action.⁷⁵
- 2.45 With respect to communal facilities, the study found that both communities have a basic communal infrastructure; however, the use and consumption of these infrastructures differ. In the case of Villanueva, results show that the community continues to make frequent use of the chapel, multisport park, soccer field, commercial spaces, school, and rodeo ring. This infrastructure continues to serve as

⁷⁴ In the case of Villanueva, net worth is 9,922,135 Colombian pesos versus 7,232,771 Colombian pesos in El Brasil.

⁷⁵ The tool used to analyze this dimension is basically a community questionnaire targeting leaders and the various workshops conducted for focus groups in Villanueva and El Brasil.

a connecting thread both for adjacent communities and for resettled families, making socioeconomic and cultural exchanges possible.⁷⁶ In the case of the control group, in 2007 the Gómez Plata municipio gave El Brasil a community center which, despite being unequipped, is frequently used for income-producing activities. The multisport field and the recreational park lack the necessary municipal maintenance.

- 2.46 In terms of quantity and quality of social groups and networks, the resettlement's original communities showed strength based on more than 25 years of community organizing tradition, particularly in La Cancana and Garzón. According to the participants in the workshops conducted for this study, this organizing tradition led to considerable participation during the process of resettlement and joint work with EPM. However, the armed conflict's influence disrupted this dynamic, particularly when the leader of one of the most enterprising organizations (La Telaraña Roja) was assassinated.⁷⁷ The year 2008 witnessed a slight recovery in social groups as eight of the 13 organizations existing in 2001 remained active,⁷⁸ but there was also a slight drop between 2001 and 2008 in the levels of participation in these organizations. On the other hand, El Brasil has only one organization, the Junta de Acción Comunal [Community Action Board] (JAC), which focuses on providing public services: improved access to the vereda, property legalization, basic sanitation, resolution of education problems, etc. In El Brasil, the most common form of community participation is the *convite*.⁷⁹ Regarding participation, interviewees concur that the high point occurred during construction of the bridge and the school. However, despite the problems associated with the loss of confidence in the JAC due to sluggish activity and bad management in 2007, the interviewees believe that their participation level has remained stable in recent years.

⁷⁶ The Villanueva rodeo ring has become an important driving force for cattle trade in the microregion of Cañón de Porce, where small and medium-sized cattle farmers operate. This infrastructure makes it easier for them to buy and sell cattle close to their land. In 2008, community centers in Villanueva reported lower use with respect to 2001; this is probably related to the dissolution of the culture committee and the Corporación Telaraña Roja following to the assassination of its leader.

⁷⁷ That the organizations in Villanueva have continued to exist shows great resilience in the face of the crisis in recent years due to the armed conflict.

⁷⁸ Most participants in the workshops conducted for this study identify four of the organizations created during EPM's social policy orientation period as the most valued in their community: Asociación de Juntas de Acción Comunal del Porce [Porce Community Action Boards Association] (Asojumpor), Asociación de Ganaderos de Hojas Anchas [Hojas Anchas Cattle Farmers' Association] (Asogha), the senior citizens' group, and the women's group.

⁷⁹ These are voluntary associations aimed at performing community benefit activities and, in some cases, helping to perform construction or other work for the benefit of a community member. Those who participate in a *convite* contribute their labor free of charge and their commitment is in effect until the work has been completed. These are also opportunities for socializing and sharing, and are typically associated with the maintenance of the internal roads and the hanging bridge.

- 2.47 With respect to the exercise of citizen rights and responsibilities, both communities emphasize participation in presidential and municipal elections and in the election of officers for community organizations, as well as tax payment compliance. This points to a potential for instilling a sense of the public sphere in both communities, which is a key factor in building social capital and citizenship. However, the results of the study indicate lower levels of trust in the municipal administration on the part of Villanueva's population than on the part of El Brasil, despite the fact that the resettlement is represented by a councilman at the Yolombó municipal hall. Likewise, municipal officials consider Villanueva a difficult community, one that often rejects Yolombó's municipal programs. Recent housing improvement programs in El Brasil appear to have led to an improvement in relations with the municipio, despite the persistent and critical school problem which to date has not been mediated by municipal officials.
- 2.48 The armed conflict was studied through interviews with community leaders, testimonies from inhabitants, a review of area studies, and municipal, departmental and national statistics. It is a variable that, while external to the resettlement process, had profound effects on the social and economic dynamics of both communities. The rates of violence associated with the armed conflict have dropped in recent years at the national level in terms of both homicides and kidnappings.⁸⁰ For Villanueva and El Brasil, the worst times of the conflict were from 2001 to 2003, when 13 people were murdered in Villanueva and two in El Brasil.
- 2.49 The 2008 study conducted for this evaluation pointed to certain differences in the conflict's effects on each of the populations. According to the responses obtained during the workshops and in the family surveys, 85% of the families in Villanueva were affected by the violence in recent years, while in El Brasil the figure was 73%. The consequences are also different: while in Villanueva the armed conflict mostly caused a loss in income-producing activities (43% of those affected), in El Brasil 42% of the families suffered family losses and only 15% lost their source of income. A study of the conflict's effects on the resettlement's dynamics⁸¹ corroborates the high impact of the armed conflict on the economic and habitat adaptation variables, as well as the conflict's disruption of the organizational and participatory dynamics, due to the great mistrust engendered by any external agent during those years. Several resettlement leaders were murdered, some decided to abandon their homes, and 18 families lost their production projects or suffered a loss of assets. The worst period was in late 2001, when an armed group entered the

⁸⁰ According to Ministry of Defense statistics, nationwide homicides in 2006 numbered 17,209, a 40.3% drop from the 2002 figure of 28,837. Kidnappings followed a similar trend, going from 2,882 to 621, which is a drop of 78.4%. In the Departamento of Antioquia, there were 8,407 homicides in 2001; in 2007 the rate had fallen by 74.1%, with a yearly total of 2,181, or 6,226 fewer cases.

⁸¹ Agudelo, G., 2002. Degree thesis on the impacts of the conflict on Villanueva's population.

resettlement area and prevented the normal conduct of the community's production projects.⁸²

- 2.50 Peaceful coexistence of diverse creeds and religious beliefs (Pentecostal, Trinitarian, Evangelical) seems to be the norm in both the resettlement and the control group. This religious diversity has driven some activities and has led to the creation of youth groups, which in recent years had disappeared.

2. Evaluation of the resettlement's impact (econometric study)

- 2.51 This section aims at identifying the resettlement's impact on the quality of life (as measured by wellbeing and health indices) and the income, spending, and net worth levels of the affected individuals.⁸³

- 2.52 The resettlement process involved a radical change in multiple respects (e.g., place of residence, housing, and income-producing activity). The challenge of this evaluation was to identify variables that, while observable, were not affected by the resettlement. Three variables were found that comply with this criterion for heads of household in each of the interviewed families: age, gender, and education. It is important to restrict the sample to heads of household because, for all other individuals, the likelihood that these three variables were affected by the resettlement is greater.⁸⁴ For example, it is likely for younger individuals to have studied more due to greater access to education in Villanueva. Furthermore, it is possible that, as a result of the greater access to schools and the characteristics of the new housing, families decided to have more children or bring other relatives into their homes, thus impacting the average age of the sample. However, there do not appear to be substantial differences in age and education among heads of household in both groups, since these variables were not affected by the resettlement. Lastly, there is no direct reason why the program could affect the gender variable for heads of household.

