

Report No. 59696-BO



Plurinational State of Bolivia Agriculture Public Expenditure Review

March 15, 2011

Agriculture and Rural Development Unit (LCSAR)
Sustainable Development Department
Country Department L6C: Bolivia, Chile, Ecuador, Peru, Venezuela
Latin America and the Caribbean Region



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Acronyms

ABT	<i>Autoridad de Bosques y Tierras</i> (Authority for Fiscal and Social Control of Forests and Land)
APER	Agriculture Public Expenditure Review
ARD	Agriculture and Rural Development
AZUCARBOL	<i>Empresa de Azúcar de Bolivia</i> (Bolivian State Enterprise for Sugar)
BDP	<i>Banco de Desarrollo Productivo</i> (Bank for Productive Development)
CIAT	<i>Centro de Investigación Agrícola Tropical</i> (Tropical Agriculture Research Center)
CIDAB	<i>Centro de Información y Documentación Agrícola de Bolivia</i> (Bolivian Agricultural Information and Documentation Center)
COFOG	United Nations Classification of the Functions of Government
CONSERVAR	<i>Conservación de la Naturaleza y Calidad Ambiental</i> (Conservation of Nature and Environmental Quality)
CIAR	<i>Creación de Iniciativas Alimentarias Rurales</i> (Creation of Rural Food Initiatives)
DELA	<i>Desarrollo Económico Local y Agropecuario</i> (Local Agricultural Economic Development Project)
EBA	<i>Empresa Boliviana de Almendras</i> (Bolivian State Enterprise for Almonds)
EMAPA	<i>Empresa de Apoyo a la Producción de Alimentos</i> (Food Production Support Company)
EMBRAPA	Brazilian Agricultural Research Corporation
EMPODERAR	<i>Emprendimientos Organizados para el Desarrollo Rural Autogestionario</i> (Organized Enterprises for Development)
ENA	<i>Empresa Nacional del Arroz</i> (National Rice Company)
FAM	<i>Federación de Asociaciones Municipales</i> (Federation of Municipal Associations)
FAO	United Nations Food and Agriculture Organization
FDPPIOYCC	<i>Fondo de Desarrollo para los Pueblos Indígenas Originarios y Comunidades Campesinas</i> (Development Fund for Indigenous Peoples and Rural Communities)
FNDR	<i>Fondo Nacional de Desarrollo Regional</i> (National Regional Development Fund)
FONABOSQUE	<i>Fondo Nacional de Desarrollo Forestal</i> (National Forestry Development Fund)
FONADAL	<i>Fondo Nacional de Desarrollo Alternativo</i> (National Fund for Alternative Development)
FONDESIF	<i>Fondo de Desarrollo del Sistema Financiero y de Apoyo al Sector Productivo</i> (Financial System Development Fund for Productive Sector Support)
FPS	<i>Fondo Nacional de Inversión Productiva y Social</i> (National Fund for Productive and Social Investments)
GDP	Gross Domestic Product
HIPC	Heavily Indebted Poor Countries
IADB	Inter-American Development Bank
IBTA	<i>Instituto Boliviano de Tecnología Agrícola</i> (Bolivian Agricultural Technology Institute)
IDH	<i>Impuesto Directo a los Hidrocarburos</i> (Direct Hydrocarbons Tax)
IEDH	<i>Impuesto Especial de Hidrocarburos</i> (Special Tax on Hydrocarbons)
IFPRI	International Food Policy Research Institute
IMF	International Monetary Fund
INE	<i>Instituto Nacional de Estadísticas</i> (National Statistics Institute)
INIA	<i>Instituto Nacional de Investigación Agropecuaria de Uruguay</i> (National Agricultural Research Institute of Uruguay)
INIAF	<i>Instituto Nacional de Innovación Agropecuaria y Forestal</i> (National Agricultural and Forestry Innovation Institute)
INRA	<i>Instituto Nacional de Reforma Agraria</i> (National Institute for Agrarian Reform)
IRR	Internal Rate of Return
LAC	Latin America and the Caribbean Region

LACTEOSBOL	<i>Empresa Boliviana de Lacteos</i> (Bolivian State Enterprise for Dairy)
LPP	<i>Ley de Participación Popular</i> (Law of Popular Participation)
MDP	<i>Ministerio de Planificación del Desarrollo</i> (Ministry of Development Planning of Bolivia)
MDRyT	<i>Ministerio de Desarrollo Rural y Tierras</i> (Ministry of Rural Development and Lands of Bolivia)
NAFIBO	<i>Nacional Financiera de Bolivia</i> (Bolivia's National Financial Institution)
OECAs	<i>Organizaciones Económicas Campesinas</i> (Rural Economic Organizations)
OECD	Organization for Economic Cooperation and Development
PAR	<i>Proyecto de Alianzas Rurales</i> (Rural Alliances Project of the World Bank)
PASA	<i>Proyecto de Apoyo a la Seguridad Alimentaria</i> (Food Security Support Program)
PDCR	<i>Proyecto de Desarrollo Concurrente Regional</i> (Regional Development Project of the World Bank)
PDM	<i>Plan de Desarrollo Municipal</i> (Municipal Development Plan)
PEFA	Public Expenditure and Financial Accountability
PER	Public Expenditure Review
PETS	Public Expenditure Tracking Survey
PGN	<i>Presupuesto General de la Nación</i> (National Budget)
PISA	<i>Proyecto de Innovación y Servicios Agrícolas</i> (Agricultural Innovation and Services Project of the World Bank)
PND	<i>Plan Nacional de Desarrollo</i> (National Development Plan) 2006-2010
POA	<i>Plan Operacional Anual</i> (Annual Operational Plan)
R&D	Research and Development
RECREAR	<i>Recreando el Papel del Estado en Empresas Alimentarias Rurales</i> (Renewal of the Role of the State in Rural Food Businesses)
SBI	<i>Sistema Boliviano de Innovación</i> (Bolivian Innovation System)
SEDAG	<i>Servicio Departamental Agropecuario</i> (Department Agricultural Services Unit)
SENASAG	<i>Servicio Nacional de Sanidad Agropecuaria e Inocuidad Alimentaria</i> (National Service for Agricultural Health and Food Safety)
SFP	<i>Sistema de Formulación Presupuestaria</i> (Budget Formulation System)
SFPM	<i>Sistema de Formulación Presupuestaria Municipal</i> (Municipal Budget Formulation System)
SICOPRE	<i>Sistema de Contabilidad y Presupuestos</i> (Accounting and Budgeting System)
SIGMA	<i>Sistema Integrado de Gestión y Modernización Administrativa</i> (Integrated System for Administrative Management and Modernization)
SINAFID	<i>Sistema Nacional de Financiamiento para el Desarrollo</i> (National Development Finance System)
SUSTENTAR	<i>Sustentar el Uso de los Recursos Naturales</i> (Sustainable Use of Natural Resources)
TGN	<i>Tesoro General de la Nación</i> (Treasury of Bolivia)
UDAPE	<i>Unidad de Análisis de Políticas Sociales y Económicas</i> (Unit for Analysis of Social and Economic Policies in the Ministry of Development Planning of Bolivia)
UN	United Nations
UNDP	United Nations Development Program
USAID	United States Agency for International Development
VAM	Vulnerability Analysis and Mapping
VIPFE	<i>Vice Ministerio de Inversión Pública y Financiamiento Externo</i> (Vice Ministry for Public Investment and External Financing)
VMPC	<i>Vice Ministerio de Presupuesto y Contaduría</i> (Vice Ministry for Budget and Accounting)
WDI	World Development Indicators

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¹ The star identifies World Bank Staff.

EXECUTIVE SUMMARY

Overview

Agriculture is one of the most important sectors for reducing poverty, improving food security and contributing to the development of Bolivia. Whether the importance given to the sector in the Government Plans has been translated into adequate public actions to improve the sector performance and outcomes is of interest in this Agricultural Public Expenditure Review. The Review focuses on budgetary allocations to the sector and provides a detailed understanding of the level and composition of public expenditure in agriculture. These aspects of public expenditure in agriculture are analyzed through three important dimensions – effectiveness, efficiency and equity.

Despite the priority given to agriculture in the Government Plans, productivity of the sector remains one of the lowest in Latin America and poverty in rural areas persists. Agriculture's modest growth (of 3%) has been driven by a large increase of the production frontier in the lowlands, highly concentrated on a few crops, and a related increase in soy-related exports. Yield effects on output growth have been modest and the yield gap between Bolivia and neighboring countries is very large.

In the context of food price volatility, improving agricultural productivity is becoming an urgent matter. Low productivity can be attributed to many factors; some beyond the control of the Government (such as weather variability and climate change) while others are within the reach of the public sector (such as public expenditure allocated to productive ends).

Physical, structural and climate factors (droughts, frosts, floods) pose challenges to the agricultural production in Bolivia. Agriculture is a very spatially heterogeneous sector, reflecting the agro-ecological diversity of Bolivia. Particularly in the highlands, the low population density and difficult topography constrain the provision of adequate infrastructure and productive services. The highlands face additional challenges such as extreme fractionalization of land and eroded soils. Climate related disasters explain around a third of the food price increases in Bolivia through their effects on agricultural output. These effects can be further exacerbated through high regional specialization, making agriculture more vulnerable to contemporaneous weather shocks.

Government policies and public interventions are also important ingredients in the performance of the sector in the economy of Bolivia. There is an imbalance between what agriculture contributes to the economy and how much public funds it receives. The contribution of the agricultural sector to the economy (accounting for 13% of GDP in 2007 and 27% of GDP if agro-industry is considered) greatly exceeds the importance given to agriculture in public expenditure allocations (an average of 1.4% during the period of 1996 to 2008).² The budget share allocated to agriculture also remains very small (on average 2.5% of the nation's budget), despite the large budget increase during the period between 2000 and 2008 (an increase of 167%, reaching 1 billion bolivianos in 2008). This is due to several factors, among them: 1) negotiation of budgetary allocations being done at institutional rather than sectoral basis; 2) weak budget coordination between the line Ministry and its de-concentrated and decentralized entities; 3) recording of actual expenditures only, with a large share of off-budget items, including resources from co-financing and price support; 4) underutilization of budgeted resources; 5) lack of results-based accounting of budget execution.

Since the 1990s, there have been important political and institutional transformations in Bolivia, related to the process of decentralization, giving greater roles and resources to sub-national governments. Revenues from

² This is a widespread phenomenon across developing countries, with the gap between the two indicators of performance being much larger (in the magnitude of 30 percentage points) for agriculture-based developing countries and around 7 percentage points for urbanized developing countries. Bolivia's gap of less than 12 percentage points, puts it in the group of transforming countries (World Bank, 2008).

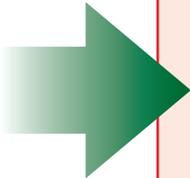
the extractive industries are being redistributed across economic and administrative units in the country, providing resources for the development of the productive industries that are expected to generate income and employment (among them agriculture and agriculture-related activities). The policy emphasis is normally put on communities, considered as productive and decision-making units at the local level, and their relationship with higher administrative levels in the country (municipalities, regions and central government). Changes in the investment patterns at the sub-national level are becoming more noticeable in the agricultural sector.

Main Messages

Three main messages and supporting arguments emerge from the analysis of spending in agriculture and agriculture-related investments in Bolivia, and revolve around the notion of efficiency, effectiveness and equity.

Effectiveness of public spending in agriculture

Due to knowledge gaps, it is hard to ascertain the extent to which development outcomes, such as agricultural growth, food security, and poverty reduction are affected by public sector expenditure. This is caused by both lack of adequate data and a focus on short-term outputs, rather than on medium and longer-term strategic objectives of the sector as a whole. This emphasis is found across all levels of government. Impact assessment efforts are limited, disjointed and focused on specific programs and/or projects, which reduces their effectiveness for policy recommendations. Monitoring tools are scant, with executed expenditures out of planned budgets, rather than concrete results, being a common indicator of choice.

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- Public expenditure in agriculture and agriculture-related investments has not been effective for increasing agricultural productivity in Bolivia.
 - Yet, evidence suggests that spending in public goods (such as agricultural research and extension among others) can bring about important increases in agricultural output.
 - There are also indications that spending allocation decisions in the sector are more decentralized and are taking into account food security.
 - A clear bottom-up approach to decision-making for resource allocations emerges across rural municipalities, with the role of communities becoming more prominent.
 - Lack of a sector-wide monitoring and evaluation framework, however, limits the assessment of spending's impact and constrains the planning of future interventions.

Strategic reallocation of public resources towards public goods in agriculture (such as research and extension, sanitary and phytosanitary measures, etc.) can raise agricultural output in Bolivia. A 10% increase in the share of agricultural research expenditure could increase agricultural output growth per rural inhabitant by at least 2% and by as much as 7%. Such re-allocations of public spending could be conducive to improving productivity of the sector in the mid- and longer terms. The strong positive relationship between investments in agricultural research and extension and agricultural output is supported by evidence from other countries.

Spending in agriculture and agriculture-related investments is more decentralized than that of other sectors in Bolivia, with municipal governments playing an increasingly important role. This, in principle, is an opportunity for responding to local needs in rural areas but, in practice, has seen limitations with inadequate resource allocations (average share allocated to agriculture in Department budgets is around 5%, when the average contribution of agriculture in Departments' GDP is 15%), lack of clear roles and responsibilities, and insufficient absorption and implementation capacity of lower levels of government.

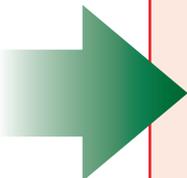
The role of communities, on the other hand, is becoming more prominent within participatory processes at the municipal level. Actual participatory mechanisms across rural municipalities are found to adhere to those established by legal norms. A clear bottom-up approach to decision-making for resource allocations emerges, with the role of communities becoming more prominent. Whether these local demands are satisfied in reality, however, hinges on the improvement of the articulation between medium-term planning (through municipal development plans or PDMs) and annual implementation of agricultural projects (in the context of annual operational plans or POAs).

There are indications that spending in agriculture and agriculture-related investments is being allocated where it is most needed in terms of reducing vulnerability to food insecurity. Although there are important temporal and location-specific effects, public spending in agriculture and agriculture-related investments appears to be going towards areas with high vulnerability, which may be indicative of resource allocation decisions in the sector taking into account food insecurity. This is particularly true for spending in research and extension as well as infrastructure.

However, Bolivia is missing a results focused monitoring and evaluation system of expenditures in the agricultural sector. This makes effective evaluation of sector performance and prioritization of expenditures difficult. Currently, evaluations are based on budget execution as an indicator of performance, with little indication of the physical impact of investments. This has to change to enable sector priorities to be formulated based on actual results, improving the potential impact of public spending in agriculture.

Efficiency of public spending in agriculture

Public expenditure in agriculture has historically been low in Bolivia, which makes its composition and allocation across competing uses and levels of government especially critical for reaching objectives. The technical and spending efficiency of agricultural expenditures have not been formally measured in Bolivia. Yet, they are important indicators for future planning and prioritization of spending. There are both supply and demand factors to efficient spending. On the supply side, planned budgets often exceed the capacity for expenditure execution, resulting in the underutilization of public resources. On the demand side, there is a weak articulation between community plans for public resources and local productive processes, and hence, may not be conducive to increases in agricultural productivity and income generation in the long run.

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- In general terms, public expenditure in agriculture has not been used efficiently.
 - Public resources across sectoral institutions and levels of government are not fully utilized and off-budget support to the sector is large.
 - From the standpoint of functional classification of spending, public goods in the sector are not prioritized in sectoral budgets, with limited public resources being allocated to research and extension.
 - From the standpoint of economic classification of spending, evidence of investment in human capital is limited both at the national and sub-national levels of government, compromising the quality of service delivery and oversight in the sector and the long-term sustainability of sectoral investments.

There is significant discrepancy of technical efficiency at the sub-national level in Bolivia, both within and across Departments. Technical efficiency is a relative measure of how a given Department uses *public* spending (the inputs) in agriculture and agriculture-related investments to maximize agricultural GDP (the output). Technical efficiency of Departments like Tarija and Beni is far more internally consistent (or homogenous within the boundaries of the Department) than that of Oruro and Santa Cruz, where there is wide variability of technical efficiency across

municipalities. The most technically efficient municipality is found in Oruro, where agriculture contributes very little to the Department's GDP.

Under-utilization of public resources is widespread in Bolivia and it is evident in the agricultural sector, across all levels of government. Actual expenditures in agriculture at the national and sub-national levels are below 80% of approved expenditures and in some cases much lower. Hence, at least 20% of approved budgets remain unused. Around 90% of municipalities under-utilize their limited public resources for agricultural investments, which challenges their role of provision of services to meet local needs in the decentralized context of the country.