- 2.53 Using matching techniques, we isolated the resettlement's effect on the following variables: (i) previous month's income; (ii) previous month's expenses; (iii) previous month's net worth; (iv) wellbeing index; and (v) health index.⁸⁵

⁸² Corporación Futuro Para la Niñez, 2002. Monitoreo de la componente socioeconómica de las comunidades de influencia de la Central Porce II, Villanueva, Guayana, Guyabito, El Encanto, Vega Botero [Monitoring of the socioeconomic component of the communities in the area of influence of the Porce II Hydroelectric Plant: Villanueva, Guayana, Guyabito, El Encanto, Vega Botero] Medellín.

⁸³ This exercise is based on the 2008 EPM-IDB surveys of the population of El Brasil and the individuals resettled in Villanueva. The survey spanned a total of 70 families in Villanueva and 26 families in El Brasil, respectively amounting to 443 and 120 individuals. While there is information for other years, it could not be used in this evaluation because the relevant databases are not disaggregated by individual or family. Annex A shows the methodology used for the econometric estimates.

⁸⁴ Restricting the sample to heads of household yields a total of 96 observations, of which 27 are for the control group (El Brasil) and 69 for the treatment group (Villanueva).

⁸⁵ The wellbeing and health indicators were built as a weighted average of several dichotomous variables. See details in Annex A.

- 2.54 The matching results show evidence that the resettlement had a positive effect on food and total household spending, total net worth of head of household, and family wellbeing index variables. In the case of the latter two variables, the results are very significant. These variables attest to a substantial improvement in the quality of life of the resettled population with respect to the control population. On the other hand, no evidence was found of a positive resettlement impact on the income of heads of household. However, it is worth noting that the fact that the income levels of the heads of household were restored after the radical change in the population's productive activities should be considered as a positive impact of the resettlement process and the activities associated with the productive projects. Also, no evidence was found of any impact on the health index, which indicates that both communities are in a similar position with respect to these variables. In this regard, it is worth noting that public policy changes associated with the provision of ambulatory health care services and the deterioration of neighborhood health stations may have affected the absence of differences between the two populations, despite the existence of a health station in the resettlement.
- 2.55 In summary, the resettlement was successful in restoring the living standards of heads of household. In fact, there is no adverse impact for any of the analyzed variables, while evidence was found of an improvement in the spending, net worth and wellbeing variables. All the results are robust to the type of algorithm used to estimate the matching.

III. CONCLUSIONS AND RECOMMENDATIONS

A. Main conclusions of the study findings

- 3.1 The methodology used for this study—a comparative analysis of the resettled population and a control population—makes it possible to assess the socioeconomic impact on communities affected by projects that involve involuntary resettlement. Thus, this study supplements EPM's 2005 ex post evaluation through a comprehensive analysis of the resettlement's long-term socioeconomic impact (10 years since the displacement of the population and 14 years since the establishment of the baseline) associated with trends in its spatial, demographic, economic, political/organizational and social capital dimensions.⁸⁶ However, it should be noted that the evaluation encompassed only the resettled community and did not, due to a lack of follow-up data, include the families that were compensated (through direct sale).⁸⁷ These results are consistent with the resettlement policy

⁸⁶ Since this study supplements previous studies conducted by EPM as part of the execution of the Porce II Project and the ex post evaluation, the details on the various stages of the resettlement process and its results are found in the aforementioned EPM publications.

⁸⁷ There was also no analysis of the resettlement's impact on the host population (all other corregimientos in the municipio of Yolombó where the resettled population was placed). It is worth underscoring the importance of the potential indirect impacts on this community, which can influence the quality of life of the resettled and non-resettled community as well as the economic and social integration processes in the region.

- guidelines established by the IDB and EPM for population displacement management.
- 3.2 Guideline 1. Restoration of the communities, whenever possible preserving their settlement patterns and family and neighborhood networks, improving their quality of life in terms of housing and community infrastructure, and public and social services (such as health and recreation).⁸⁸
- 3.3 The study's results regarding the spatial dimension in 2008 emphasize issues such as formalization of landholdings in the resettlement, housing quality improvement, and access to public and social services. In addition, the ethnographic workshops document the appropriation, use, and enjoyment of the home and its common areas, which provide a sense of belonging and rootedness in the place. There are also some positive trends in terms of the educational levels in the resettlement. The impact study results show significant improvement in family wellbeing in the resettled population as compared to the control group. The population structure shows a normal distribution, with a certain ageing tendency in the resettled population, which also appears to point to the resettlement's consolidation. Lastly, the workshops verified the resettled families' ability to adapt and coexist with groups outside their family networks and the trust that exists among the inhabitants, these being important elements in neighborhood relations and community life.
- Guideline 2: Restoration of the families' economic sustenance based on a shift of income-producing activities to other production sectors.
- 3.4 The economic dimension was the greatest challenge for a resettlement process that undertook to diversify the economic structure of the original populations, almost exclusively engaged in mining and, to a lesser extent, in agriculture and cattle farming. The 2008 study corroborates the change in economic focus among the resettled families and the strengthening of their ability to carry out other activities. The study findings show a significant change in the relative weight of economic activity sectors, from concentration in the primary sector to diversification into the secondary and tertiary sectors. The occupational structure is also diversified and reflects this economic structure, although levels of informal activities and unemployment begin to appear.⁸⁹ In addition, while the impact assessment shows significant improvements in net worth and family spending, the impact on income has not been significant. In other words, the socioeconomic variables were successfully restored but the income variable did not improve.

⁸⁸ EPM, 2004. Evaluación ambiental ex post: Desarrollo Hidroeléctrico Porce II [Ex-post environmental evaluation: Porce II Hydroelectric Project].114 Medellín.

⁸⁹ The dynamics of the Villanueva population is no longer defined as relating to a strictly rural territory; instead, it acquires certain characteristics that place it between rural and urban, which is an important feature when examining the movement in economic indicators.

B. Methodological conclusions

3.5 Following are the main conclusions drawn from the various methods used in this study:

Quantitative and econometric method. The study underscores the relevance and effectiveness of quantitative and impact assessment methods (treated vs. control population) in evaluating resettlement processes and compliance with resettlement policies. These methods' contribution is increased when combined with various qualitative and quantitative methods, providing a more comprehensive overview of the long-term social impact associated with trends, social capital, development, and sustainability of the resettled populations. It is worth noting, however, that the limitations usually found in the local, regional, and national statistical data underscore the need to have high-quality disaggregated data in the resettlement management company's information system in order to be able to apply quantitative and econometric methods.

Ethnographic method and field work. The ethnographic method is an essential element in approaching and acquiring a deep knowledge of communities, particularly for this type of evaluation. The use of information gathering techniques such as direct observation, workshops, open interviews, surveys, meetings, and group discussions with various community groups and their leaders provides the possibility of enriching the study through direct interaction between consultants and the community. Building a fluid relationship based on respect and trust makes it possible to obtain objective and reliable information and thus improve data analysis, interpretations, and integration of qualitative and quantitative results.

Interagency cooperation. The study was conducted on a participatory work basis, with a multidisciplinary and interinstitutional team (EPM-IDB) and with the participation of local consultants. Despite acknowledging the challenge of involving the executing agency in the design and interpretation of the resettlement's social impact evaluation results, the institutional lessons were valued positively. Moreover, the involvement of OVE as an independent IDB agency furthers objectivity and credibility.

Social capital. While this issue could not be treated in depth in the study, its importance for these processes is worth noting, as is the need to develop methodologies to measure the impact of resettlement processes on this type of variables.

C. Success factors in population resettlement processes

3.6 This study provides conceptual and methodological elements that embody best practices and objectively contribute to the international controversy on the issue of population displacement due to large infrastructure projects. Its dissemination would be intended, firstly, to raise the awareness of companies and institutions regarding best practices and, secondly, to contribute to the narrow bibliography on ex post evaluations of the long-term impacts of completed dam projects. This study

becomes a valid resource for progress on good practices associated with managing the impact of displacement and providing resettlement options for the affected populations.

3.7 An impact evaluation of the resettlement arising from the Porce II Hydroelectric Project points to the success factors in population resettlement processes:

- Importance of conducting vulnerability studies to design options for the affected population, providing for community participation throughout the process. Likewise, keeping information systems aimed at facilitating comprehensive follow-up of the treatment population with resettlement and/or economic compensation policies. Ensuring the consistency of generated information to make it possible to evaluate the resettlement's impact. In short, integrating the planning, execution, evaluation, and resettlement policy adjustment process.
- Integrating qualitative and quantitative analysis methods with econometric techniques to ensure reliable results in policy impact evaluations. In this regard, information on a control population, whose selection should be justifiable based on its characteristics, should be included as of the baseline.
- A commitment by the government and its institutions at their various levels, as well as by all other entities involved, is a critical factor for the sustainability of resettlement processes associated with large development projects. Thus, a gradual takeover by the authorities of the follow-up activities initiated by the company is essential for ensuring the resettlement's sustainability.

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ANNEXES

A. DESCRIPTION OF THE FORMULATION OF THE ECONOMETRIC MODEL AND ESTIMATORS

Correct identification of the resettlement's impact requires identifying the average effect of the resettlement on the resettled population. This is defined as the difference between the result variables for the resettled individuals and their counterfactual (i.e., the result for the same individuals had they not been resettled). Thus, if Y is the result variable and D is a dichotomous variable that takes a value of 1 for the resettled individuals and 0 for the others, the average effect of the resettlement on those resettled would be:

$$(1) \quad R_{ATT} = E[Y(1)/D=1] - E[Y(0)/D=1]$$

However, since the counterfactual ($E[Y(0)/D=1]$) is unobserved, a substitute must be selected to estimate R_{ATT} . Using as a substitute the average result for Y for individuals that were not resettled would create a bias in the case in which the variables that affected the individual's being resettled also affected Y . To clarify this idea, the average result for the non-resettled individuals should be added to the above expression in (1), yielding:

$$(2) \quad R_{ATT} = \{E[Y(1)/D=1] - E[Y(0)/D=0]\} + \{E[Y(1)/D=1] - E[Y(0)/D=0]\}$$

In this expression, $E[Y(1)/D=1] - E[Y(0)/D=0]$ represents the selection bias, which will be equal to zero if the resettlement affected the individuals on a random basis. In this resettlement, this is clearly not the case since the intention was to affect individuals concentrated in a certain geographical area. Thus, identification assumptions are needed in order to evaluate the impact of the resettlement.

Since only ex post information is available for conducting the evaluation, this analysis uses score-matching methodology to identify the resettlement's impact on the income and quality of life of the resettled individuals. This exercise runs into complications for two reasons: (i) the low number of available observations; and (ii) the nonexistence of a baseline with disaggregated data for purposes of correctly identifying the problem. Thus, although the best possible methodology was used based on the available data, the results may be sensitive to the low number of observations. The methodology is based on a conditional independence assumption, which indicates that given an X group of observable variables that are not affected by the resettlement, results for Y will be independent of the treatment allocation:

$$(3) \quad Y(0), Y(1) \perp D / X \quad \forall X$$

As indicated by Caliendo and Kopeing (2005), if X is independent of the results, then the probability of receiving treatment conditional on X (pscore) will have the same property. Thus, if the conditional independence assumption is met, the average effect of the

treatment on those treated may be identified as the difference in means of the result variables weighted by the pscore:

$$(4) \quad R_{ATT}^{PSM} = E_{P(X)/D=1} \{E[Y(1)/D = 1, P(X)] - E[Y(0)/D = 0, P(X)]\}$$

A probit was estimated for the probability of having been resettled as a function of age, gender, and education. Table 2 shows the results of the estimate:

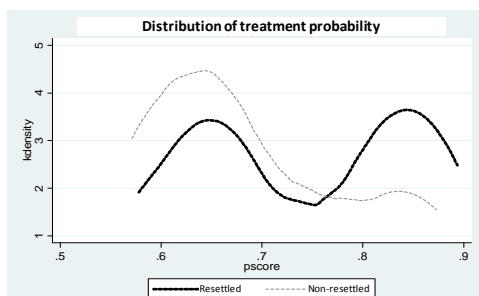
Table 2
Pscore Estimate

Dependent variable: Resettled (=1 if resettled)						
Independent variables	Coefficient	Est. error	z	P>[z]	95% Confidence interval	
Age	0.0087331	0.0133452	0.65	0.513	-0.017423	0.0348892
Gender	-0.6206452	0.3040506	-2.04	0.041	-1.216573	-0.0247169
Education	0.0082391	0.0744931	0.11	0.912	-0.1377648	0.154243
Constant	0.5491451	0.865331	0.63	0.526	-1.146872	2.245163
Observations				92		
Pseudo R2				0.042		

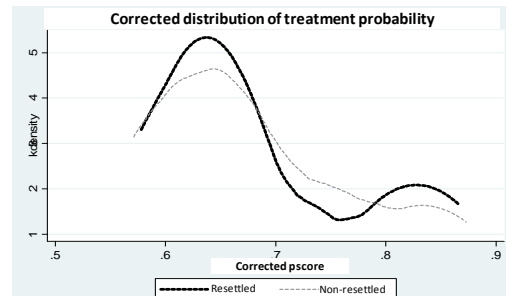
Source: Developed internally.

The pscore for each of the groups (resettled and non-resettled) is shown in Figure 9. Since not all heads of family answered the questions designed to assess the impact of the resettlement, panel A shows the distribution for all observations, and panel B for individuals who possess available information and are part of the sample’s common support (i.e., who have a probability greater than zero of being in the treatment and control group).

Figure 9. Distribution of the probability of having been resettled for household heads



Note: The sample includes 27 non-resettled, and 69 resettled individuals. Authors’ calculations.



Note: The figure shows only individuals for whom income information is available: 24 control and 38 resettled. Authors’ calculations.

Source: Developed internally.

Matching techniques were used to isolate the resettlement effect on the following variables: (i) previous month’s income; (ii) previous month’s expenses; (iii) previous month’s net worth value; (iv) wellbeing index; (v) health index. The latter two indicators were built as the weighted average of the dichotomous variables listed in Table 3. The weightings were built on the basis of the factors of the first main component of each

group of variables. Specifically, for the first main component of each group of variables, each of the vector factors was divided by the standard deviation for each variable. The result of this division is the weighting factor associated with each variable when building the final index. Subsequently, to ensure that the weightings would add up to one, this number was divided by the sum of the weightings. It should be noted that higher values for the wellbeing or health indices indicate that the individual faced greater inconveniences, and vice versa (Table 4).