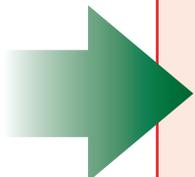
Agricultural support policies in Bolivia do not prioritize public goods. Although agriculture is a private activity, the provision of public goods in the sector (such as research and extension, sanitary and phytosanitary services) is responsibility of the Government. Yet, public support to the public goods of the sector has been limited and extremely volatile, due to its dependence on foreign funds. Although the Government Plan calls for greater support to agricultural research, only 5% of agricultural spending in 2008 was allocated to research. There is also evidence that only 15% of the total support to the sector is recorded in the sector budget, with the State supporting the sector primarily through prices, which brings about market distortions and imposes higher costs to domestic consumers.

A large share of agricultural budgets is currently diverted towards productive development (41% in 2008), a broad category of agricultural supports, and administration (37% in 2008). Productive development captures some of the public money going to private producers as support. Although it is not clear how much public money goes to private producers, in the context of Bolivia this has brought some important results in integrating farmers to markets through production alliances in rural areas. In the context of climate change and food security this may be justified, although clear exit strategies should be formulated to ensure the sustainability of the investments.

The ratio of capital to current spending in Bolivia is low; an indication of an imbalance in the economic composition of sectoral expenditures. Increases in the share of current expenditures (82% over the period 2005 to 2008) appear to be channeled towards the provision of inputs and sector budget support rather than on wages and salaries, which has created a shortage of qualified human capital for providing the services and oversight of the sector. Current expenditures are also heavily dependent on domestic public resources, while the sources of capital expenditures are often foreign.

Equity of public spending in agriculture

Although equity considerations go beyond the scope of the agricultural sector, many poor people in Bolivia live in rural areas, engage in agricultural production and, therefore, relate to public spending in the sector. Although poverty assessments are common in Bolivia, the relationship between poverty and public spending in agriculture and agriculture-related investments is not well understood. Spatial distribution of funds is one way of considering whether public money is destined to where it is most needed.

- 
- Equity in public expenditure distribution, in general, is still far from being achieved at the sub-national level in Bolivia.
 - Agricultural spending continues to be highly concentrated and unequal.
 - However, there are indications of agricultural spending becoming more progressive in recent years.

There are important spatial concentrations of agricultural expenditures that partially overlap with concentrations of agricultural economic activities. Over 60% of all public spending in agriculture is attributed to three Departments

(Santa Cruz, Tarija and Cochabamba). Although agriculture is an important economic activity in these Departments, the sector's contribution in Department GDP is not as prominent as it is in other Departments (e.g. Beni and Pando).

Prioritization of agriculture expenditures and agriculture-related investments appears to vary by wealth (measured as municipal GDP). Richer municipalities tend to spend more on agriculture than poorer ones. While richer municipalities allocate close to a third of their resources to agriculture alone, this share is only 15% in poorer municipalities (in 2007). There is regressivity in agricultural expenditures and agriculture-related investments across municipalities in Bolivia, with it being more pronounced in the poor Departments. The bottom 20% of municipalities has around 5% of total agricultural expenditures and close to 1% of total agriculture-related investments.

Furthermore, there are some signs of agricultural spending becoming more progressive in recent years. As compared to 2000, in 2007 Departments with high and medium incidence of poverty appear to have invested more public resources in agriculture than those Departments with lower levels of poverty incidence.

Policy Options

The recommendations formulated in this report are summarized in three main areas for Government attention:

I. Re-balance the composition of public expenditure in agriculture

In the context of Bolivia, two major re-allocations should be considered – one related to the **functional** composition of the agricultural budget and the other related to its **economic** composition.

Functional composition: Allocate more resources towards agricultural public goods (such as research and extension among others) to improve sectoral performance and to support a heterogeneous agricultural sector in the context of rapid technological change, climate pressures and food price volatility. To ensure a long-term expenditure planning and productivity enhancement in agriculture, and to reduce the historic volatility of spending on research and development, unprecedented Government commitment (political and financial) is required. Government commitment is required to maintain adequate levels and reduce volatility of spending on research and development. Long-term productivity enhancements, rural incomes and, ultimately, food security hinge on strategic agricultural research and its effective application.

Resource allocations towards research and extension, as well as productive development, have to be strategic and targeted, and adhere to the types of production systems in the country, as well as take into consideration the decentralized nature of decision-making and expenditure allocations. While the national government should maintain the oversight of research, coordination with the Departments is needed for adaptation of this research to different production environments. Public provision of extension (technical assistance) services is justified given the large number of poor small agricultural producers in Bolivia, but experience shows it has to be demand driven in order to be effective. Investments in productive development have to be well defined and have a clear time horizon and exit strategy.

Economic composition: Improve the balance between current and capital expenditures in agriculture, focusing on human capital. With sub-national governments allocating most of their funds to capital investments, little resources are left for investing in human capital. At the national level, within the current component of sectoral expenditures, more money should be spent on human capital, both to increase the number of people working in the sector, as well as to enhance their training and capacity. To ensure the long-term oversight of sector productivity, strategic re-allocations of current expenditures will be required towards investment in human capital and away from support categories.

II. Improve the instruments for prioritization and targeting of agricultural investments

Prioritization and targeting of public agricultural investments is a good starting point for improving sector performance. The emphasis on extension of the agricultural frontier, rather than on long-term improvement of productivity of agriculture, continues to be a policy choice of preference in the country, now in the context of food security policies. This would need to change to enable the country to address intensifying pressures from increasing food prices and weather variability. **There are two complementary ways to address this:**

***Ex-ante* or before investments are made:** The definition of achievable objectives is important. The objective of the agricultural sector should be the improvement of agricultural productivity. Within this objective, investments should target those activities with the highest social and economic return. Objectives such as achieving food security, poverty reduction and the sustainable management of natural resources are also very important but, in order to achieve them, they require multi-sectoral interventions. Improvement in agricultural productivity can bring about other positive externalities (e.g. food security through higher yields and poverty reduction through employment and higher incomes) if successfully implemented.

Prioritization within the agricultural sector should consider the diversity of production systems and agricultural economic units in rural areas. Different typologies of producers can be established (based on producers capacity to innovate, linkages to local markets, etc., rather than only on agro-ecology, size of unit of production or poverty levels) and different policies and incentives targeted towards improving the performance of each typology, such that agricultural output of the country as a whole is increased.

***Ex-post* or after investments are made:** Bolivia needs **a coordinated (across levels of government and institutions) monitoring and evaluation system that enables the tracking of results of the sector as a whole and facilitates the planning of investments.** The lack of such a system not only has serious implications for measuring actual impact of agricultural expenditures, but it also constrains the prioritization of future resource allocations in the sector and its stance in the budget process of Bolivia. This would require a significant investment in human resources and capacity not only at the national level, but also in each Department. Coordination with the Ministry of Planning is also warranted, as the agency responsible for oversight of the performance of all investments in the country.

III. Ensure better implementation of available resources in agriculture

Although the limitations in implementation capacity of public funds in the sector go beyond the objectives of the current document, they bring important insights that justify the need for further research:

A. Improved institutional capacity: More and better trained human resources would be required to improve the absorptive capacity in the sector.

B. Better coordination across levels of government and clarity of expenditure mandates: While adherence to the roles and responsibilities defined by the laws of public resource transfers in the country is required, these maintain shared and overlapping functions and do not provide sectoral detail to guide a coordinated spending effort in agriculture. Specific sectoral guidelines may be required, clarifying mandates and focusing on the implementation of sectoral allocations. This can be done in the Sector Strategy, which should be revised and updated.

C. Delivery of resources: Does spending arrive at the intended delivery point? Bottlenecks in the process of public service delivery need to be identified and addressed. With an increased focus towards local procurement of goods and services in Bolivia, such evaluation should not be difficult to undertake.

D. Budget process: The under-utilization of public resources is often linked to the weaknesses in the budget process. While this issue goes beyond the scope of the sector, it has a direct implication on its financial performance and requires further scrutiny. Sectoral norms can be established with strict timetables for disbursement of funds and delivery checks and balances to ensure that the sectoral budget is used as planned. This will require careful planning and oversight, which brings the attention back to the capacity of human capital, institutionality of sector allocation, coordination and, monitoring and evaluation systems.

Public expenditures in agriculture ought to be better rationalized. Clear sector priorities need to be defined and carried forward through the budget process in coordination with the sector entities at the different levels of government. A revision of the Sector Strategy is required, where these priorities and the specific roles and responsibilities are defined. The formulation of the sector priorities has to be result-based to enable the tracking of progress, the assessment of impact and future planning in the sector.

1. INTRODUCTION

Objectives

1.1. Agriculture is one of the key components of the poverty reduction strategy of the Government of Bolivia, in particular in rural areas, and it is a critical sector for achieving food security in the country. The National Development Plan of 2006–2010, the Government’s development strategy, and the subsequent Government Program for 2010–2015, assign agriculture and rural development a leading role in the country’s new productive matrix. Based on the National Development Plan, the Strategy of the Agricultural Sector (*Plan for a Rural, Agrarian and Forestry Revolution*) identifies three main objectives: i) attain food security and sovereignty, ii) enhance the condition of rural populations by means of increasing agricultural and forest production, and iii) assure the sustainable management of natural resources.

1.2. There is a renewed attention to the agricultural sector in Bolivia, within the new framework of territorial development, plural economy and autonomies. This is driven by the redesign of the productive matrix of the country, with agricultural development, productive services and productive infrastructure playing an integral role. Transforming this renewed attention into sustainable productive outcomes requires greater emphasis on and understanding of the institutional structure, budget processes, public resources allocations and expenditure flows that affect the sectoral performance.

1.3. Within this context, the study has three main objectives:

- 1. Provide a better understanding of the level and composition of public expenditure in agriculture.** Implicit in this objective is the construction of a consolidated dataset of public expenditure in agriculture and agriculture-related investments at the national, departmental and municipal levels, disaggregated by functional and economic classifications³ at all levels.
- 2. Assess the adequacy (in terms of quantity and quality) and distribution of public spending and its effects on agricultural productivity, food security and poverty reduction in Bolivia.** Implicit in this objective is an analysis of the efficiency, effectiveness and equity of public expenditure in agriculture, across all levels of government.
- 3. Provide policy recommendations for improving the allocation of public resources in agriculture** to enable the country to take greater advantage of its vast agricultural potential.

1.4. The objectives of the study were validated through a consultation process with the Government of Bolivia. A study of public expenditure in agriculture was requested by the Ministry of Development Planning of Bolivia (MPD). Subsequently, an amplification of the scope of the study was requested by the Ministry of Rural Development and Lands (MDRyT), emphasizing agricultural public spending across administrative levels. Since specific objectives were not defined *a-priori* by either Ministry, a consultation group was formed with the participation of several Government Ministries, including MPD, MDRyT, Autonomies and Finance to discuss the scope and define the objectives of the study.

Rationale

1.5. Recent analytical work on public spending in the agricultural sector in Bolivia is limited. Despite the dynamic process of decentralization in Bolivia, there have been few attempts to document and analyze the allocation of public

³ These are standard classifications in public expenditure analysis. Functional classification refers to the sectoral composition of expenditure (e.g. research, extension, producer support, etc.), while economic classification captures the capital and current composition of public expenditure.

funds to agriculture, in general, and across different levels of government, in particular. In 2004, the World Bank and the Inter-American Development Bank completed a joint Public Expenditure Review (PER), updating the 1999 country PER. The agricultural sector, however, was not included among the sectoral analyses of the 2004 PER. In 2004, a diagnostic analysis of sectoral public expenditure (including agriculture) was carried out as an input to the Rural Alliances Project (PAR) of the World Bank. While providing useful information on spending trends across sectors, the study's scope was limited (the data end point is 2003, there is limited information on the composition of spending, and data at municipal level is scant). More in-depth information on public expenditures at sub-national levels was gathered for the Regional Development Project (PDCR) of the World Bank. In 2006, with the incoming Government of President Evo Morales, the World Bank produced several policy notes related to rural development. The notes identify the main issues of the agricultural sector in the context of decentralization, without testing the posed hypotheses of poverty persistence, increasing role of non-agricultural activities, shortage of public goods and services, inefficient rural public investment and the need to improve opportunities in the sector (Fretes-Cibils et al., 2006). Understanding these issues is critical for designing interventions and formulating strategies to stimulate agricultural growth in Bolivia. In 2008, a diagnostic analysis of the sector was undertaken by UDAPE, with rich information on political economy, processes and trends.

1.6. Economic analysis of public expenditure in agriculture and agriculture-related activities is timely. In recent years, Bolivia has been redefining many of its internal institutional and economic processes, formulating new roles and responsibilities within and across levels of government and aligning budgets according to priorities defined within a territorial perspective. The new Constitution and the new Law of Autonomies add a degree of complexity to the resource allocation process that requires further scrutiny. With agriculture playing an important role in rural areas and in the Government development strategies, it is important that sector expenditures are assessed within this complex environment and recommendations made for their effective, efficient and equitable use.

1.7. This study's analytical approach hinges on three key questions:

- 1. *How effective is public spending in agriculture?*** There is a gap in knowledge of the impact of public spending in agriculture on specific development outcomes, such as agricultural growth, food security, and poverty reduction. This is caused by both lack of adequate data and a focus on short-term programmatic outputs, rather than on medium and longer-term strategic objectives of the sector as a whole, across levels of government. Impact assessment efforts are limited, disjointed and focused on specific programs and/or projects, which reduces their effectiveness for policy recommendations. Monitoring tools are scant, with executed expenditures out of planned budgets, rather than concrete results, being a common indicator of choice.
- 2. *How efficient is public spending in agriculture?*** Public expenditure in agriculture has historically been low in Bolivia, which makes its composition and allocation across competing uses and levels of government especially critical for reaching objectives. The technical and spending efficiency⁴ of agricultural expenditures have not been formally measured in Bolivia. Yet, they are important indicators for future planning and prioritization of spending. There are both supply and demand factors to achieve more efficient spending. On the supply side, planned budgets often exceed the capacity for expenditure execution, resulting in the underutilization of public resources. On the demand side, demands by communities for public resources may not be articulated with productive processes and hence may not be conducive to increases in agricultural productivity and income generation in the long run.
- 3. *How equitable is public spending in agriculture?*** Although equity considerations go beyond the scope of the agricultural sector, many poor people in Bolivia live in rural areas, engage in agricultural production and,

⁴ Technical efficiency refers to the effectiveness with which a given set of inputs is used to produce an output. Spending efficiency considers the allocation of resources across functional and economic composition of spending, both within the sector and across levels of government.

therefore, relate to public spending in the sector. Although poverty assessments are common in Bolivia, their relationship with public spending in agriculture and agriculture-related investments is not well understood. Benefit-incidence approaches are often used to assess whether public resources in agriculture are spent in a regressive or progressive manner. Spatial distribution of funds is another way to view allocations by considering whether more money is destined to where it is most needed.

Scope

1.8. Territorial: The PND establishes a territorial approach⁵ to development in Bolivia. To adhere to the established structure of expenditure flows in Bolivia, the study considers public expenditures at three levels of government. Spending in agriculture is undertaken by the central (national) government, the departmental governments (called *Gobernaciones*) and the municipal governments. *Gobernaciones* and municipal governments account for around 50% of public agriculture and agriculture-related expenditure in Bolivia (2008). The recent Law of Autonomies adds two more sub-national units, with regions and indigenous peasant territories assuming a role in the decentralized decision-making structure of the country. This new structure is considered in the study, but not used in the analysis as budget processes and public expenditure allocations continue to be defined as before this Law was enacted (in July 2010).

1.9. Sectoral: The definition of agriculture used in this study is formulated using international standards and the Bolivian context. The widely used UN Classification of the Functions of Government (COFOG) definition of agriculture (including crops, livestock, forestry, fishing and hunting, as well as agribusiness) and the UN FAO definition of public expenditure in agriculture, were combined in this study (both definitions are summarized in Annex 1). The resulting list of functional classifications of the agricultural sector was adapted to the context of Bolivia, using existing budgetary classifications. A final definition of the functional categories of agriculture and agriculture-related spending was agreed upon by a working group from the World Bank, UDAPE and FAM. Figure 1 (below) provides a summary of the categories of agriculture and agriculture-related spending (Annex 2 provides a detailed description of each category). Agricultural (A) spending is a narrow category that captures the spending in core public goods of the agricultural sector and other services directly related to agricultural production. Agriculture-related (AR) spending is a broader category of spending that includes spending from a number of different public entities and across sectors that directly or indirectly relates to the agricultural sector.