Table 3. Variables used to build the wellbeing and health indices

Wellbeing index	Health index
Has piped water system (=1 if does not have)	Contracted urinary tract infections over the past 3 months (=1 if it occurred)
Has sewerage (=1 if does not have)	Suffered from hypertension over the past 3 months (=1 if it occurred)
Water treatment exists (=1 if does not exist)	Suffered from diarrhea over the past 3 months (=1 if it occurred)
Fixed telephone (=1 if does not have)	Suffered from ARI over the past 3 months (=1 if it occurred)
Mobile telephone (=1 if does not have)	Contracted the flu over the past 3 months (=1 if it occurred)
Refrigerator (=1 if does not have)	
Washer (=1 if does not have)	
Oven (=1 if does not have)	
Fan (=1 if does not have)	

Source: Developed internally.

Table 4. Score Matching Estimates

I. Income		Observations (common support)		Mean		Diference	E.S.	T-Estat
	Resettled	Nonresettled	Resettled	Nonresettled	(Resettled - Nonresettled)			
Income (nearest 1 neighbour)	38	24	528657.9	456105.3	72552.63		135978.18	0.53
Income (nearest 2 neighbour)	38	24	528657.9	545388.2	-16730.26		125537.18	-0.13
Income (nearest 3 neighbour)	38	24	528657.9	561929.8	-33271.93		121472.22	-0.27
Income radius	38	24	528657.895	471979.167	56678.7		87174.8	0.65
Income kernel	38	24	528657.9	492108.9	36549.03		111481.13	0.33

Note: * significant to 10%; ** significant to 5%; and *** significant to 1%.

II. Expenditure		Observations (common support)		Mean		Diference	E.S.	T-Estat
	Resettled	Nonresettled	Resettled	Nonresettled	(Resettled - Nonresettled)			
Expenditure (nearest 1 neighbour)	38	24	566348.9	367733.3	198615.56		112441.16	1.77*
Expenditure (nearest 2 neighbour)	38	24	575015.9	405295.5	169720.46		103600.54	1.64*
Expenditure (nearest 3 neighbour)	38	24	575015.9	432113.6	142902.27		101304.28	1.41
Expenditure radius	38	24	575015.909	404150	170865.9		82703.3	2.07**
Income kernel	38	24	575015.9	404254.6	170761.31		97150.98	1.76*

Note: * significant to 10%; ** significant to 5%; and *** significant to 1%.

III. Net worth		Observations (common support)		Mean		Diference	E.S.	T-Estat
	Resettled	Nonresettled	Resettled	Nonresettled	(Resettled - Nonresettled)			
Net worth (nearest 1 neighbour)	38	24	56426315.4	7203157.9	49223157.50		16835171.00	2.92***
Net worth (nearest 2 neighbour)	38	24	56426315.4	10408421.1	46017894.30		16700063.80	2.76***
Net worth (nearest 3 neighbour)	38	24	56426315.4	12173508.8	44252806.60		16688701.50	2.65***
Net worth radius	38	24	56426315.4	12316000	44110315.4		16480186.1	2.68***
Net worth kernel	38	24	56426315.4	12356846.6	44069468.80		16619218.80	2.65***

Note: * significant to 10%; ** significant to 5%; and *** significant to 1%.

IV. Wellbeing index		Observations (common support)		Mean		Diference	E.S.	T-Estat
	Resettled	Nonresettled	Resettled	Nonresettled	(Resettled - Nonresettled)			
I.B. (nearest 1 neighbour)	62	25	0.3	0.7	-0.42		0.08	-5***
I.B. (nearest 2 neighbour)	62	25	0.3	0.7	-0.39		0.08	-4.93***
I.B. (nearest 3 neighbour)	62	25	0.3	0.8	-0.43		0.08	-5.56***
I.B. radius	62	25	0.32	0.75	-0.4		0.0	-13.45***
I.B. kernel	62	25	0.3	0.7	-0.42		0.07	-5.88***

Note: * significant to 10%; ** significant to 5%; and *** significant to 1%.

V. Heath index		Observations (common support)		Mean		Diference	E.S.	T-Estat
	Resettled	Nonresettled	Resettled	Nonresettled	(Resettled - Nonresettled)			
I.S. (nearest 1 neighbour)	62	25	0.1	0.1	0.03		0.05	0.5
I.S. (nearest 2 neighbour)	62	25	0.1	0.1	0.04		0.05	0.66
I.S. (nearest 3 neighbour)	62	25	0.1	0.1	0.04		0.05	0.68
I.S. radius	62	25	0.1	0.1	0.05		0.03	1.52
I.S. kernel	62	25	0.1	0.05	0.06		0.05	1.11

Note: * significant to 10%; ** significant to 5%; and *** significant to 1%.

Source: Developed internally.

B. INFORMATION GATHERING TOOLS

To analyze the impact of the resettlement on certain socioeconomic indicators for the populations of Villanueva and El Brasil, OVE and EPM jointly used primary and secondary information sources.

1. Primary information

Three data collection tools were prepared: a socioeconomic datasheet for each family, an infrastructure and services form for each community, and an institutional capacity form for each sector. To implement these tools, the 10 questionnaires comprising the SIEMSEC Economic, Social, and Cultural Information System were used as an input and adapted to the impact assessment's needs. In addition, categories such as vulnerability,

sustainability, and social capital⁹⁰ were included on the basis of a bibliographical review.⁹¹

a. Family socioeconomic datasheet

This socioeconomic datasheet primarily includes basic information on the head of household, family composition, finances and net worth, and housing and basic infrastructure.⁹² This data is collected through a structured questionnaire and ethnographic interview. The specific variables are described below:

Family composition: includes family type, number of individuals per family, and distribution by gender, age, occupation, monthly income, education level, family's length of time in the community, and migratory movements of the nuclear family members.

Finances-net worth: includes ownership, size, and principal uses of productive land, status of productive projects of those resettled, and total family income and expenditure. The family's net worth (home, furniture and household goods, land, vehicle, jewelry, investments, etc.) is also calculated.

Housing and basic infrastructure: includes home and land surface area, holdings and type of housing, spaces and services, water consumption habits and source preservation, use of other energy sources, general state of home maintenance, expansion and improvement investments over the previous five years, condition of the home, and use of the assigned resettlement housing.

b. Infrastructure, services, and social capital form

The community questionnaire was designed to measure social capital and targeted a sample of civil society organizations for each of the two populations. Data collection at the community level was achieved through focus groups with community leaders. Information was gleaned on the condition and use of various recreational and cultural spaces (soccer field, multisport facilities, multipurpose hall, and children's playground), as well as other infrastructure such as chapels, commercial spaces, police station, etc. This questionnaire also included information on the types of economic and social development institutions and programs being implemented by the municipal authorities, as well as on other private entities present in the communities, the number of

⁹⁰ Includes concepts such as sustainable human development, endogenous local development, corporate social responsibility (CSR), comprehensive resettlement, commitments to the Global Compact and Millennium Development Goals, institutionalization, and globalization.

⁹¹ Cernea, 2000 on risks of impoverishment of displaced populations; Wescoat, 1999 on ex post evaluation of dams and water projects for the World Commission on Dams; Scudder, 1997 on social impacts of large dam projects; Correa, 1997 on socioeconomic impacts of large projects; Phadke, 1999 on bibliography of dams, displacement and reconstruction of communities; World Bank, 2003 on social capital measurement through comprehensive surveys.

⁹² Two sections on education and training (abilities and skills developed by family group members) and health (frequent diseases and places where medical attention is sought) were initially included. It was finally decided to separate these issues and explore them directly through a questionnaire aimed at institutions such as educational centers, health care centers, and hospitals (see Institutional tools).

beneficiaries serviced, and their level of satisfaction. On the issue of citizen safety and security, it included questions on the types and causes of conflicts in the community and their means of resolution, as well as on the inhabitants' perceptions of safety and security in the community. Lastly, it included questions on the community members' level of participation in social and community organizations, institutions offering technical and/or financial support to community organizations, trust and solidarity among community members, and information and communication channels.

c. Institutional capacity form

Health care centers. The health questionnaire focused on collecting information on the type of health care services requested and frequent diseases, as well as on changes in the community's health levels over the previous five years and its morbidity and mortality rates. Specifically, a tool was designed to obtain the following information: name of the institution, location, type of institution within the health care system, availability of medical and paramedical personnel, type of service requested, frequent treatments, referrals to other levels of care, deaths, changes in the health of the community, etc. The questionnaire targeted the responsible official at the health station in the resettled community (Villanueva), and the municipal administrations of Yolombó and Gómez Plata for supplementary information purposes.

Educational centers. The education questionnaire consisted of questions on the location of the educational institution, the education levels offered in each community, availability of teachers, number of classrooms, student enrollment, students from the community, students from adjacent veredas, number of teachers, student/teacher ratio, retention and dropout rates, and state of the infrastructure. The questionnaire targeted the principals of the educational institutions in the form of an interview-survey.

2. Secondary information

The project's administrative data (SIEMSEC) were examined along with the ex post evaluation conducted by EPM (2004) and other EPM corporate management reports. Other information reviewed includes SISBEN data,⁹³ area studies (degree theses), and municipal, departmental and national statistics.

⁹³ Data from the Quality of Life and Impact of Social Programs Group, Colombian Social Development Office. SISBEN (Sistema de Identificación de Potenciales Beneficiarios de Programas Sociales) [System for Identifying Potential Beneficiaries of Social Programs].

C. CHANGES IN VILLANUEVA 1994 – 2001 – 2008

Table 5. Changes in Villanueva 1994 – 2001 – 2008

	1994		2001		2008	
	Number	%	Number	%	Number	%
FAMILY						
TOTAL INDIVIDUALS	427		493		356	
TOTAL FAMILIES	119		119		70	
NUCLEAR FAMILIES	93	78.15%	80	67.23%	36	51.43%
SINGLE-PARENT MOTHER					10	14.29%
SINGLE-PARENT FATHER					2	2.86%
BOTH PARENTS					24	34.29%
EXPANDED FAMILIES					0	0.00%
EXTENDED FAMILIES	26	21.85%	39	32.77%	31	44.29%
OTHER FAMILIES	0	0.00%	0	0.00%	3	4.29%
ASSIGNED RESETTLEMENT HOUSING						
ASSIGNED RESETTLEMENT HOUSING			119	100.00%	69	98.57%
NONASSIGNED RESETTLEMENT HOUSING			0	0.00%	1	1.43%
FATE OF ASSIGNED RESETTLEMENT HOUSING						
NEVER ARRIVED AT RESETTLEMENT			13	10.92%	13	10.92%
SOLD			0	0.00%	11	9.24%
LEASED			0	0.00%	12	10.08%
GIFTED			0	0.00%	1	0.84%
LENT			0	0.00%	9	7.56%
KEPT AND INHABITED			106	89.08%	73	61.34%
HOUSING OCCUPANCY						
OWNER-OCCUPIED DWELLINGS	2	1.68%	106	89.08%	70	100.00%
TENANT-OCCUPIED DWELLINGS	0	0.00%	13	10.92%	0	0.00%
OCCUPIED DWELLINGS-POSSESSION	117	98.32%	0	0.00%	0	0.00%
OCCUPIED DWELLINGS-LOAN	0	0.00%	0	0.00%	0	0.00%
TYPE OF DWELLING						
HOUSE	42	35.29%	119	100.00%	70	100.00%
SHACK	46	38.66%	0	0.00%	0	0.00%
HUT	31	26.05%	0	0.00%	0	0.00%
USE OF DWELLING						
RESIDENTIAL	119	100.00%	119	100.00%	70	269.23%
COMMERCIAL	0	0.00%	0	0.00%	0	0.00%
OCCUPANCY STATUS						
OCCUPIED	119	100.00%	119	100.00%	70	100.00%
UNOCCUPIED	0	0.00%	0	0.00%	0	0.00%

	1994		2001		2008	
	Number	%	Number	%	Number	%
CONSTRUCTION FEATURES						
CONCRETE BLOCK-ADOBE WALLS	42	35.29%	119	100.00%	70	100.00%
RAMMED EARTH WALLS		0.00%	0	0.00%	0	0.00%
WOODEN WALLS	40	33.61%	0	0.00%	0	0.00%
CARDBOARD-PLASTIC WALLS	37	31.09%	0	0.00%	0	0.00%
WATTLE AND DAUB-BAMBOO-RATTAN WALLS			0	0.00%	0	0.00%
TILE FLOORS			119	100.00%	70	100.00%
CEMENT FLOORS	42	35.29%	0	0.00%	0	0.00%
WOOD FLOORS	40	33.61%	0	0.00%	0	0.00%
EARTHEN FLOORS	37	31.09%	0	0.00%	0	0.00%
MUD-TILE ROOFS	42	35.29%	119	100.00%	68	97.14%
ZINC ROOFS	40	33.61%	0	0.00%	1	1.43%
STRAW ROOFS			0	0.00%	0	0.00%
ASBESTOS ROOFS			0	0.00%	1	1.43%
CARDBOARD AND PLASTIC ROOFS	37	31.09%	0	0.00%	0	0.00%
MASONRY STRUCTURE			119	100.00%	70	100.00%
VAULTED STRUCTURE			0	0.00%	0	0.00%
WOOD STRUCTURE			0	0.00%	0	0.00%
METAL STRUCTURE			0	0.00%	0	0.00%
STRATIFICATION						
STRATUM					3	4.29%
STRATUM 2					67	95.71%
STRATUM 3					0	0.00%
PROPERTY TAX						
PAYMENT OF PROPERTY TAX					67	95.71%
NONPAYMENT OF PROPERTY TAX					3	4.29%
HOUSING INDICES						
BUILT HOME AREA (SQ. METERS)					77.66	
BUILT HOME AREA (SQ. METERS) PER PERSON					15.27	
PERSONS PER DWELLING	3.59		4.14		5.09	
BEDROOMS PER DWELLING	1.5		3.3		3.30	
PERSONS PER BEDROOM	2.39		1.26		1.54	
BATHROOMS PER DWELLING	0.24		1.04		1.04	
PERSONS PER BATHROOM	14.7		3.98		4.88	
SHOWERS PER DWELLING	0.11		1.01		1.01	
PERSONS PER SHOWER	32.8		4.10		5.01	