1.10. Data:⁶ This definition of agriculture and agriculture-related activities was used for the data generation process for this study. The data on agriculture and agriculture-related (A&AR) expenditures was derived from the national accounting data obtained from the Public Accounting Department of the Ministry of Economy and Public Finance of Bolivia. Expenditure data in Bolivia is typically recorded by program and project and aggregated at the national level. With the help of FAM and UDAPE, agriculture and agriculture-related expenditure data was identified in the national accounting data⁷ and disaggregated by function (within the categories presented in Annex 2), economic classification (capital and current) and level of government (central, departmental and municipal) for a period of 13 years – from 1996 to 2008. Sub-national units of observation include the

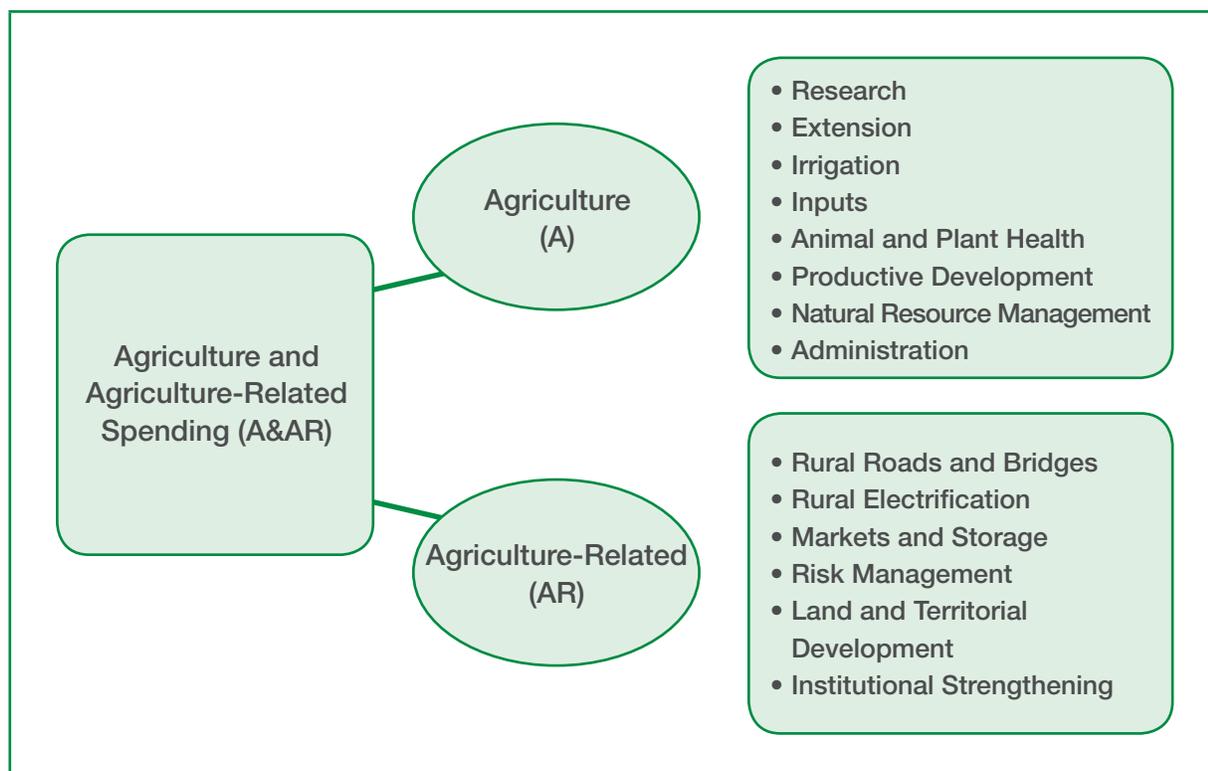
⁵ Territorial, in the context of the development strategy of Bolivia, refers to “land and its natural resources”. Within this territorial perspective, traditional administrative margins (departments and municipalities) are overwritten by more vaguely defined limits of newly created autonomous entities, such as regions and indigenous/peasant territories.

⁶ More information on the methodology used to generate the data can be found in the background paper: FAM. 2009. Revisión del gasto público en el sector agropecuario a nivel municipal y prefectural 1997–2008. This paper is available at: www.worldbank.org/bolivia

⁷ Algorithms, based on synonyms at the project and program levels, were used for identifying agriculture and agriculture-related expenditure in the large national accounting dataset. The thousands of lines of raw expenditure data were validated to ensure their relationship to the agricultural sector of the economy.

9 Departments of Bolivia and the 327 municipalities, which in 2009 represented all the municipalities in the country⁸ (a map of Bolivia is included in Annex 3). This dataset (referred in this document as APER dataset) can be considered as a first step towards establishing a broader sectoral tool for monitoring and evaluation of expenditure allocations.

Figure 1. Definition and functional classification of agriculture used in this study



1.11. Other data sources used in the study are: budget data obtained from the Ministry of Economy and Public Finance of Bolivia, FAO data on public expenditure in agriculture, WDI indicators, the VAM index, as well as primary data on municipal institutions and public expenditure in agriculture collected (for the purposes of this study) in a random sample of 40 rural municipalities in Bolivia.

1.12. Timeframe: The study focuses on the period starting in 1996 up until the end of 2008. This is driven by two factors. First, since 1994 there have been important developments in the country's distribution of public resources (under the Law of Popular Participation) that have evolved over the years and explain many of the observed spending patterns thereafter. Second, the last three years of the APER dataset (2006 to 2008) capture public expenditure allocations under the leadership of President Evo Morales, currently in his second term in office. The 2009 data was not yet consolidated at the time when the study's dataset was assembled.

Approach and Methodology

1.13. The study focuses exclusively on the budget formulated expenditures in the agricultural sector, including spending on agriculture-related activities that other public sectors make. Better understanding of the composition of the agricultural sector budget and its execution is of primary interest in this study, as it provides the framework within which efficiency, effectiveness and equity are evaluated and recommendations made. Non-budgetary items

⁸ Since the dataset was put together in December 2009, 12 more municipalities have been established in Bolivia, bringing the current total number of municipalities to 339.

(such as price supports and other interventions such as low or zero interest loans, state procurement of food, state commercialization of basic goods) are not dealt with in this study as a different methodology is required for their assessment.⁹

1.14. Several methodologies are combined in the study to provide an in-depth understanding of spending patterns within and across administrative units and their composition. There is no conceptual justification or an established benchmark as to what constitutes an optimal level of public expenditure. The theory provides a rationale for Government intervention in providing goods and services when markets fail to provide public goods, when there are economies of scale and externalities (Devarajan, Swaroop and Zou, 1996). The theory, however, does not provide guidance on how best to allocate resources between and within sectors in order to have a maximum impact on growth and poverty reduction (Paternostro, Rajaram, Tiongson, 2007). Given the theoretical limitations, the level of public expenditures in the study is assessed through benchmarking and diagnostic analyses of trends. The composition of spending is analyzed through three important dimensions – effectiveness, efficiency and equity.

1.15. Effectiveness of public expenditure is evaluated against two outcomes of interest. Empirical analyses were undertaken to identify the economic linkages between A&AR public expenditure and agricultural growth, on one hand, and food security, on the other. Both are key objectives of the rural strategy of Bolivia and were measured using 3 types of analysis: *a) Agricultural output growth at the departmental level* – the analysis considers the impact of spending re-allocations across sectors (*inter-sectoral expenditures*) and within the agricultural sector and other cross-sectoral agriculture-related activities (*intra-sectoral expenditures*); *b) Food security at the municipal level* – the analysis uses the municipal vulnerability index constructed in Bolivia (VAM) and its association with expenditures in agriculture and agriculture-related investments in the country; and *c) Monitoring and evaluation mechanisms* – the analysis of effectiveness of public expenditure is complemented by an assessment of existent mechanisms of monitoring and evaluation in Bolivia, as tools for measuring results and their impact.

1.16. Efficiency of public expenditure is addressed from both the technical and spending perspective. *Technical efficiency* of A&AR public expenditures is empirically assessed at the departmental level through a stochastic frontier analysis; *spending efficiency* is considered across functional and economic classifications. Descriptive analysis and comparisons are used to visualize patterns of spending. The *coefficient of deviation* between planned and executed budget (actual expenditure) is calculated across levels of government and for the agricultural sector, in particular. Trends and comparisons are used to identify persistent underutilization of resources. Alignment of budgets with policy priorities is also assessed.

1.17. Equity is addressed from a spatial perspective focusing on the distribution of sectoral funds across geographical/administrative units. Concentration curves are derived to visualize the extent of progressivity of spending across Departments, and temporal aspects of spending are also presented across types of municipalities to assess the extent of targeting of spending. A benefit incidence analysis of the largest interventions in the agricultural sector would have been a useful tool to identify the impact of agricultural spending on different typologies of beneficiaries. However, this is beyond the scope of this study and is a recommendation for future analytical work in the sector.

1.18. The study also addresses two cross cutting issues that aid the public expenditure analysis: municipal institutions and budget process. The institutional and governance arrangements, as well as budgetary management processes and capacities often play a determining role in the efficiency, effectiveness and equity of sectoral expenditures. One of the key challenges is to ensure strong and coherent linkages between stated agricultural strategies, policies

⁹ The structure of agricultural supports in Bolivia, including both budgetary and non-budgetary supports, has been examined by a recent unpublished analysis by the Inter-American Development Bank (IADB).

and budgetary allocations. ***Budget process:*** The budget process is examined from a sectoral perspective to identify the limitations in the supply of public expenditures both in terms of its levels (the formulation of budget ceilings and the role of the sector) and composition (the allocation of sector resources across public entities); ***Municipal institutions:*** Planning and prioritization of spending are analyzed in detail at the municipal level addressing potential demand-side constraints related to the formulation and execution of Municipal Development Plans and Annual Operation Plans. This is approached through a comparison between formal (normative) and actual institutional decision-making processes related to agricultural public spending in a nationally representative sample of 40 randomly selected rural municipalities in Bolivia. International experiences with decentralized service delivery in agriculture are provided to draw comparisons and identify potential lessons.

2. REVIEW OF AGRICULTURAL SECTOR PERFORMANCE

Historically, the development of the agricultural sector has been closely linked to the performance of the extractive industries in Bolivia, with hydrocarbon revenues used for public investments in the economy, in general, and the sector, in particular. This continues in the new development plans of the country. The agricultural sector is given a central role in these plans as means for attaining food security and for enhancing the conditions of rural populations through increased agricultural and forest production. This however, is far from being achieved, with agricultural productivity in Bolivia lagging behind most countries in Latin America.

Historic Perspective¹⁰

2.1. The Bolivian economy has historically been characterized by a model of development based on exports (and accrued revenues) from the extractive industries. Throughout the years and across the different economic models that the country has adopted over time (Figure 2 below) commodity prices have been important driving forces of economic growth in Bolivia. They have provided, and continue to provide, resources for the public sector and contribute to re-define its role in the country's economy and, in particular, in the productive sector. In general, periods of high commodity prices have seen a greater State participation in Bolivia's economy.¹¹

2.2. Despite its volatility, the agricultural sector has sustained a positive average growth rate (Figure 2 below). The average growth rate of the agricultural sector (of 3%) has persisted below that of the general economy (of 3.8%), reducing its relative contribution. Agriculture's modest growth has been driven by a large increase of the production frontier in the lowlands, highly concentrated on a few crops, and a related increase in soy-related exports. Yield effects on output growth have been modest (Annex 4). The volatility of the agricultural growth rate can be attributed primarily to adverse climatic pressures and lack of adequate mechanisms to respond to risk.

2.3. During the 1970s, the increase in prices of raw materials saw Bolivia's economy grow at rates higher than 5% annually. Public sector participation in the economy was widespread. Large amounts of public resources were devoted to the development of agriculture in the Eastern parts of the country (Santa Cruz). The Bolivian Agricultural Technology Institute (IBTA) and several State-run enterprises were also created in the agricultural sector (e.g. ENA – National Rice Company). This was also a period marking agribusiness development and exports of non-traditional products, such as soy and cotton (as opposed to traditional exports of minerals and hydrocarbons).

2.4. The 1980s began with a severe drought that affected a third of the country (in particular the highlands), with the lower parts of the country experiencing flooding, causing significant damage to the sector and the economy. This gave rise to large waves of rural-urban migrations. It also put agriculture at the forefront of the national development agenda of 1984-1987 as a sector able to kick-start the economy, generating rural employment and diversifying production for domestic market provision. Among others, further extension of the agricultural frontier and redistribution of rural populations were among the objectives of agricultural policies at that time.

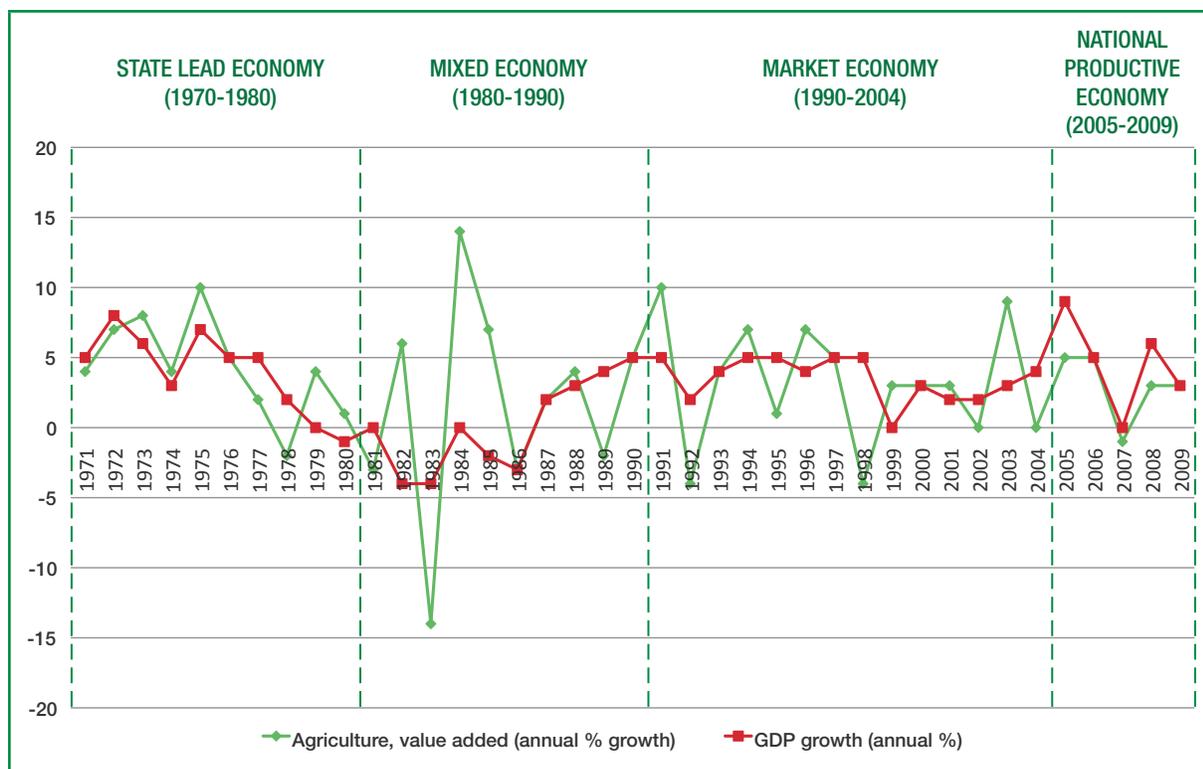
2.5. The 1990s began with a change in the economic development model of the country, giving greater role to markets in the allocation of scarce resources and the application of stabilization policies. It was a period of economic, social

¹⁰ This section is based on a broader, comprehensive background paper prepared by UDAPE: Medeiros, G. and E. Marconi. 2010. Revisión del gasto público en el sector agropecuario. This paper is available at: www.worldbank.org/bolivia

¹¹ In years of commodity price booms, however, commodity dependent countries like Bolivia tend to have significant exchange rate appreciation, which tend to reduce the competitiveness of tradable sectors, like agriculture. Despite the exchange rate appreciation in recent years, no concrete evidence of this phenomenon, also known as Dutch disease, is identified in the agricultural sector of Bolivia.

and political instability due to excessive debt, high inflation and economic recession. The role of the public sector and the efficiency of State-run enterprises were reconsidered in light of falling prices of raw materials and mounting fiscal deficits. Price controls and subsidies were removed, State enterprises were privatized. This was also a period of important political and institutional transformations related to the process of decentralization. The focus of the first phase of the decentralization process, initiated in 1994 with the Law of Popular Participation (LPP), was on municipal governments and their role in the provision of public services. The decentralization at the municipal level changed both the distribution and emphasis of public investment, with greater focus given to poverty and prioritization towards social programs. In late 1990s, more roles and resources (from debt relief) were transferred to municipal governments through the *Ley de Diálogo*.

Figure 2. Annual growth rate of Bolivia's economy and of agricultural output



Source: UDAPE, 2010 and WDI, 2010

2.6. The 2000s began with a stagnant economy and political instability. During this period, raw material prices started another upward trend. The National Development Plan (2006) put the public sector back at the driver seat of the Bolivian economy and of the productive sector, in particular. Raw materials became critical for the new development framework of the Bolivian Government, which relied on the revenue generated through exploitation of hydrocarbons for broad public investments. The second stage of the decentralization process, initiated in 2005 and governed by the Law of Hydrocarbons (of 2005) and the Law of Administrative Decentralization (of 1995), put the focus on Department governments in Bolivia. The driving force of this second phase of decentralization was the re-distribution of wealth from natural resources (and specifically hydrocarbons), which generated an increasing demand for greater regional autonomy (World Bank, 2007).