	1994		2001		2008	
	Number	%	Number	%	Number	%
WATER SOURCES						
DWELLINGS WITH PIPED WATER	0	0.00%	119	100.00%	70	100.00%
ARTISANAL SUPPLY	23	19.33%	0	0.00%	0	0.00%
HOSE-FED DWELLINGS	94	78.99%	0	0.00%	0	0.00%
CANYON-FED DWELLINGS	2	1.68%	0	0.00%	0	0.00%
WELL-FED DWELLINGS	0	0.00%	0	0.00%	0	0.00%
HUMAN WASTE DISPOSAL						
SEWERAGE	21	17.65%	119	100.00%	70	100.00%
SEPTIC TANK	1	0.84%	0	0.00%	0	0.00%
OPEN FIELD	90	75.63%	0	0.00%	0	0.00%
WATER SOURCES	7	5.88%	0	0.00%	0	0.00%
LATRINE	0	0.00%	0	0.00%	0	0.00%
ENERGY SOURCES						
DWELLINGS WITH ELECTRICITY	43	36.13%	119	100.00%	70	100.00%
DWELLINGS USING GAS	0	0.00%	102	85.71%	68	97.14%
DWELLINGS USING FIREWOOD	76	63.87%	17	14.29%	25	35.71%
DWELLINGS USING COAL	0	0.00%	0	0.00%	1	1.43%
DWELLINGS USING OTHER SOURCES	0	0.00%	0	0.00%	0	0.00%
TELEPHONY						
DWELLINGS WITH FIXED TELEPHONE	0	0.00%			10	14.29%
DWELLINGS WITH MOBILE PHONE	0	0.00%			36	51.43%
FINAL SOLID WASTE DISPOSAL						
WASTE SEPARATION	0	0.00%	119	100.00%	70	100.00%
BURIED	0	0.00%	0	0.00%	0	0.00%
SANITARY LANDFILL	0	0.00%	0	0.00%	0	0.00%
RECYCLING	0	0.00%	0	0.00%	0	0.00%
BURNED	51	42.86%	0	0.00%	0	0.00%
OPEN FIELD	61	51.26%	0	0.00%	0	0.00%
WATER SOURCES	7	5.88%				
SPACES AND INCLUSION PER DWELLING						
LIVING ROOM	37		119		70	
DINING ROOM	7		119		70	
KITCHEN	108		119		75	
PATIO	71		119		71	
CIRCULATION SPACES AND FAMILY ROOM			119		107	
DEMOGRAPHICS						
INHABITANTS	427	100.00%	493	100.00%	356	100.00%
MALES	256	59.95%	266	53.96%	166	46.63%

	1994		2001		2008	
	Number	%	Number	%	Number	%
FEMALES	171	40.05%	227	46.04%	190	53.37%
PERSONS UNDER 15 YEARS OF AGE	173	40.52%	203	41.18%	124	34.83%
GIRLS UNDER 15 YEARS OF AGE		0.00%		0.00%	63	17.70%
BOYS UNDER 15 YEARS OF AGE		0.00%		0.00%	61	17.13%
PERSONS AGED 15 TO 45	205	48.01%	234	47.46%	169	47.47%
PERSONS AGED 15 TO 25		0.00%		0.00%	73	20.51%
FEMALES AGED 15 TO 25		0.00%		0.00%	37	10.39%
MALES AGED 15 TO 25		0.00%		0.00%	36	10.11%
PERSONS AGED 25 TO 35		0.00%		0.00%	50	14.04%
FEMALES AGED 25 TO 35		0.00%		0.00%	33	9.27%
MALES AGED 25 TO 35		0.00%		0.00%	17	4.78%
PERSONS AGED 35 TO 45		0.00%		0.00%	46	12.92%
FEMALES AGED 35 TO 45		0.00%		0.00%	23	6.46%
MALES AGED 35 TO 45		0.00%		0.00%	23	6.46%
PERSONS OLDER THAN 45	49	11.48%	56	11.36%	63	17.70%
PERSONS AGED 45 TO 60		0.00%		0.00%	29	8.15%
FEMALES AGED 45 TO 60		0.00%		0.00%	16	4.49%
MALES AGED 45 TO 60		0.00%		0.00%	13	3.65%
PERSONS OLDER THAN 60		0.00%		0.00%	34	9.55%
FEMALES OLDER THAN 60		0.00%		0.00%	18	5.06%
MALES OLDER THAN 60		0.00%		0.00%	16	4.49%
AVERAGE AGE (years)					26.4	
EDUCATION						
INCOMPLETE PRIMARY	177	41.45%	193	39.15%	106	29.78%
COMPLETE PRIMARY	79	18.50%	91	18.46%	56	15.73%
INCOMPLETE SECONDARY	25	5.85%	55	11.16%	78	21.91%
COMPLETE SECONDARY	14	3.28%	20	4.06%	27	7.58%
INCOMPLETE HIGHER	0	0.00%	2	0.41%	1	0.28%
COMPLETE HIGHER	0	0.00%	0	0.00%	7	1.97%
SOME EDUCATION	295	69.09%	361	73.23%	275	77.25%
NO EDUCATION (ABOVE THE AGE OF 6)	47	11.01%	20	4.06%	40	11.24%
AVERAGE YEARS OF EDUCATION					4.30	
TOTAL YEARS OF EDUCATION					1,530	
SOCIAL SECURITY						
CONTRIBUTORY					77	21.63%
SUBSIDIZED					189	53.09%
CONTRIBUTORY AND SUBSIDIZED		8.40%		48.74%	266	74.72%
SISBEN		0.00%		51.26%	76	21.35%

	1994		2001		2008	
	Number	%	Number	%	Number	%
NO SOCIAL SECURITY		91.60%		0.00%	14	3.93%
ECONOMY						
OCCUPATION						
LABORER	0	0.00%	38	14.18%	34	9.55%
EMPLOYEE	0	0.00%	24	8.96%	17	4.78%
SELF-EMPLOYED WORKER	250	93.28%	184	68.66%	52	14.61%
BUSINESSMAN	0	0.00%	0	0.00%	2	0.56%
DOMESTIC WORKER	0	0.00%	0	0.00%	0	0.00%
DAY LABORER	18	6.72%	22	8.21%	6	1.69%
STUDENT	0	0.00%	0	0.00%	103	28.93%
HOUSEWIFE	0	0.00%	0	0.00%	49	13.76%
UNEMPLOYED	0	0.00%	0	0.00%	23	6.46%
NO OCCUPATION	0	0.00%	0	0.00%	68	19.10%
MILITARY SERVICE	0	0.00%	0	0.00%	2	0.56%
WORKING-AGE POPULATION					281	78.93%
ECONOMICALLY ACTIVE POPULATION	268	100.00%	268	100.00%	134	37.64%
ECONOMICALLY INACTIVE POPULATION	0	0.00%	0	0.00%	147	41.29%
OCCUPATION	268	100.00%	268	100.00%	111	31.18%
UNDEREMPLOYMENT	0	0.00%	0	0.00%	41	11.52%
OCCUPATIONAL RATE		100.00%		100.00%		39.50%
UNEMPLOYMENT RATE		0.00%		0.00%		17.16%
UNDEREMPLOYMENT RATE		0.00%		0.00%		36.94%
GLOBAL PARTICIPATION RATE						47.69%
ECONOMIC ACTIVITIES						
COMMUNAL AND SOCIAL SERVICES	0	0.00%	24	8.96%	13	11.71%
REAL ESTATE	0	0.00%		0.00%	1	0.90%
TRANSPORTATION	0	0.00%	14	5.22%	4	3.60%
COMMERCE	10	3.73%	36	13.43%	17	15.32%
RESTAURANT AND HOTEL	0	0.00%		0.00%	3	2.70%
CONSTRUCTION	0	0.00%	38	14.18%	23	20.72%
AGRICULTURE	18	6.72%	33	12.31%	15	13.51%
FISHING	0	0.00%		0.00%	16	14.41%
CATTLE FARMING	0	0.00%		0.00%	2	1.80%
HUNTING	0	0.00%		0.00%	0	0.00%
FORESTRY	0	0.00%	22	8.21%	7	6.31%
MINING	240	89.55%	3	1.12%	5	4.50%
FINANCIAL BROKERAGE	0	0.00%			0	0.00%
MANUFACTURING	0	0.00%			5	4.50%