2.7. In recent years, the new Constitution (of 2009) instituted a plural economy (including the state, private sector, cooperatives and communities) and the re-nationalization of natural resources, initiating the third phase of the decentralization process in the country. This new Constitution is the base of all policies and strategies that are currently being developed. In 2010 the Law on Autonomies re-draws the roles, responsibilities and resource allocations within

a territorial framework, putting greater emphasis on the participation of the regions¹² (within Departments) and indigenous peasant territories (within municipalities) in the decision making process. The Law breaks with the linear vertical administrative structure by introducing different groupings based on population factors (including numbers, and social and cultural aspects) at sub-national level and allowing them to have autonomy. National, territorial (department, region, municipality) and local (rural communities, indigenous populations and families) levels of engagement are defined and new criteria for fiscal transfers are being considered.

Policy Perspective

2.8. The National Development Plan (2006–2010) is the cornerstone of the new development pattern of Bolivia. It identified the strategies and priorities of development in Bolivia. The Government Plan for Economic and Social Development (2010–2015) is a continuation of the path set forth by the National Development Plan. Both Plans give agriculture an important role in the productive development of Bolivia. The Strategy for the agricultural sector was formulated in 2008 and is based on the National Development Plan.

The National Development Plan 2006–2010

2.9. **The National Development Plan (PND) 2006–2010 sets the framework for the new development pattern of Bolivia.** The Plan, a vision for the short, medium and long term of the country, is developed around four focal areas: Social and Community aspects (*Bolivia Digna*), Decentralization (*Bolivia Democrática*), Productive aspects (*Bolivia Productiva*) and External relations (*Bolivia Soberana*). These focal areas describe the different dimensions of the country's new development pattern¹³, characterized by more inward looking, redistributive, State orchestrated, natural resource-based, participatory strategies. Its ultimate goal is the reduction of poverty, inequality and social exclusion and improvement of the well-being of all Bolivians (*Vivir Bien*). The new development pattern takes into consideration the unique characteristics of the country – the diversity of actors and their particular social and economic structure, the regional asymmetries, and the high levels of poverty.

2.10. A new productive matrix, a new institutional framework to support it and a related new territorial perspective on resources and economic agents are the factors that underlie the new development pattern of production and wealth accumulation:

A. A new productive matrix: The redesign of the productive matrix of the country is characterized by resources from the extractive industries being redistributed across economic units in the country and providing for the development of the productive industries that generate income and employment (among them, agriculture and agriculture-related activities); it is also characterized by a regionalization of production and by the redistribution of land. Agricultural development, productive services and productive infrastructure form an integral part of the new productive matrix of Bolivia.

B. A new institutional framework: The emphasis is put on communities, considered as productive and decision-making units at the local level, and their relationship with higher administrative levels in the country (municipalities, regions and central government). The new development pattern identifies the need for integrating small productive units, such as peasant enterprises, producer associations, cooperatives, micro family

12 According to the Law a region is formed by an aggregation of municipalities or provinces within a given Department, such that they represent 10% of the Department's territory or 10% of the Department's population.

13 The National Development Plan calls for the use of a "development pattern" rather than a "development model" in the context of Bolivia as it argues that the country is not following a recognized and validated prototype; instead, it is proposing the building of a new development pattern to substitute the existent primary export pattern.

businesses, into the national economy. The formal inclusion of the rural and indigenous communities in the economic life of the country dictates the need for reformulation of Bolivia's institutional framework, giving greater participation to communities, local and regional organizations.

C. A new territorial perspective: the regions (and their specific agro-climatic characteristics, diversity, consumption patterns and cultural practices) are given an important role across established administrative units in the country. The proposed reconfiguration (*territorial decentralization*) emphasizes the region as a level of public management along with national, departmental and municipal levels and as a territorial unit of planning and public investment. It includes the formation of regional territories as units of territorial planning based on associations of autonomous municipalities (based on linguistic and cultural characteristics) and calls for the re-ordering of existent administrative units in the country. This is expected to enable public policy actions that better reflect the local needs and characteristics, as well as take advantage of regional productive potential.

2.11. The PND gives great importance to innovation and technological development as means for increasing productivity and competitiveness. Bolivia invests only 0.26% of its GDP in activities related to technology and innovation, most of which goes for the payment of wages and salaries. With about 23 million bolivianos in 2005, it is one of the LAC countries that spends the least (0.003% of the total LAC investment in technology and innovation; more than 20 times less than Chile [PND, p. 180]). This poses a serious limitation to the generation and application of scientific and technological knowledge to productive uses and value addition.

2.12. In this context, the PND proposes the formation of a Bolivian Innovation System (SBI) that would link scientific and technological centers with the productive sector and a Technological Bank that would leverage resources from SINAFID. The SBI, initiated in 2008, is currently being overseen by the Vice Ministry of Science and Technology under the Ministry of Development Planning. It includes in its mandate the pursuit of technological innovations in the productive sector.

The Government Plan for Economic and Social Development (2010-2015)

2.13. The public sector plays a key role in the implementation of the new development pattern of Bolivia. Public investment is used as a mechanism for redistribution of wealth through a number of laws and decrees that establish the criteria for the allocation and use of funds. The largest source of resources in Bolivia is the extractive industry (hydrocarbons and mining), which were nationalized in May 2006. Foreign financing is directed to public investment in accordance with the National Development Plan's strategies. A National System for Development Financing (SINAFID¹⁴) is created by the Plan, through the Bank for Productive Development (BDP). The BDP, established in 2007, is a financing tool of the State for strategic productive priorities and a mechanism for redistribution of national income through financing productive development, giving priority to previously marginalized sectors (e.g. agricultural production and micro, small and medium rural and urban enterprises) and regions.¹⁵ Food production is the sector that has benefitted the most so far (72%) from the credits offered by BDP.

2.14. The creation of non-bank financial systems is foreseen by the Plan to promote socially productive investments. The Network of Cooperatives and Community Savings Banks will be created with resources from the BDP and local

14 SINAFID integrates four existent financial institutions – NAFIBO (*Nacional Financiera*), FONDESIF (*Fondo de Desarrollo del Sistema Financiero y de Apoyo al Sector Productivo*), FNDR (*Fondo Nacional de Desarrollo Regional*), FPS (*Fondo Nacional de Inversión Productiva y Social*) - financial entities that channel resources to sub-national governments, financing different local development projects, many of which contribute to the development of the agricultural sector. SINAFID is financed by a credit from the Inter-American Development Bank (IADB).

15 SINAFID is meant to redistribute the resources generated from the extractive industries. It is also meant to provide low interest rates (6% annual), longer repayment periods (up to 12 years) and longer (and more variable) grace periods to enable participation of small productive units mainly in rural areas.

contributions (from municipalities, producer associations, small and medium size firms, cooperatives, etc.). They will provide seed, operational and risk capital, as well as technical assistance. Rather than crowding out private investment, these actions are expected to fill an existent gap in the provision of financial services to small, marginalized producers, considering that only 20% of municipalities in Bolivia have financial services. Compensation Funds and Development Funds are planned with resources from surplus revenues from the extractive industries and other internal and external resources. They will provide additional financing to the territorial entities, in particular those that are below a pre-established threshold, in order to ensure more equitable resource provision.

2.15. The Plan establishes a vision for a bottom-up decision making framework with top-down resource allocations.

Communities, through their Development Councils (*Consejos de Desarrollo*), are expected to play a leading role both in the planning of regional development and in its public management, rather than participating only as beneficiaries. The Councils are expected to represent the collective interests, and not sectoral or private needs. The Plan foresees a social control of public management, suggesting an adjustment of responsibilities and resource transfers to sub-national levels, directing public investment to local and regional levels with the objective of reducing inter-municipal and inter-regional disparities and improving efficiency of execution.

2.16. According to the Plan, a myriad of public sector programs and projects are being initiated in rural areas.

For example, through the Program for Agricultural Mechanization, 1,061 tractors, 20 harvesters and 40 cultivators were donated to producer organizations, communities and municipalities for food production, with the final aim of obtaining food security. The Program “Bolivia Changes, Evo Delivers” (launched in 2006) has implemented projects in several areas, mostly in social infrastructure –among them, productive development, irrigation, road infrastructure. With the Program “Big Industrial Leap” the installation of many small and medium factories is planned for the processing of agricultural production from communities, cooperatives and local productive units, for example for milk products, fruits, citrus and others. An ammonia and urea plant is also foreseen for the domestic production of fertilizers at a cost affordable to small producers.¹⁶ *Plan Vida*, with an estimated budget of \$2.9 billion bolivianos during the period 2009-2015, focuses on the eradication of the causes of extreme poverty through, among other things, promotion of local growth and economic development, boosting productivity, guaranteeing the continuous access to food, improving the capacity of territorial and productive self-management of communities. Food, nutrition and food security take up 33% of the budget, while the development of productive potential takes up 18% of the budget (Government Plan 2010-2015).

2.17. The Government Plan recognizes that despite its potential, the agricultural sector has important limitations.

Among them are low productivity and technological development, weak institutional organization and dependency on other productive sectors and internal demand. According to the Plan, the National Government has allocated US\$136 million on average to support the agricultural sector and to overcome climate change damage through a myriad of programs and projects. The Plan calls for the creation of the National Institute for Agricultural and Forestry Research (INIAF).¹⁷ For technical assistance and capacity building, the Plan suggests the strengthening of the OECAs, among other commercially driven producer associations. To stimulate local demand and support small producers, the Plan calls for the State and all public institutions to procure goods and services provided by local small producers.¹⁸

¹⁶ The Plan claims that currently 1 ton of urea costs US\$750, which makes it inaccessible for small producers. With building of local capacity, the cost of production would be between US\$130-\$180 per ton and the price in the domestic market is foreseen at US\$250-\$290 per ton, incentivizing domestic use of fertilizers (Government Plan 2010-2015).

¹⁷ The World Bank is providing support to INIAF through the project that is currently being prepared on Innovation and Agricultural Services (PISA).

¹⁸ Local procurement of agricultural goods and services, if adequately managed and implemented, can reduce the unit cost of provision and it may be a more cost effective way of stimulating local production and development of local markets. Recent experience from Uganda suggests that the unit costs of goods produced at the central level were usually 20%-50% higher than comparable market prices or unit costs at the local level. Also, the delivery of centrally procured goods was prone to wastage (World Bank, Uganda Agricultural PER, 2010).

2.18. Among some of the mechanisms and incentives for stimulating local markets (and hence agricultural production) proposed in the Plan are: 1) set up of permanent State Fairs in the 9 Departments and in other intermediate towns; 2) State procurement in local markets through the consolidation of *Insumos Bolivia*, a State agency for purchasing and provision of inputs; 3) selective protection of domestic market segments, one of which is food, through the imposition of tariffs; 4) strengthen capacity of producer organizations; 5) establish a strategic domestic market information system; 6) prioritize investment projects in infrastructure characterized by high labor demand.

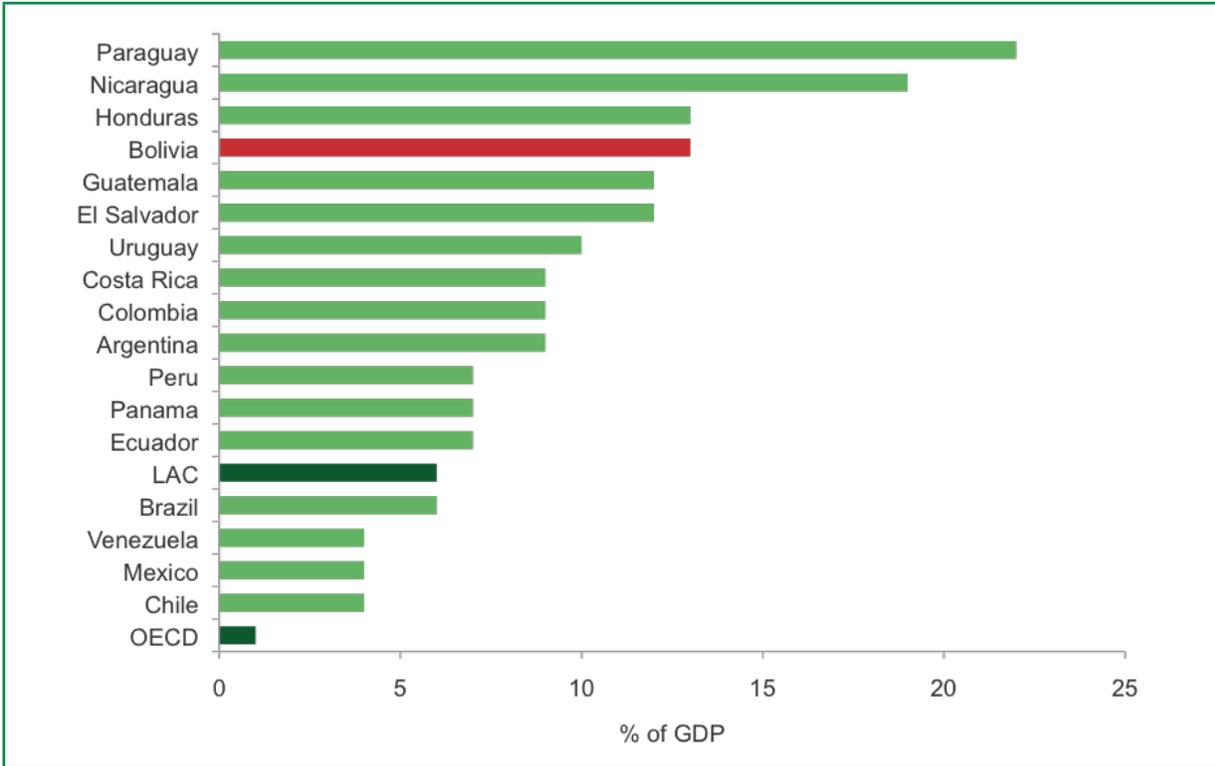
The Strategy of the Agricultural Sector

2.19. The focus of the Strategy is the strengthening of family agriculture and generally of small agricultural units, such as peasants, indigenous and other rural communities. The Strategy, currently under revision, was formulated in 2008, adhering closely to the National Development Plan. The Ministry of Rural Development and Lands (MDRyT) is the line Ministry in charge of carrying forward agricultural policies and strategies, with a mandate for implementing 10 programs (Annex 5) and for the oversight of 3 de-concentrated and 7 decentralized entities in the sector (discussed in more detail below). The Strategy does not define the roles and responsibilities of departmental and municipal governments for the implementation of these programs.

Economic Perspective

2.20. Agriculture continues to play an important role in the economy of Bolivia. Agriculture continues to be one of the most important sectors in the country (second to manufacturing), accounting for 13% of GDP in 2007. The contribution of agriculture is even larger if agro-industry is accounted for, reaching close to 27% of GDP. The sector contribution to the economy is above the regional average of 6% for LAC (Figure 3), underscoring the transitional nature of Bolivia’s economy in comparison to its more urbanized neighbors.

Figure 3. Contribution of agriculture in the economy (as % of GDP), by country (2007)

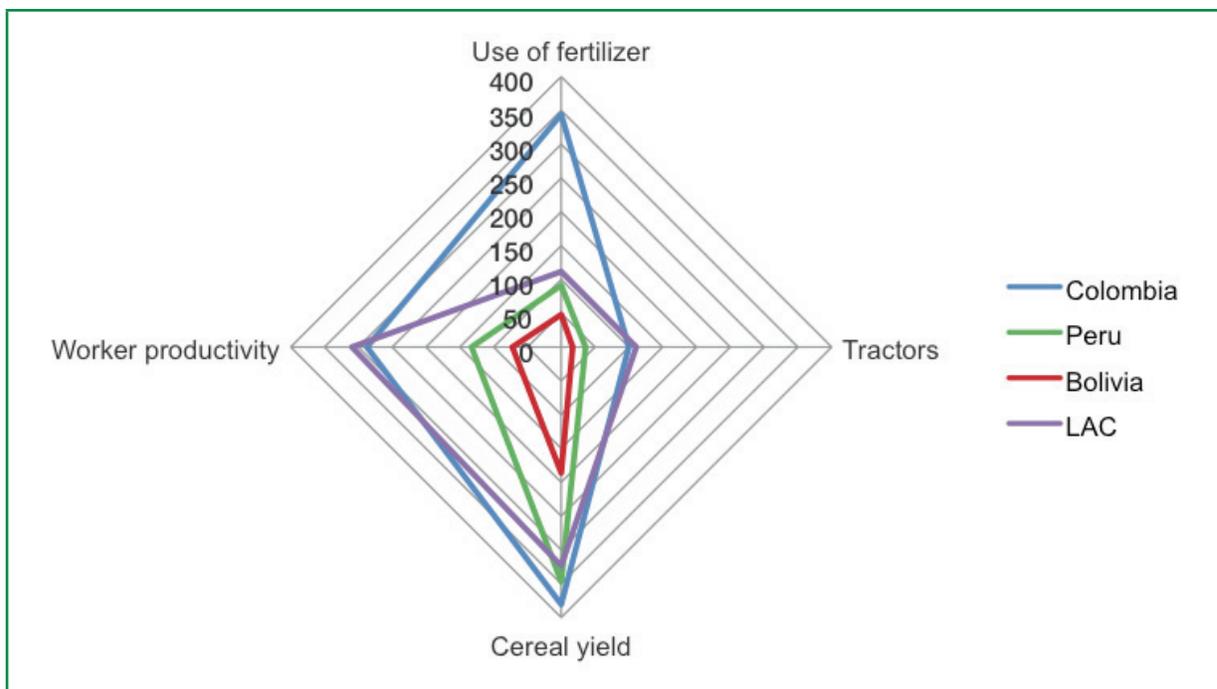


Source: WDI, 2010

2.21. Agriculture is also the largest employer of rural labor in Bolivia. Despite the decline in rural population (currently at 33% of the total population), the sector employs almost 90% of the economically active people living in rural areas (WDI, 2010). The vast majority of the rural population employed in agriculture is poor (85%) and 75% lives in extreme poverty (UDAPE, 2006), underscoring the strong linkages between agricultural interventions and desired reductions of rural poverty. Furthermore, agriculture provides 59% of total (direct and indirect) employment in Bolivia's export sector (IMF, 2006).

2.22. The sector's potential is large, but its productivity is the lowest in Latin America, irrespective of the indicator used for comparison. Use of inputs (fertilizers and machinery) is the lowest in Latin America. Worker productivity is also among the lowest and cereal yield is stagnant. The yield gap between Bolivia and neighboring countries is very large (Annex 4). In Figure 4, comparisons are made with other countries in the region that have similar agricultural land area (in square kilometers in 2007) and landscape to illustrate Bolivia's position. Keeping land area constant, Colombia and Peru exhibit greater productivity than Bolivia for all indicators.

Figure 4. Agricultural productivity indicators for Bolivia (2002-2007 averages)



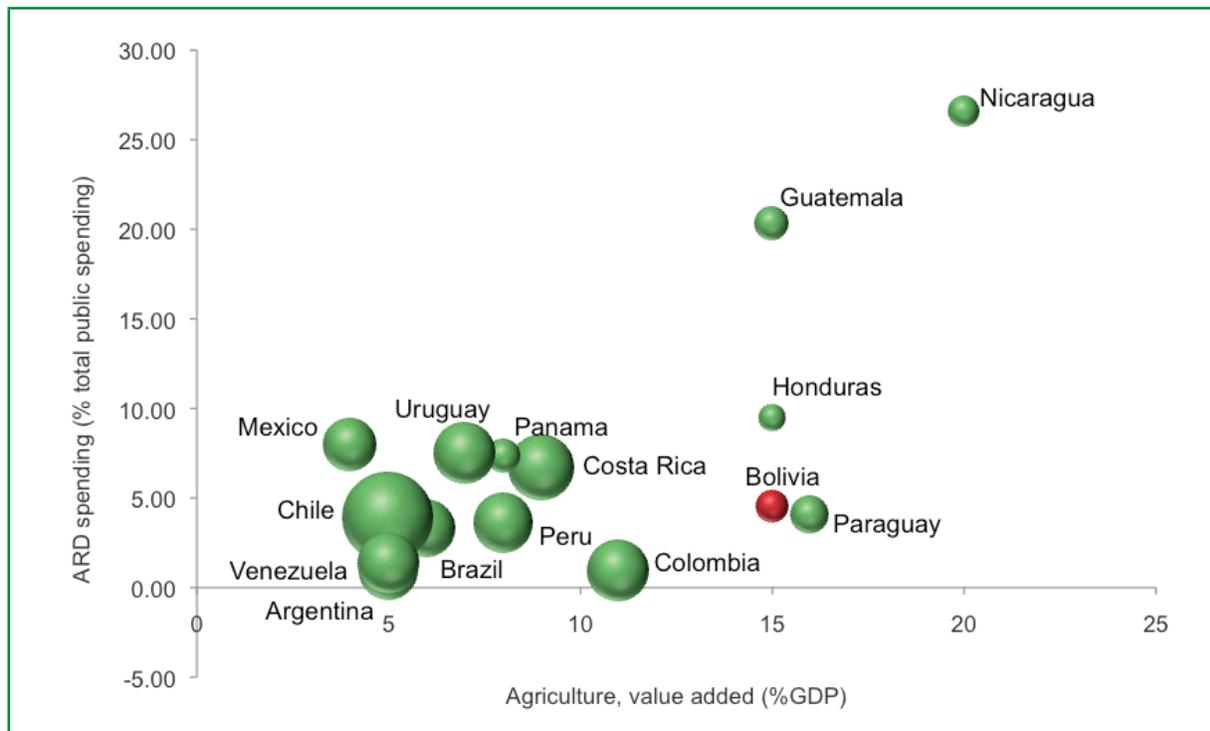
Source: WDI, 2010

Note: Indicators are measured as follows: Tractors per 100 km² of arable land; Use of fertilizer is the fertilizer consumption in kilograms per hectare of arable land; Cereal yield in kg per hectare; Worker productivity as agricultural value added per worker. Use of fertilizers, Cereal yield and Worker productivity are rescaled by a factor of 10 (i.e. the original values are divided by 10) to ensure visual compatibility.

2.23. The contribution of the agricultural sector to the economy continues to exceed the importance given to agriculture in public expenditure allocations. Public expenditure in agriculture has historically been low in Bolivia, representing on average 1.4% of total expenditure during the period of 1996 to 2008. If public spending in agriculture-related investments is also considered, this average figure increases to 9% of total expenditure in Bolivia. Although these numbers appear low, they are in par with spending patterns in agriculture in other LAC countries (Figure 5 below). The difference, however, is not in the share of spending, but in the achieved productivity and the role of the sector in the economy. Countries with similar share of public spending in agriculture as Bolivia exhibit much larger productivity gains (as shown in Figure 5 below), suggesting that the composition of spending, its targeting and implementation, are critical to the sector performance.

2.24. Private investment in agriculture is also very limited. Contrary to the extractive industries, agriculture has been traditionally unable to attract large private investment – only commercial agriculture has received Foreign Direct Investment, although in very limited amounts and with no clear tendency over time. Low productivity, high transaction costs, credit and technology constraints in rural areas in particular, the low integration of local non-urban markets in Bolivia (World Bank, 2010), are among some of the factors that have prevented private sector investment in agriculture. Access to finance by small producers is also constrained by incomplete property rights that prevent the use of land as collateral. Only 5% of the total commercial banks’ portfolio in Bolivia is allocated to the agricultural sector.

Figure 5. Importance of agriculture and its performance, 2001



Source: FAO Public Expenditure in LAC Dataset, 2001 and WDI, 2010

Note: Size of bubble indicates tons/ha of cereal production.

2.25. Agriculture’s development has been constrained by other structural problems. The low population density (of 9 people per square kilometer; the lowest in LAC) constrains the provision of adequate infrastructure and productive services, particularly in the highlands, which face additional challenges such as extreme fractionalization of land – almost 75 percent of the properties are 1-5 hectares large – and eroded soils. This situation prevents economies of scale, reduces access to finance and technology, forces peasants to seek different strategies for risk diversification, such as growing different crops to ensure self-subsistence or alternative sources of income from the non-agricultural rural sector. This process is seen particularly in the West of the country, where the risks in the productive sector are higher and where physical and structural constraints limit an expansion of the agricultural frontier.

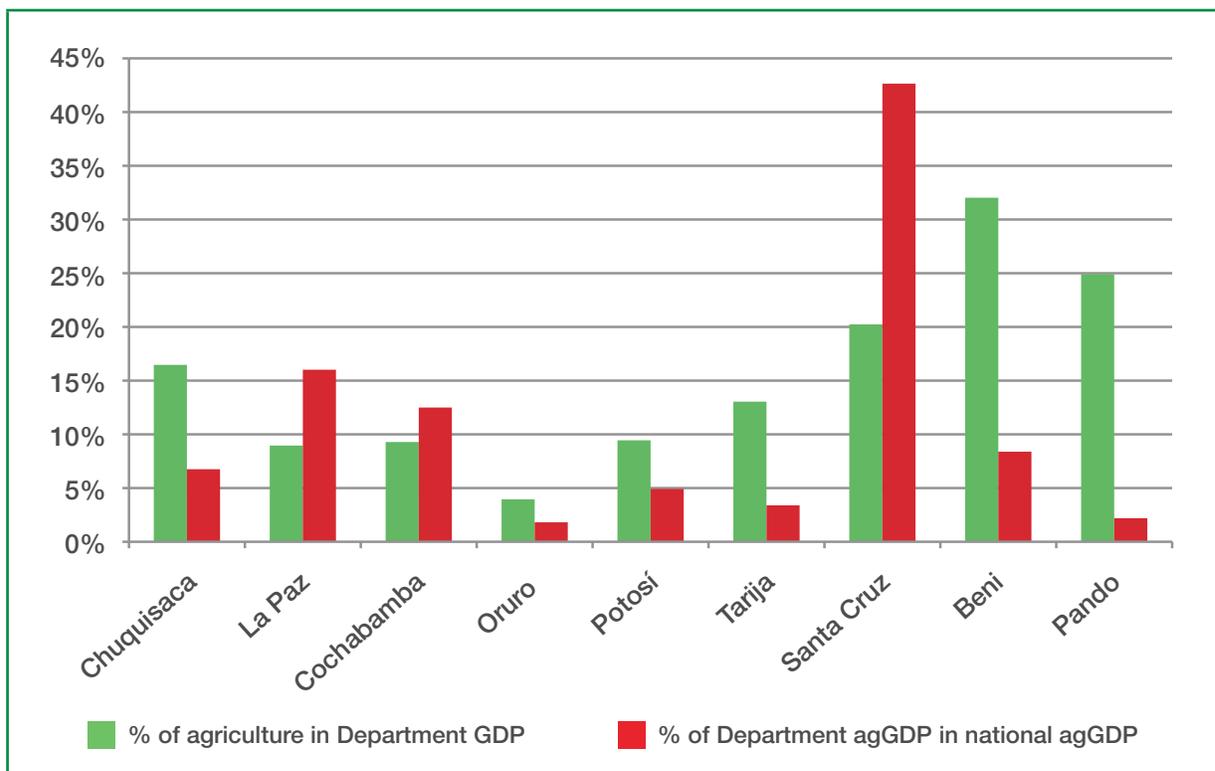
2.26. The importance of agriculture in Bolivia varies across regions. Agriculture is a very spatially heterogeneous sector, reflecting both the agro-ecological diversity of Bolivia, as well as differences in the orientation of production. The traditional agricultural sector, with small units of production¹⁹, is concentrated in the Western highlands and

¹⁹ Close to 70% of the 600,000 agricultural productive units in the country are small family-owned, poor and operated on a subsistence basis (PND, p. 128).

valleys and focuses on food production primarily destined to domestic markets. In this region, the contribution of the sector to the Departments' economy ranges between 4% and 9% of the Departments' GDP (Figure 6 below) and the weight of non-agricultural income in total household income is large. The Eastern lowlands (Chuquisaca, Santa Cruz, Beni, Pando) are characterized by an intensive agricultural production and agribusiness, with a mixture of large and small producers, focusing primarily on export markets. In the lowlands, the contribution of agriculture (excluding agribusiness) to the Departments' GDP ranges between 16% and 32% and the weight of agricultural income in total household income is very large.

2.27. The heterogeneous production patterns bring significant within-country trade flows, with the lowlands being net suppliers. La Paz produces only 16 percent of agricultural output while Santa Cruz produces 42 percent despite the fact that each Department accounts for 27 percent of total population (Figure 6). Almost all industrial agriculture is located in Santa Cruz, while Beni accounts for 22 percent of livestock production with only 4 percent of population. These differences generate important domestic trade flows: Santa Cruz is the supplier of industrial agricultural products and their derivatives; Santa Cruz, Beni and Cochabamba are the main suppliers of poultry and cattle; and several dispersed areas supply non-perishable traditional products. On the other hand, fresh staples produced by non-industrial agriculture are mostly consumed locally, mainly because transport costs are high – as a result of long distances, difficult geography, and low quality roads – preventing trade with distant regions.

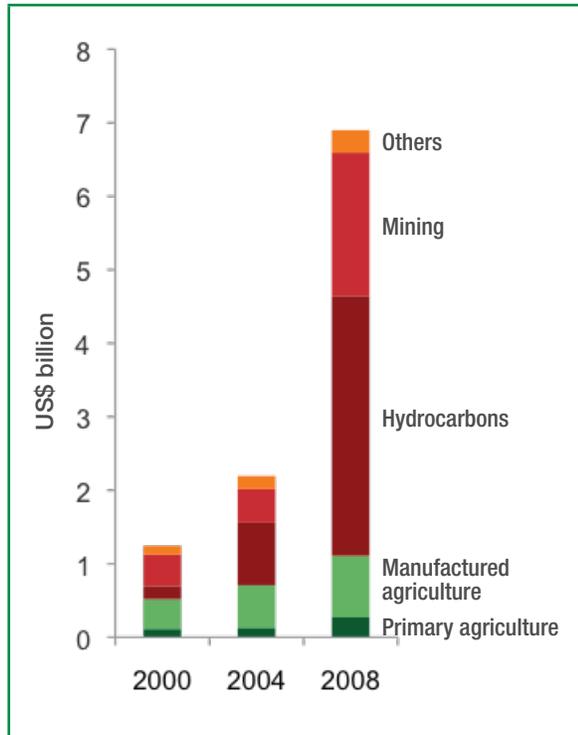
Figure 6. Contribution of agriculture to the economy of Departments in Bolivia



Source: INE

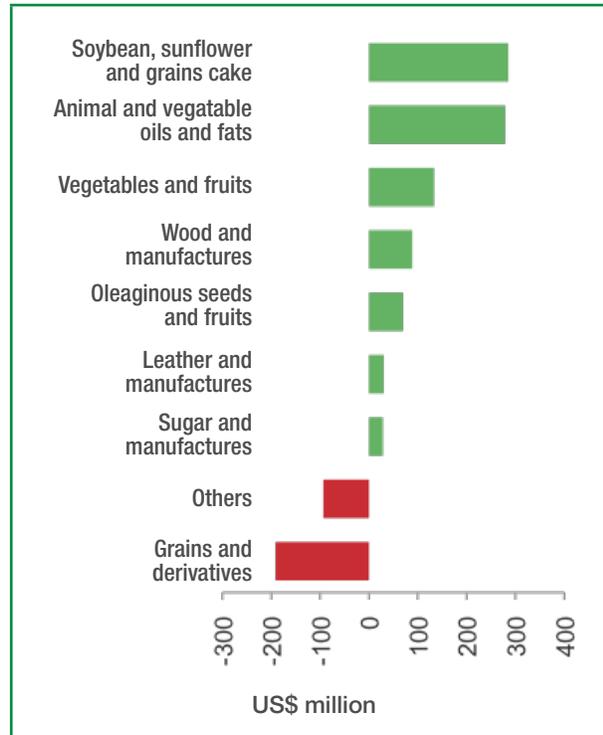
2.28. Agriculture is a small player in Bolivia's exports. Agricultural exports are specialized in industrial agriculture and forestry, with only a handful of traditional products reaching external markets. In the last decade there has been a boom in exports from extractive industries, and in particular hydrocarbons. As a result, the share of agricultural exports decreased from 42 percent of total exports in 2000 to 16 percent in 2008 despite almost doubling their value (Figure 7).

Figure 7. Export composition, 2008



Source: INE

Figure 8. Agriculture trade balances, 2008



Source: INE

2.29. Half of total agricultural exports are represented by the soy bean complex. Forestry accounts for 20 percent of agricultural exports. Livestock exports are limited due to non-tariff restrictions and high transport costs, with some derived products, such as leather, being exported. Exports from non-industrial traditional agriculture are very limited, quinoa being the most successful one. Quinoa export value has increased tenfold since 2000 favored by high international prices, reaching 2 percent of total agricultural exports. On the other hand, Bolivia has a sizable deficit in grains and derivatives, resulting in large imports of wheat, wheat flour and, to a lesser extent, rice (Figure 8 above).

3. BUDGETS AND INSTITUTIONS IN THE AGRICULTURAL SECTOR

Although important progress has been made in public financial management in Bolivia, there is room for improvement in the articulation between institutional strategies, Government Plans and budget allocations. Despite the large increase in the resource base of public entities in the agricultural sector, the budget share allocated to agriculture continues to be small. Important challenges remain. There is evidence of widespread under-utilization of public resources in the sector at the national and sub-national levels, challenging arguments that the level of spending in agriculture should be increased. There is also evidence that off-budget support to the sector is large.

Overview of Budget Processes²⁰

3.1. The budget in Bolivia is an instrument of administration and economic and fiscal policy in the country, with the objective of establishing budgetary policies to direct public entities within the framework of the objectives and policies for economic and social development established in the National Development Plan (the budget process in Bolivia is summarized in Annex 6). The new Constitution (2009) gives a fundamental role to citizen participation in determining public spending and investment, including technical planning and execution. It also specifies the main sectors which will be prioritized in budgetary allocations - education, health, food, housing and productive development - a prioritization of expenditure not made explicit in the previous Constitution.