	1994		2001		2008	
	Number	%	Number	%	Number	%
ELECTRICITY, GAS AND WATER SUPPLY	0	0.00%			0	0.00%
Other (women's projects)	0	0.00%	98	36.57%	0	0.00%
INCOME						
MONTHLY INCOME PER CAPITA IN CURRENT VALUES					152.074	
DAILY INCOME PER CAPITA IN CURRENT VALUES					5.069	
DAILY INCOME PER CAPITA IN USD					2.34	
INCOME PER FAMILY IN CURRENT VALUES					773.407	
MONTHLY INCOME PER CAPITA IN SMMLV					0.33	
INCOME PER FAMILY IN SMMLV					1.68	
FAMILY INCOME BELOW 1 SMMLV	29	24.37%	29	24.37%	22	31.43%
FAMILY INCOME BETWEEN 1 AND 2 SMMLV	81	68.07%	43	36.13%	28	40.00%
FAMILY INCOME BETWEEN 2 AND 3 SMMLV	8	6.72%	36	30.25%	11	15.71%
FAMILY INCOME EXCEEDING 3 SMMLV	1	0.84%	11	9.24%	9	12.86%

Note: US\$1=2,163.00 Colombian pesos.

Source: Developed internally on the basis of the census and surveys.

D. VILLANUEVA – EL BRASIL COMPARATIVE ANALYSIS, 2008

Table 6. Villanueva – El Brasil comparative analysis, 2008

	VILLANUEVA		EL BRASIL	
	Number	%	Number	%
FAMILY TYPE				
NUMBER OF FAMILIES	70		26	
NUCLEAR FAMILIES	36	51.43%	16	61.54%
SINGLE-PARENT MOTHER	10	14.29%	2	7.69%
SINGLE-PARENT FATHER	2	2.86%	1	3.85%
BOTH PARENTS	24	34.29%	13	50.00%
EXPANDED FAMILIES	0	0.00%	0	0.00%
EXTENDED FAMILIES	31	44.29%	4	15.38%
OTHER FAMILIES	3	4.29%	6	23.08%
HOUSING				
ASSIGNED RESETTLEMENT HOUSING	69	98.57%	0	0.00%
NONASSIGNED RESETTLEMENT HOUSING	1	1.43%	26	100.00%
FATE OF ASSIGNED RESETTLEMENT HOUSING				
NEVER ARRIVED AT RESETTLEMENT	13	10.92%	0	0.00%
SOLD	11	9.24%	0	0.00%
LEASED	12	10.08%	0	0.00%
GIFTED	1	0.84%	0	0.00%
LENT	9	7.56%	0	0.00%
KEPT AND INHABITED	73	61.34%	0	0.00%
HOUSING OCCUPANCY				
OWNER-OCCUPIED DWELLINGS	70	100.00%	0	0.00%
TENANT-OCCUPIED DWELLINGS	0	0.00%	1	3.85%
INHABITED DWELLINGS-POSSESSION	0	0.00%	25	96.15%
INHABITED DWELLINGS-LOAN	0	0.00%	0	0.00%
TYPE OF DWELLING				
HOUSE	70	100.00%	17	65.38%
SHACK	0	0.00%	7	26.92%
HUT	0	0.00%	2	7.69%
USE OF DWELLING				
RESIDENTIAL	70	100.00%	26	100.00%
COMMERCIAL	0	0.00%	0	0.00%
OCCUPANCY STATUS				
OCCUPIED	70	100.00%	26	100.00%
UNOCCUPIED	0	0.00%		0.00%
CONSTRUCTION FEATURES				
CONCRETE BLOCK-ADOBE WALLS	70	100.00%	13	50.00%
RAMMED EARTH WALLS	0	0.00%	0	0.00%
WOODEN WALLS	0	0.00%	11	42.31%
CARDBOARD-PLASTIC WALLS	0	0.00%	0	0.00%

	VILLANUEVA		EL BRASIL	
	Number	%	Number	%
WATTLE AND DAUB-BAMBOO-RATTAN WALLS	0	0.00%	2	7.69%
TILE FLOORS	70	100.00%	2	7.69%
CEMENT FLOORS	0	0.00%	15	57.69%
WOOD FLOORS	0	0.00%	2	7.69%
EARTHEN FLOORS	0	0.00%	7	26.92%
MUD-TILE ROOFS	68	97.14%	1	3.85%
ZINC ROOFS	1	1.43%	17	65.38%
STRAW ROOFS	0	0.00%	1	3.85%
ASBESTOS ROOFS	1	1.43%	6	23.08%
CARDBOARD AND PLASTIC ROOFS	0	0.00%	1	3.85%
MASONRY STRUCTURE	70	100.00%	12	46.15%
VAULTED STRUCTURE	0	0.00%	0	0.00%
WOOD STRUCTURE	0	0.00%	14	53.85%
METAL STRUCTURE	0	0.00%	0	0.00%
STRATIFICATION				
STRATUM 1	3	4.29%	19	73.08%
STRATUM 2	67	95.71%	7	26.92%
STRATUM 3	0	0.00%	0	0.00%
PROPERTY TAX				
PAYMENT OF PROPERTY TAX	67	95.71%	11	42.31%
NONPAYMENT OF PROPERTY TAX	3	4.29%	15	57.69%
HOUSING INDICES				
BUILT HOME AREA (SQ. METERS)	77.66		57.85	
BUILT HOME AREA (SQ. METERS) PER PERSON	15.27		18.12	
PERSONS PER DWELLING	5.09		3.19	
BEDROOMS PER DWELLING	3.30		1.81	
PERSONS PER BEDROOM	1.54		1.77	
BATHROOMS PER DWELLING	1.04		0.81	
PERSONS PER BATHROOM	4.88		3.95	
SHOWERS PER DWELLING	1.01		0.81	
PERSONS PER SHOWER	5.01		3.95	
WATER SOURCES				
DWELLINGS WITH PIPED WATER	70	100.00%	0	0.00%
ARTISANAL SUPPLY	0	0.00%	26	100.00%
HOSE -FED DWELLINGS	0	0.00%	0	0.00%
CANYON-FED DWELLINGS	0	0.00%	0	0.00%
WELL-FED DWELLINGS	0	0.00%	0	0.00%
HUMAN WASTE DISPOSAL				
SEWERAGE	70	100.00%	0	0.00%
SEPTIC TANK	0	0.00%	2	7.69%
OPEN FIELD	0	0.00%	8	30.77%
WATER SOURCES	0	0.00%	6	23.08%
LATRINE	0	0.00%	10	38.46%