3.2. From a budget perspective, there have historically been 4 levels in the public sector: 1) Central (national) administration, comprising 20 ministries and their respective de-concentrated entities and decentralized institutions; 2) Universities (14 in the country, of which 3 are indigenous and were recently created), all of them are autonomous entities; 3) Departments (there are 9); 4) Municipalities (currently 339). However, **the new territorial formulation of the country has brought about a disconnect between the levels in the public sector recognized by Law and the four used for budget formulation.** Although recognized by Law, the newly created regions and peasant territories are not yet included as levels in the budget formulation process which, in practice, challenges their existence in and questions their financial viability.

3.3. Although important progress has been made in public financial management in Bolivia, there is room for improvement in the articulation between institutional strategies, Government Plans and budget allocations. At the institutional level, public entities are required to provide a summary of their POAs that is compatible with allocated budgets, specifying objectives and institutional management of resources according to the Institutional Strategy, which is linked to the National Development Plan. In reality, public entities' POAs and their respective budget allocations are often incompatible. Prioritization of budgets is only partially driven by the National Development Plan, with political and regional pressures playing an increasingly important role.

3.4. The programmatic formulation of the budget is a very broad and cumbersome process. The budget is implemented based on formalized programmatic structures with the allocation of resources for the production of goods and services defined by programs, sub-programs, projects and activities. Since 2007, the budget is approved by law, without an adequate budget negotiation process that provides a space for claims or regional proposals. This reduces flexibility, particularly constraining the agricultural sector, which is subject to extreme events such as floods and drought. Reallocation of budgets is also not politically favored. Furthermore, during budget formulation, despite the large number of adopted budget classifications²¹, many of them are wrongly filled by the public entities and, often,

²⁰ This section borrows from the background paper: Brito, J. 2010. Análisis del proceso presupuestario y su desarrollo en el sector agrícola en Bolivia. This paper is available at: www.worldbank.org/bolivia

²¹ The budget is classified by institution, by subject, by expenditure items, by funding source, by financing entities, by economic sectors, by functional expenditure, by geographic location.

additional effort is needed to estimate sectoral expenditures. The established procedures for registering a project are lengthy and project information is not regularly updated. The coordination between national and sub-national levels in terms of project registration is also weak.

3.5. There appears to be little harmonization of transaction registry systems and also, limited evaluation mechanisms. During budget implementation, there are many budget modifications and requests for additional monetary resources; the end of year closing is slow and complicated, making tracking and evaluation very difficult. During the evaluation stage, no evaluation reports are produced by the public entities because of lack of physical information related to programmatic budgets. This does not allow for corrective action to be undertaken in order to comply with budget management objectives. Furthermore, general technical norms for financial evaluation of the budget against the specific objectives as defined by the POAs are not defined at the national level, and the public entities tend to evaluate their performance by only one parameter: *the percentage of executed budget*.

3.6. Some capacity and timing issues are still to be resolved. There is a large turnover of public employees that brings challenges to the budget process due to the new staff's lack of experience. The timing for presenting the budget is also not clear under the New Constitution, which makes the process of its formulation somewhat vague. Furthermore, delivery dates for budget estimates for operating expenses are often not met by public sector entities, which leads to the estimation of next year budget allocations based mostly on budget execution from the previous year.

Budgets and the Agricultural Sector

3.7. There has been a large increase in the resource base of the Ministry of Rural Development and Land (MDRyT), the line Ministry in charge of carrying forward agricultural policies. Between 2000 and 2008, there has been a 167% increase (in real terms) in the approved budget for the Ministry, reaching 1 billion bolivianos (also in real terms) in 2008. Although the budget increase in agriculture is larger than those received by the Health and Education Ministries (with 84% and 7% increase, respectively), other Ministries have seen a much larger share of the budget being allocated to them, e.g. Ministry of Public Works (with 970% increase), Ministry of Economic Development (with 349% increase), Ministry of the Environment and Water (with 648% increase). In absolute terms, however, the financial resources allocated to the agricultural sector, accounting for the approved budget increases, are larger than those of other sectors.²² These increases have been possible with resources from the extractive industry, in particular from hydrocarbons.

3.8. Evidence of large budget increases is also found at the sub-national level between 2004 and 2008. Total Department budgets have increased by 119% on average during this period (Table 1 below). Budget allocations to the agricultural sector, in particular, have increased threefold in most *Gobernaciones*. The latter represent budget allocations to the Department Agricultural Services Units (also known as SEDAGs) operating in all 9 *Gobernaciones*.

3.9. Despite the budget increases, the share allocated to agriculture remains very small both at the national and sub-national levels. The agricultural sector represents on average 2.5% of the nation's budget²³, which comprises around 1.5% of central administration budget and 1% of sub-national budget. Although there is variation in the budget share allocated to the SEDAGs, the average of 4.72% is small considering the role attributed to Departments in the decentralization context.

²² The actual approved budgets for 2008 (in real terms, in bolivianos) for these Ministries are: Health – 388 million, Education – 1 billion, Public Works – 720 million, Economic Development – 10 million, Environment – 280 million.

²³ The 1.2 billion bolivianos planned for agricultural development in the 2011 budget represent 7% of the nation's budget.

Table 1. Budget allocations across Departments for the period 2004 to 2008

Department	Total approved budget (increase in %)	SEDAG approved budget (increase in %)	Share of SEDAG budget in total budget (%)	Share of SEDAG budget being spent (%)
Cochabamba	64	745	4.34	77
Chuquisaca	141	429	4.04	72
Santa Cruz	95	150	5.38	80
La Paz	57	43	1.69	67
Beni	86	798	4.68	86
Oruro	145	379	2.61	83
Potosí	211	4,442	0.64	63
Tarija	158	142	6.27	71
Pando	114	97	12.87	97
All Departments (average)	119	348 (without Potosí) 803 (including Potosí)	4.72	77

Source: Department information

3.10. Several factors can be attributed to the small budget share allocated to agriculture: 1) negotiation of budgetary allocations being done at institutional rather than sectoral basis; 2) weak budget coordination between the line Ministry and its de-concentrated and decentralized entities; 3) recording of actual expenditures only, with a large share of off-budget items, including resources from co-financing and price support that are not part of the budget; 4) underutilization of budgeted resources; 5) lack of results-based accounting of budget execution. Each factor is described next.

3.11. Factor 1: During the process of budget formulation, the negotiation of budgetary allocations is done at an institutional and not sectoral basis, as a function of the resources that the sectoral entities manage according to their objectives. Both the MDRyT and the decentralized entities translate the objectives and priorities into concrete achievable results, into specific tasks to fulfill, into procedures to be applied and into means and resources to be used, which are embodied in programs and projects, according to which budget requests are made to VMPC and VIPFE (for investment). The de-concentrated units²⁴, for their part, establish budget drafts independently, but their budget is aggregated to the budget of MDRyT.

3.12. Factor 2: Budget coordination between the line Ministry and de-concentrated and decentralized entities is weak. After the Ministry of Public Works²⁵, MDRyT oversees the largest number of de-concentrated and decentralized entities in Bolivia (a total of 10). This makes the task of coordinating sectoral activities extremely cumbersome, requiring sufficient technical capacity and human resources for its implementation. One example is the interaction between MDRyT and SENASAG (a de-concentrated public entity in the agricultural sector). SENASAG's budget is formulated with inputs from all regional offices and it is included in MDRyT's budget as a program. As a de-concentrated entity, SENASAG cannot be assigned an independent institutional code and its budget has to be included in the budget of the line Ministry. Another limiting factor in its treatment as a program is the fact that SENASAG's personnel cannot be considered permanent despite the time they are involved with the institution. It formulates and executes its budget independently through programs and projects. In the formulation

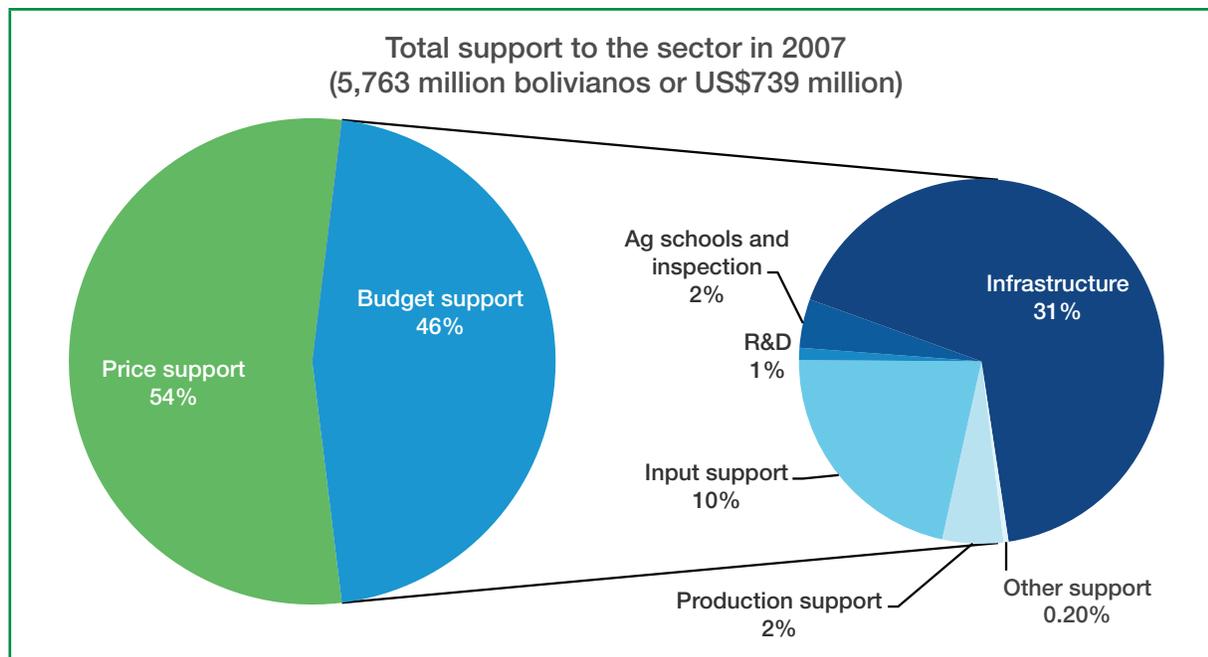
²⁴ The differences between de-concentrated and decentralized entities (as defined in a legal decree in Bolivia) can be summarized as follows. A de-concentrated entity is governed by the Minister of Agriculture; the assets of the entity belong to the Ministry and the entity has no legal personality (i.e. the Ministry signs contracts). Budget ceilings of de-concentrated entities are set by MDRyT. For a decentralized entity, while overall guidance comes from the Ministry, the entity is governed by a board and not the Ministry itself; the assets of the entity belong to the entity and not the Ministry; the entity has a legal personality and can act for itself.

²⁵ The Ministry of Public Works coordinates the activities of 13 de-concentrated and decentralized entities.

stage, there is limited information related to the amount of transfers from the Department governments, making budget formulation difficult to clearly estimate. Another limitation is that SENASAG does not have a link to the budget system SIGMA and its budget execution accounting is done manually.

3.13. Factor 3: There is a significant amount of off-budget resources being allocated to the agricultural sector in Bolivia. Using an OECD methodology, a recent (unpublished) study by the Inter-American Development Bank finds that **Bolivia supports the agricultural sector primarily through prices.** Of total support to the sector, 46% is budgetary support with the remaining 54% representing price support. Most of the budget support goes to infrastructure (Figure 9).

Figure 9. Distribution of support to the agricultural sector



Source: Authors using information from IADB study, 2010

3.14. Furthermore, this split of resources leaves only 15% of the total support recorded in the sectoral budget. About 63% of all support is producer support (the remainder being support to general services and small portion of transfers to consumers). The vast majority of this producer support (82%) is received through market price support, which is financed by consumers. Although the share of price support in Bolivia is similar to that in Peru and Ecuador (and well above the average of the OECD of 49%), it is far more expensive in Bolivia than in other Latin American countries, representing 5.9% of the country's GDP (IADB, 2010).

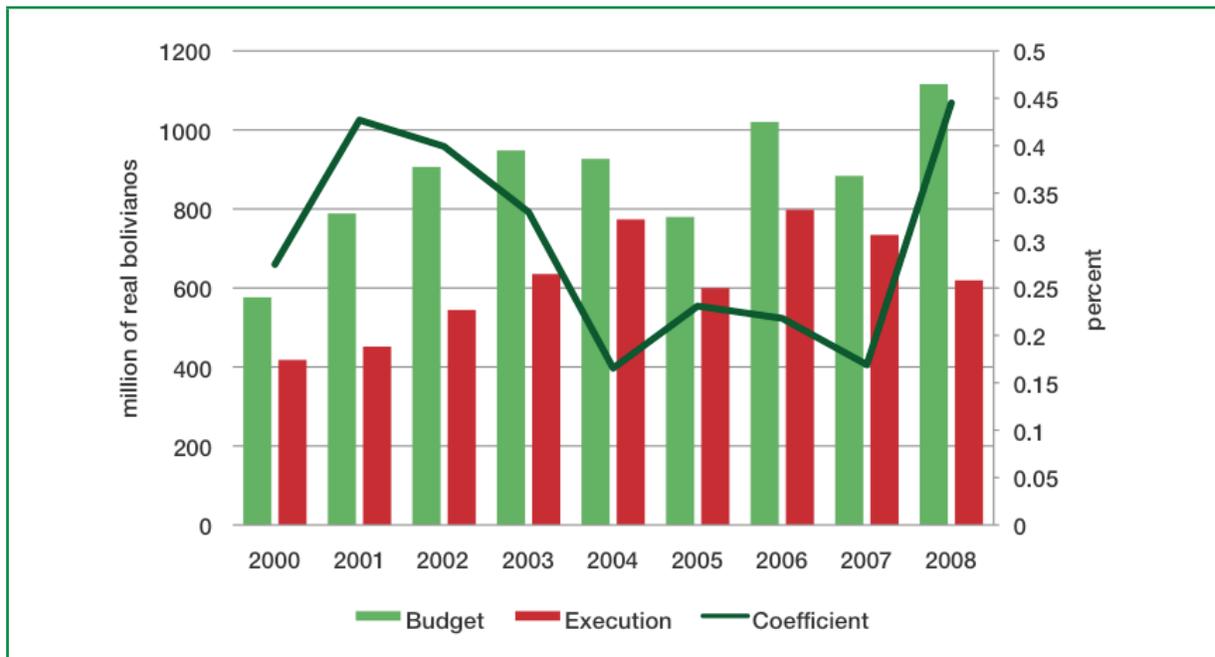
3.15. The amounts of co-funding are not generally reflected in the stream of budget execution, although these amounts can be quite large. Local counterpart resources represent a steady 10% of total budget over the period of 2000–2008. For example, the amount of co-funding for 2009 for the Government Program PAR was 11 million bolivianos. This is also noted in the case of other Government Programs in the agricultural sector that implement their projects through transfers to sub-national governments, who coordinate with private organizations and generate their own monetary input which is not registered as budget execution. The co-funding from municipal governments is also not registered in the budget execution of municipal governments.

3.16. Factor 4: Under-utilization of budgeted resources in agriculture reduces the leverage of the sector in budget negotiations. This raises important questions related to the absorption capacity of public resources allocated to the

sector. It is also related to the need for more results-based evaluation of spending to enable more accurate budget planning and allocation, as well as expectations of reaching specific financial and physical goals.

3.17. Evidence of under-utilization of budgeted resources is found at the national level. During the period 2000-2008, actual expenditures of the agricultural sector institutions represented on average 70% of planned budgets²⁶ (Figure 10). The gap between budget and execution for 2008 is particularly large, as during this year additional transfers were made to support the State enterprise EMAPA for mitigating the effects of the rises in global food prices.²⁷ Evidence of under-utilization of sectoral resources is also provided in Annex 7 for the de-concentrated and decentralized entities of the Ministry, where a similar picture emerges of the share of executed budgets being below 80%. The standard on budget execution according to the Public Expenditure and Financial Accountability (PEFA) partnership is to be within 10% of the planned budget.

Figure 10. Planned and executed budget of agricultural sector institutions



Source: Authors using data from Ministry of Finance

Note: The deviation coefficient is measured as the ratio of non-executed budget over planned (approved) budget.

3.18. Although aggregate under-utilization of public resources appears to be large in the sector, the magnitude of the gap varies by functional classifications of spending.²⁸ At the Department level, significant under-utilization of public resources is observed over time in irrigation and drainage expenditure, in particular in the Departments of La Paz and Oruro. Over-utilization of public resources (i.e. more being spent than actually allocated), although less frequent, appears to be the norm for rural roads, and to a lesser extent for agriculture (Annex 8). This may be

²⁶ The evidence of under-utilization is widespread in Bolivia and it is not only a characteristic of the agricultural sector. The vast majority of line Ministries of Bolivia has under-spent their allocated budgets in the last 5 to 10 years with similar execution gaps as those of the Ministry of Agriculture (around 70%).

²⁷ EMAPA's budget execution in 2008, however, was 21% with the vast majority of the budget of this entity being approved for current spending (98%), of which 81% was approved for subsidies (under the category of "materials and supplies").

²⁸ Although the information is presented by Department, it is important to note that during the period of budget execution, several adjustments between activities, projects and programs are made within institutions in the sector and not within the Departments as such. The budgets are approved and executed by institutions and not by Departments.

suggestive of important re-allocations of public expenditure within the sector and across sectors at the sub-national level, due to priorities or lack of capacity in the under-spending sectors.

3.19. The frequency distributions of the gap between budgeted and executed resources at the municipal level (for 2008) suggest that **the majority of municipalities under-utilize their public resources** – 79% of municipalities do so for rural roads expenditures, 85% for irrigation, and 90% for agricultural expenditures (Annex 9). These figures point to the need of a more in-depth understanding of existing limitations at the municipal level in the planning and execution of spending.

3.20. Factor 5: Budget formulation is not results-based, which makes it susceptible to the influence of political and other discretionary factors. Budgets are incremental and not adjusted to actual performance, which leads to wide gaps between planned and executed expenditures, as discussed above. This is particularly noted in the agricultural sector, where sector-wide monitoring mechanisms are nonexistent and the registry system (SIGMA) has not enabled the sectoral classification of spending, which results in the need of manual work for determining the scope of such spending (across programs, projects, and across levels of government) and its execution. Lack of such classification inhibits the analysis of impact of spending in the sector and limits the strategic planning of future investments.

3.21. Budget execution is the sole indicator of performance. Despite the complexity of the budget process and the institutional requirements for Annual Operational Plans (or POAs) for all levels of government, outputs are measured in financial terms only, as executed versus planned budgets. Physical measures of performance are rare and ad-hoc. Results indicators are project-specific, fulfilling different investment demands and related outputs. The success of an intervention is thus assessed based on the percentage of executed budget rather than on the quality of results. This has constrained a process of prioritizing investments based on concrete results and has, arguably, constrained the effectiveness of public spending in the sector.

3.22. Performance is evaluated at the programmatic level. Because budget formulation is developed and executed by programs and projects, performance is also evaluated at the programmatic level. This is the case across sectors, including agriculture. There are several limitations to this approach. It does not allow for functional distinction of achieved results against the spending allocated to them and their scope. Also, it does not provide a clear indication of the quality of spending and limits an effective prioritization process based on achieved results.

3.23. Several approaches to monitoring and evaluation in the sector have been identified in Bolivia.²⁹ These are not coordinated efforts, as they focus on different aspects of sectoral interventions and typically do not monitor indicators but rather examine implementation. The MDRyT has initiated the use of a results matrix for its projects and programs. This has evolved into a process of designing a Management Tracking System that is intended to monitor the products of every unit, program and project of the MDRyT. The System has several important limitations that can prevent it from being an adequate tool for monitoring sectoral expenditures. The UNDP, using its expertise on measuring the indicators of the Millennium Development Goals, has recently developed a baseline for the productive sector in two Departments in Bolivia (La Paz and Cochabamba), and a set of monitoring indicators focusing on a number of agricultural products. UNDP's efforts to create a Department level monitoring system (by agricultural product) are aligned with the new role for statistical management and analysis that the new Constitution assigns to the Departments. This is also important given that monitoring mechanisms and efforts are heterogeneous across Departments, making a sectoral assessment of impact of spending difficult.

²⁹ This section provides a very brief summary of a comprehensive background paper by Casanovas, M., 2010. *Sistemas de monitoreo y evaluación en el sector agropecuario de Bolivia*. This paper is available at: www.worldbank.org/bolivia

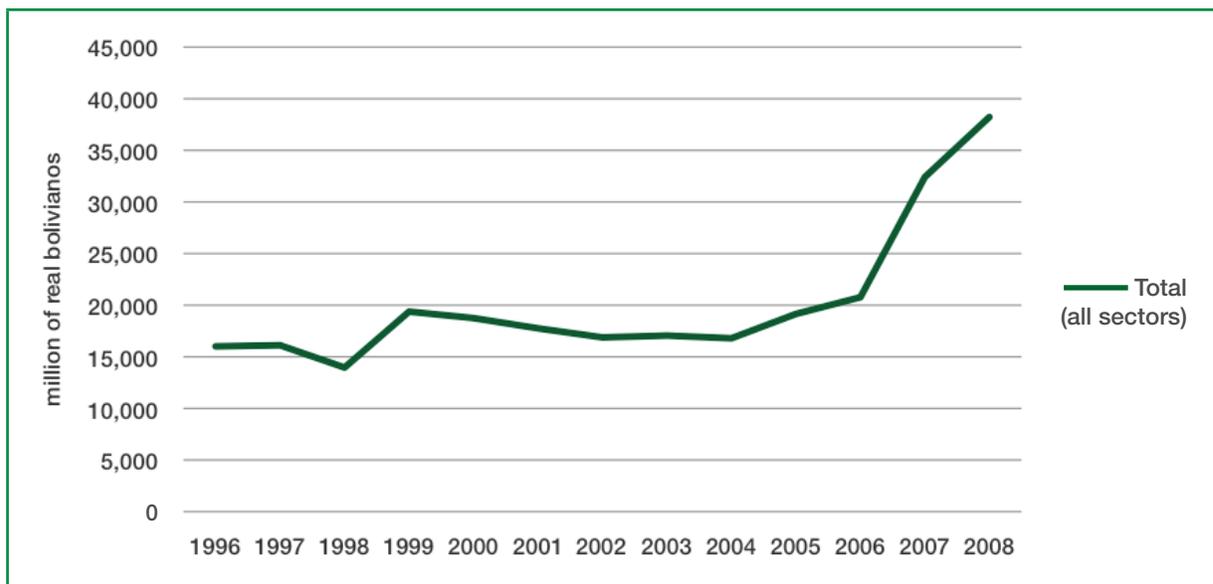
4. ORGANIZATION OF PUBLIC EXPENDITURE IN AGRICULTURE

Despite the important role that agriculture plays in the economy of Bolivia, public spending in the sector is relatively low (at national and sub-national levels). The composition of agricultural spending has given little priority to agricultural research and extension services, with more resources currently being destined towards productive development and administrative categories. The economic composition of agricultural spending has seen large increases in the share of current expenditures, which has fiscal implications. Changes in investment patterns at the sub-national level are becoming more noticeable in the agricultural sector. Spending in the sector is much more decentralized than that of other sectors, with municipal governments playing an important role.

National Level

4.1. There has been a marked increase in total public spending in Bolivia. Total real expenditures (in 2005 prices) have increased by 85% between 2006 and 2008 (Figure 11). Between 1996 and 2006, public spending in Bolivia represented around 27% of the country's GDP. This share has increased to 40% in 2007 and 45% in 2008. Although not an imminent threat, this marked increase in public spending can have fiscal deficit implications and may constrain the long-term sustainability of the provision of public goods in the country. The Government has had recurrent surpluses, which has enabled it to spend more in recent years. These surpluses, however, are primarily based on resources from the hydrocarbon industry, which are volatile, requiring a rethinking of the long term sustainability of increased public spending.

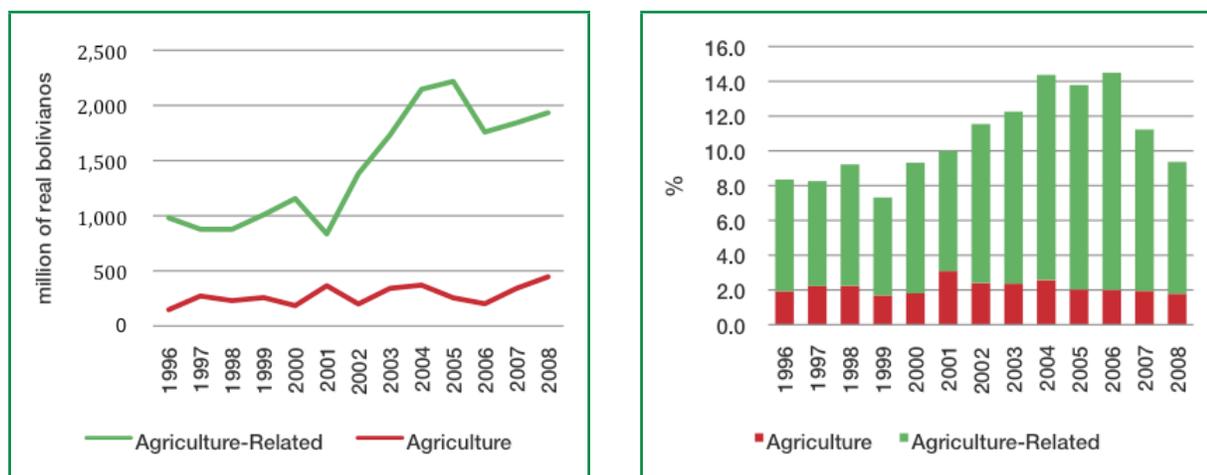
Figure 11. Total public expenditure in Bolivia



Source: APER database

4.2. Although the importance of the agricultural sector is explicit in the Government development plans, the share of total spending allocated to agriculture does not reflect the priority given to the sector. While total public expenditure has been on the rise, agricultural spending has remained almost constant (Figure 12) representing a very small share of total public spending. This is in contrast to agriculture-related spending, where significant public resources have been allocated to the building of rural roads and bridges (representing close to 90% of all agriculture-related spending). While the share of agriculture-related spending in total spending has fluctuated from 12% in 2004 to 8% in 2008, the share of agricultural expenditures has remained constant at around 2% between 1996 and 2008.

Figure 12. Agriculture and agriculture-related public expenditure (in levels and %)

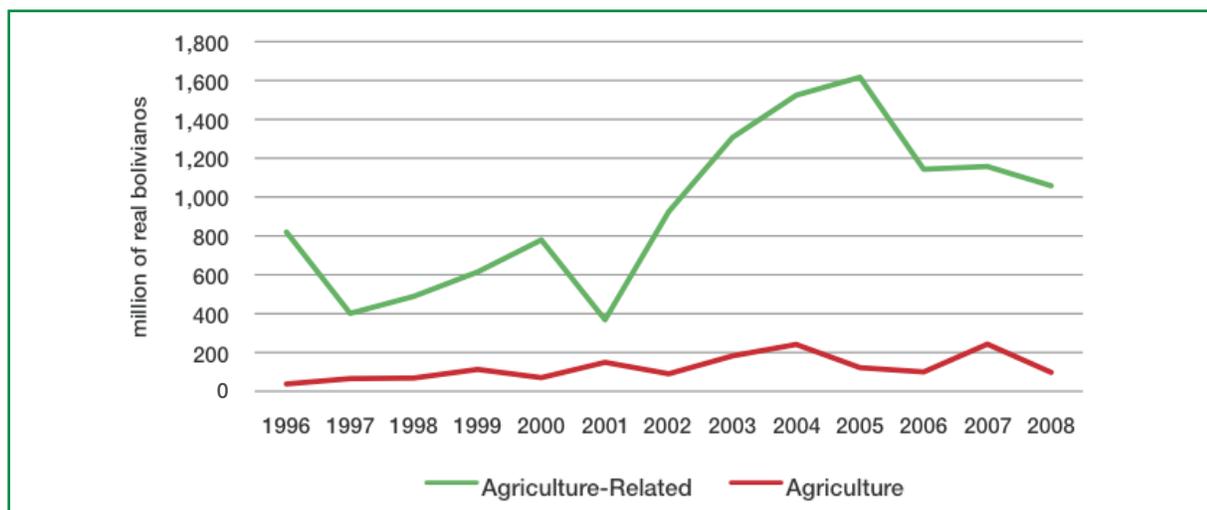


Source: APER dataset

4.3. The public sector has deepened its role in the sector through the creation of State enterprises as generators of value added in agriculture. Through the largest State enterprise, EMAPA, the Government is consolidating its presence in the acquisition and transformation of food, as well as in the price support policies of food in the country. Although under the oversight of the Ministry of Productive Development and Plural Economy, EMAPA supports small agricultural producers through interest-free loans and commercialization at subsidized prices for at least 50% of the items in the basic food basket (e.g. rice, wheat, maize, soybean, cooking oil, flour, beef and chicken). Other State enterprises are more specialized, such as AZUCARBOL (for sugar), LACTEOSBOL (for milk) and EBA (for almonds).

4.4. The agricultural sector continues to be dependent on foreign financing, although less so than in the past. Significantly more foreign money has been devoted to agriculture-related investments than to agriculture in Bolivia (Figure 13). Although more volatile, on average, 64% of total agriculture-related expenditure is from foreign sources, while in agriculture it is 43%. Foreign funding, however, is on the decline in Bolivia, with a sharp fall in 2006 and a continuing downward trend in 2008. This is partly due to USAID's reduction of its assistance levels in the sector. In 2008, a little over half of spending in agriculture-related activities (55%) and a fifth of spending in agriculture (22%) were from foreign sources.

Figure 13. Foreign financing in agriculture and agriculture-related investments



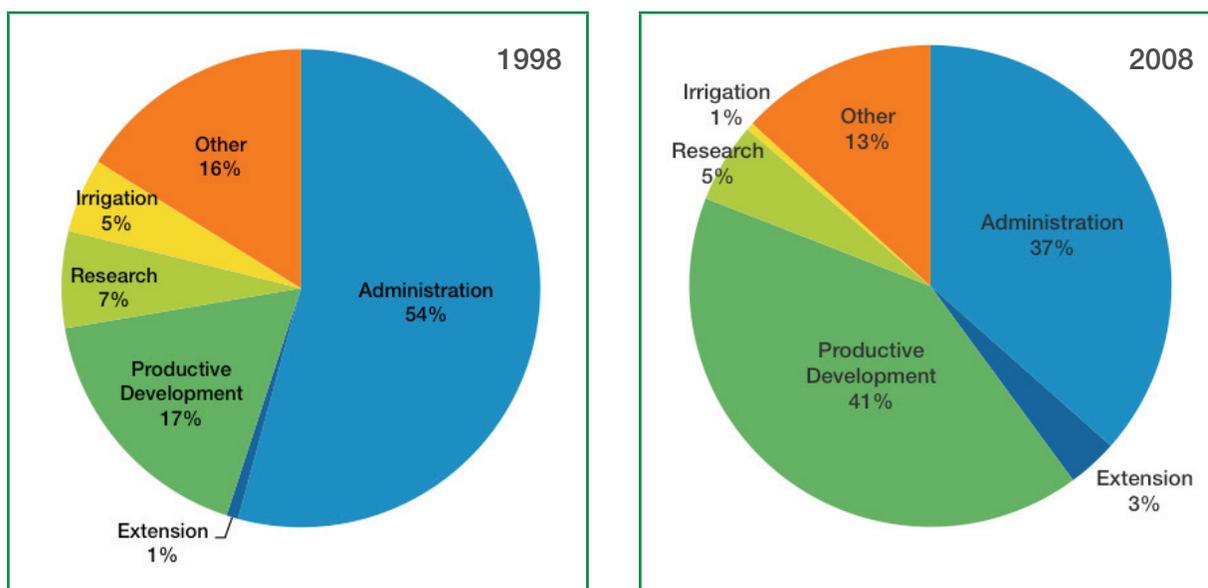
Source: APER database

Functional composition of spending

4.5. Spending on agricultural research and extension has been low and extremely volatile. Although average research spending between 1996 and 2008 has represented around 18% of total agricultural spending, it has been very volatile - only 1.6% in 1996, peaking at almost 40% in 2004 and falling to 5.35% in 2008. During the period 1996 to 2008, the average spending on irrigation (as a percentage of agricultural spending) was 3%, while that on extension was 5%. The volatility of spending on agricultural research can be attributed to the fact that historically agricultural research has been externally financed with no core national funding allocated to it. This has led to volatility tied to fluctuations in the availability of donor resources.

4.6. In recent years more emphasis has been put on productive development (defined in Annex 2), which includes institutional development and a range of budget supports to production and value chain development. In 2008, spending on productive development received the largest share of agricultural spending (41%) followed by administration and regulation (37%) (Figure 14). Productive development captures some of the public money going to private producers as support. Although it is not clear how much public money goes to private producers, in the context of Bolivia this has brought some important results in integrating farmers to markets through production alliances in rural areas. In the context of climate change and food security this may be justified, although clear exit strategies should be formulated to ensure the sustainability of the investments. Despite its importance in the context of Bolivia, territorial planning and land have received an average of 4% of agriculture-related spending between 1996 and 2008.

Figure 14. Functional composition of agricultural spending, by year



Source: APER database

Note: Annex 2 provides a detailed description of each functional category of agricultural spending.