	VILLANUEVA		EL BRASIL	
	Number	%	Number	%
ENERGY SOURCES				
DWELLINGS WITH ELECTRICITY	70	100.00%	24	92.31%
DWELLINGS USING GAS	68	97.14%	20	76.92%
DWELLINGS USING FIREWOOD	25	35.71%	16	61.54%
DWELLINGS USING COAL	1	1.43%	0	0.00%
DWELLINGS USING OTHER SOURCES	0	0.00%	0	0.00%
TELEPHONY				
DWELLINGS WITH FIXED TELEPHONE	10	14.29%	1	3.85%
DWELLINGS WITH MOBILE PHONE	36	51.43%	16	61.54%
FINAL SOLID WASTE DISPOSAL				
WASTE SEPARATION	70	100.00%	1	3.85%
BURIED	0	0.00%	0	0.00%
LANDFILL	0	0.00%	0	0.00%
RECYCLING	0	0.00%	0	0.00%
BURNED	0	0.00%	16	61.54%
OPEN FIELD	0	0.00%	9	34.62%
SPACES AND INCLUSION PER DWELLING				
LIVING ROOM	70		9	
DINING ROOM	70		6	
KITCHEN	75		26	
PATIO	71		11	
CIRCULATION SPACES AND FAMILY ROOM	107		18	
DEMOGRAPHICS				
INHABITANTS	356	100.00%	83	100.00%
MALES	166	46.63%	44	53.01%
FEMALES	190	53.37%	39	46.99%
PERSONS UNDER 15 YEARS OF AGE	124	34.83%	24	28.92%
GIRLS UNDER 15 YEARS OF AGE	63	17.70%	11	13.25%
BOYS UNDER 15 YEARS OF AGE	61	17.13%	13	15.66%
PERSONS AGED 15 TO 25	73	20.51%	19	22.89%
FEMALES AGED 15 TO 25	37	10.39%	10	12.05%
MALES AGED 15 TO 25	36	10.11%	9	10.84%
PERSONS AGED 25 TO 35	50	14.04%	10	12.05%
FEMALES AGED 25 TO 35	33	9.27%	6	7.23%
MALES AGED 25 TO 35	17	4.78%	4	4.82%
PERSONS AGED 35 TO 45	46	12.92%	13	15.66%
FEMALES AGED 35 TO 45	23	6.46%	6	7.23%
MALES AGED 35 TO 45	23	6.46%	7	8.43%
PERSONS AGED 45 TO 60	29	8.15%	9	10.84%
FEMALES AGED 45 TO 60	16	4.49%	4	4.82%
MALES AGED 45 TO 60	13	3.65%	5	6.02%
PERSONS OLDER THAN 60	34	9.55%	8	9.64%
FEMALES OLDER THAN 60	18	5.06%	2	2.41%

	VILLANUEVA		EL BRASIL	
	Number	%	Number	%
MALES OLDER THAN 60	16	4.49%	6	7.23%
AVERAGE AGE (years)	26.4		28.3	
EDUCATION				
INCOMPLETE PRIMARY	106	33.65%	27	37.50%
COMPLETE PRIMARY	56	17.78%	16	22.22%
INCOMPLETE SECONDARY	78	24.76%	13	18.06%
COMPLETE SECONDARY	27	8.57%	7	9.72%
INCOMPLETE HIGHER	1	0.32%	0	0.00%
COMPLETE HIGHER	7	2.22%	0	0.00%
SOME EDUCATION	275	87.30%	63	87.50%
NO EDUCATION (ABOVE THE AGE OF 6)	40	12.70%	9	12.50%
AVERAGE YEARS OF EDUCATION	4.30		3,77	
TOTAL YEARS OF EDUCATION	1,530		313	
SOCIAL SECURITY				
CONTRIBUTORY	77	21.63%	18	21.69%
SUBSIDIZED	189	53.09%	41	49.40%
SISBEN	76	21.35%	17	20.48%
NO SOCIAL SECURITY	14	3.93%	7	8.43%
ECONOMY				
OCCUPATION				
LABORER	34	9.55%	8	9.64%
EMPLOYEE	17	4.78%	2	2.41%
SELF-EMPLOYED WORKER	52	14.61%	28	33.73%
BUSINESSMAN	2	0.56%	0	0.00%
DOMESTIC WORKER	0	0.00%	0	0.00%
DAY LABORER	6	1.69%	2	2.41%
STUDENT	103	28.93%	17	20.48%
HOUSEWIFE	49	13.76%	10	12.05%
UNEMPLOYED	23	6.46%	1	1.20%
NO OCCUPATION	68	19.10%	15	18.07%
MILITARY SERVICE	2	0.56%	0	0.00%
WORKING-AGE POPULATION	281	78.93%	67	80.72%
ECONOMICALLY ACTIVE POPULATION	134	37.64%	42	50.60%
ECONOMICALLY INACTIVE POPULATION	147	41.29%	25	30.12%
OCCUPATION	111	31.18%	41	49.40%
UNDEREMPLOYMENT	41	11.52%	17	20.48%
OCCUPATIONAL RATE		39.5%		61.2%
UNEMPLOYMENT RATE		17.2%		2.4%
UNDEREMPLOYMENT RATE		36.9%		41.5%
GLOBAL PARTICIPATION RATE		47.7%		62.7%
ECONOMIC ACTIVITIES				
COMMUNAL AND SOCIAL SERVICES	13	11.71%	2	4.88%
REAL ESTATE	1	0.90%	0	0.00%

	VILLANUEVA		EL BRASIL	
	Number	%	Number	%
TRANSPORTATION	4	3.60%	0	0.00%
COMMERCE	17	15.32%	2	4.88%
RESTAURANT AND HOTEL	3	2.70%	2	4.88%
CONSTRUCTION	23	20.72%	4	9.76%
AGRICULTURE	15	13.51%	13	31.71%
FISHING	16	14.41%	1	2.44%
CATTLE FARMING	2	1.80%	4	9.76%
HUNTING	0	0.00%	0	0.00%
FORESTRY	7	6.31%	2	4.88%
MINING	5	4.50%	11	26.83%
FINANCIAL BROKERAGE	0	0.00%	0	0.00%
MANUFACTURING	5	4.50%	0	0.00%
ELECTRICITY, GAS AND WATER SUPPLY	0	0.00%	0	0.00%
INCOME				
MONTHLY INCOME PER CAPITA IN CURRENT VALUES	152,074		339,530	
DAILY INCOME PER CAPITA IN CURRENT VALUES	5,069		11,318	
DAILY INCOME PER CAPITA IN USD	2.34		5.23	
INCOME PER FAMILY IN CURRENT VALUES	773.407		1.083.885	
MONTHLY INCOME PER CAPITA IN SMMLV	0.33		0.74	
INCOME PER FAMILY IN SMMLV	1.68		2.35	

Note: US\$1 = 2,163.00 Colombian pesos.

Source: Developed internally on the basis of survey data (2008).