4.7. The agricultural research intensity ratios in Bolivia are very small. Agricultural research spending as a percentage of agricultural GDP (also known as intensity ratio) has averaged 0.01 over the period 1996 to 2008. The intensity ratio for the LAC region during the period of 1981 to 2000 is of the magnitude of 1 and that of developed countries of 2.05 (Alston and Pardey, 2006) (Box 1). The low ratio is an indication of the very limited support that agricultural research has received within the agricultural portfolio in the country. This is also evidenced in the unpublished study by the IADB, where only 1% of total support to agriculture is allocated to research and development (Figure 9 above).

Box 1. Evidence on rates of return to investment in agricultural research and extension

Empirical evidence suggests that rates of return to public spending in agricultural research and extension are high (Alston et al., 2000). The rate of return across Latin American studies averages at 53%, which is close to the average for developing countries (of 60%), but well below the average for developed countries (98%). Studies about the technological performance of the Colombian research system suggest an aggregate marginal IRR of 50% for research and 21% for extension. The benefit cost ratio of 14 to 1 further confirms that research and extension have been socially profitable public investments in Colombia (Pardey et al., 2006).

The rate of return to research is also found to vary according to each problematic area. Because of the longer production cycles, rate of return are lower for natural resource management research (primarily forestry), with an average of 42%, compared to research on annual crops (an average of 74%) or livestock (an average of 121%). A lower rate of return is also found in studies that combine research and extension (an average of 45%) compared to studies evaluating only research (an average of 88%) or only extension (an average of 79%).

4.8. Public spending in research and extension, however, is not the only factor of success. Agricultural innovation processes require long term political commitment, financial stability and institutional strength. The success of Brazil and Uruguay is proof of that (Box 2). Both countries have invested heavily in agricultural innovation, and this investment has not only been in core research, but also in human resources and institutional strengthening. This stands in contrast with Bolivia, where in less than 10 years this is now the third model of a national agricultural innovation system being developed.

Box 2. Agricultural innovation in Brazil and Uruguay

Among the institutional ingredients of success in Brazil and Uruguay are the strong and stable national institutes that lead agricultural research and the national agricultural innovation systems. The established institutional models, EMBRAPA in Brazil - created in 1973 and INIA in Uruguay - created in 1989, enjoy wide support and pursue the long term development of the agricultural sector, rather than short term objectives. Their governance structures integrate different public and private positions, and their financial model is sustainable allowing for contributions from the public and private sectors. The effective coordination across public and private entities and across space (the geographical distribution of research stations in each country) enables the Institutes to develop and implement their strategic visions according to national and regional priorities.

Investment in capacity strengthening is another important factor of success. Attracting and retaining national and international experts has been a key priority of the Institutes. For example, a quarter of the staff of EMBRAPA, for example, is comprised by researchers and 74% of them have doctoral degrees. In Bolivia, there is evidence of large turnaround of staff working in the sector, which reduces the impact of investments in capacity strengthening and compromises the continuity of programs. Even without frequent changes in staff composition, Bolivia has a very low number of qualified staff in science and technology in comparison to its neighbors.³⁰

³⁰ For more information, indicators can be consulted in: www.ricyt.org

Economic composition of spending

4.9. Current spending is larger than actually recorded. Expenditures are classified into two categories: operational and investment. Within the investment category, around 15% is allocated to current spending and the remainder is considered capital expenditure. With this in mind, current spending is actually larger than typically recorded: it is the sum of operational expenditures plus the current expenditure component in investment spending.

4.10. Although legal norms define the capital to current³¹ ratio of spending in Bolivia, the more local the level of government, the larger appears to be the share of capital expenditures. This is due to the fact that municipal governments are allowed to spend only 25% of their budgets on current spending, with the remainder being invested (under the Law of Popular Participation). *Gobernaciones* and the central government do not have restrictions on use of budget across economic classifications, but given the central government's role in the provision of services and oversight of de-concentrated institutions, its current expenditures are very high. For example, in 2008, as much as 70% of central spending in agriculture comprises current expenditures³², while it only constitutes 15% and 30% for departmental and municipal governments, respectively. This is compared to 25% of central spending in agriculture-related investments representing current spending.

4.11. There are no rules of thumb regarding an optimal balance between capital and current expenditures in agriculture. The average capital/current ratio in agriculture varies across countries, as determined by specific sector priorities and institutional and program goals. Using data from 43 developing countries over a 20 year period, and considering all public expenditure, Devarajan, Swaroop and Zou (1996) argue that reallocating funds from capital to current expenditures, while keeping the overall level of expenditure constant, can foster long term economic growth. Diminishing marginal returns on excessive capital investments render them unproductive. On the other hand, allocation of funds towards other components of recurrent expenditures (such as operation and maintenance) can bring high returns.

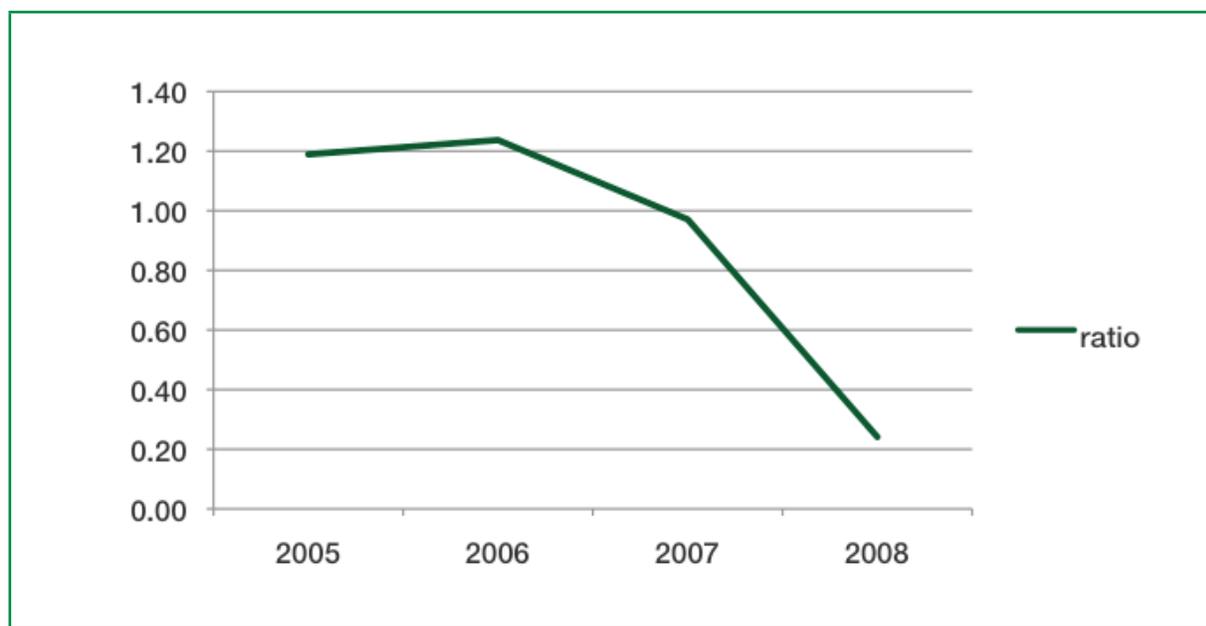
4.12. In Bolivia, the capital current ratio of agricultural expenditure has sharply decreased in recent years. Current expenditures have increased (in real terms) by 82% over the period 2005 to 2008, while capital expenditures have decreased by 62% over the same period. This has made the capital current ratio experience a significant dip in recent years reaching 0.24 (Figure 15 below). This could be explained by the fact that rural infrastructure spending is captured under agriculture-related spending and not agricultural spending. Considering that the source for most current expenditure is the National Treasury, while capital investments are mostly funded by foreign resources, this reduction in the capital current ratio has important fiscal implications.

4.13. The composition of current expenditures in agriculture is trending away from payroll costs and more towards non-wage services. Although current expenditures have seen an increase of 82% during the period 2005 to 2008, spending on personnel (wages and salaries) within the current component of spending has decreased from 42% in 2005 to 23% in 2008. International experiences suggest a ratio of salary to operational expenditure of 60:40, with the effectiveness of agricultural services being adversely affected if expenditures on wages and salaries exceed 60% of total current budget (World Bank, Turkey PER, 2004; and World Bank Pakistan study, 2004). Although more current resources appear to be spent on non-wage categories, it is not clear whether they are allocated to the operation and maintenance of existing investments or support in the sector.

31 Current expenditures (operating expenditures) refer to payment for personal services (wages and salaries), social obligations, taxes, current transfers, purchases of materials, services and inputs required for the operating of the public administration. Capital expenditures include investment spending (spending on physical capital for the increase and improvement of existent capital stocks) and capital spending.

32 Current expenditures at the central government have represented an average of 40% of the sectoral budget during the period 2005–2007, with a significant increase in 2008 to 73%. The average expenditure on wages and salaries (personnel services) within the current expenditure is 22% and within the investment expenditure around 16%.

Figure 15. Capital current ratio of agricultural expenditure in Bolivia



Source: APER database and data from Ministry of Finance

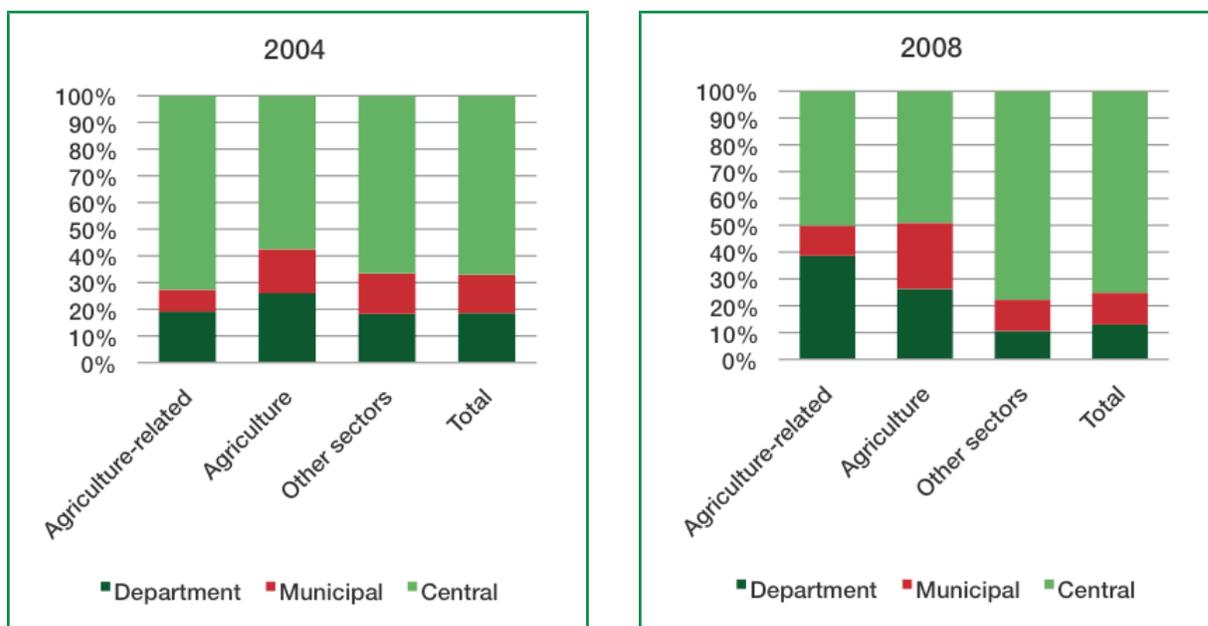
4.14. Paying attention to spending in operation and maintenance is important. A common feature across developing countries is for non-wage operation and maintenance expenditures to represent less than a third of current expenditures in agriculture, which is insufficient for sustaining adequate levels and quality of services (Fozzard, 2001). With the share of spending on wages and salaries decreasing and more and more of the limited resources destined to direct subsidies, there is an indication that perhaps an adequate share of current spending in agriculture in Bolivia is destined to operation and maintenance. This is important for the sustainability of investments in the sector. It is also important to keep in mind for future sector investments, given that operational spending can be highly sensitive to changes in capital expenditures. For example, based on expenditure patterns in Ethiopia during the period 2002-2006, an increase of 10% in real capital expenditure for agriculture would require an increase of 43% in budgetary resources for operation and maintenance. Sensitivities vary widely across regions in a decentralized context (World Bank Ethiopia PER, 2009).

Sub-national Level

4.15. Public agriculture and agriculture-related spending is much more decentralized than that in other sectors in Bolivia (Figure 16 below). The central government accounts for only half of the public agriculture and agriculture-related spending in 2008, a role that has been significantly reduced since 2004. Among sub-national governments, *Gobernaciones* allocate a larger share on agriculture-related investments than municipalities, while they share similar expenditure patterns for agriculture.

4.16. The changes in investment patterns at the sub-national level are becoming more noticeable in the agricultural sector. During the first phase of decentralization, changes in the composition of public investment were mostly influenced by local needs. Public resources were prioritized and investment concentrated on high-priority sectors (Faguet, 2004), including the social sectors, followed by productive and infrastructure projects. This pattern, however, has changed in recent years with more public resources being allocated to the agricultural sector. Over time, the share of education has decreased from 41.7 percent in 1996 to 36.6 percent in 2008. The share of health has remained constant while the share of agriculture has increased from 15.6 percent to 23.1 percent between 1996 and 2008.

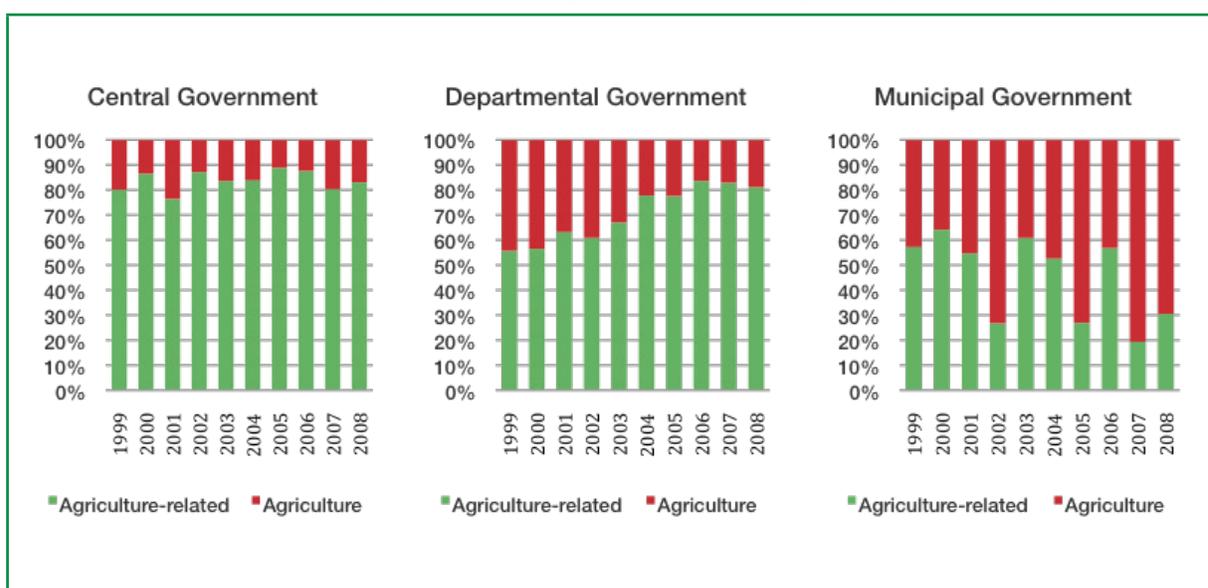
Figure 16. Expenditure distribution by level of government



Source: APER database

4.17. There is evidence of changing distribution patterns of sectoral spending within and across levels of government. Central government spending in agriculture and agriculture-related investments is allocated almost exclusively to the latter (and primarily towards the construction of roads). Departmental spending in the rural sector was more balanced in 1999, something that has changed in recent years, with the pattern of spending becoming more skewed towards agriculture-related investments (Figure 17). There appears to be a decreasing tendency in the share that departmental governments allocate to agriculture, although this share remains above the central government allocations to the sector. The share of municipal governments, on the other hand, has increased in the last decade (Table 2 below). Municipal governments are important “investors” in agriculture, with agricultural spending representing the largest share at this level.

Figure 17. Distribution of agriculture and agriculture-related spending, by level of government



Source: APER database

Table 2. Distribution of agricultural spending by level of government

Level of government	Ag spending as % of total spending		Ag spending as % of ARD spending	
	1997	2007	1997	2007
Central	1.7	1.1	23.7	15.6
Departmental	4.8	3.8	32.5	14.3
Municipal	1.1	3.7	30.5	33.6

Source: APER database

4.18. There are important spatial concentrations of agriculture and agriculture-related expenditures. In all studied years, over 60 percent of all public spending in agriculture is accounted for by Santa Cruz, Tarija and Cochabamba. In 2008, Tarija alone accounted for 40 percent of total spending on irrigation, while two Departments (Tarija and Potosí) accounted for nearly half of rural roads spending in Bolivia (Annex 10).

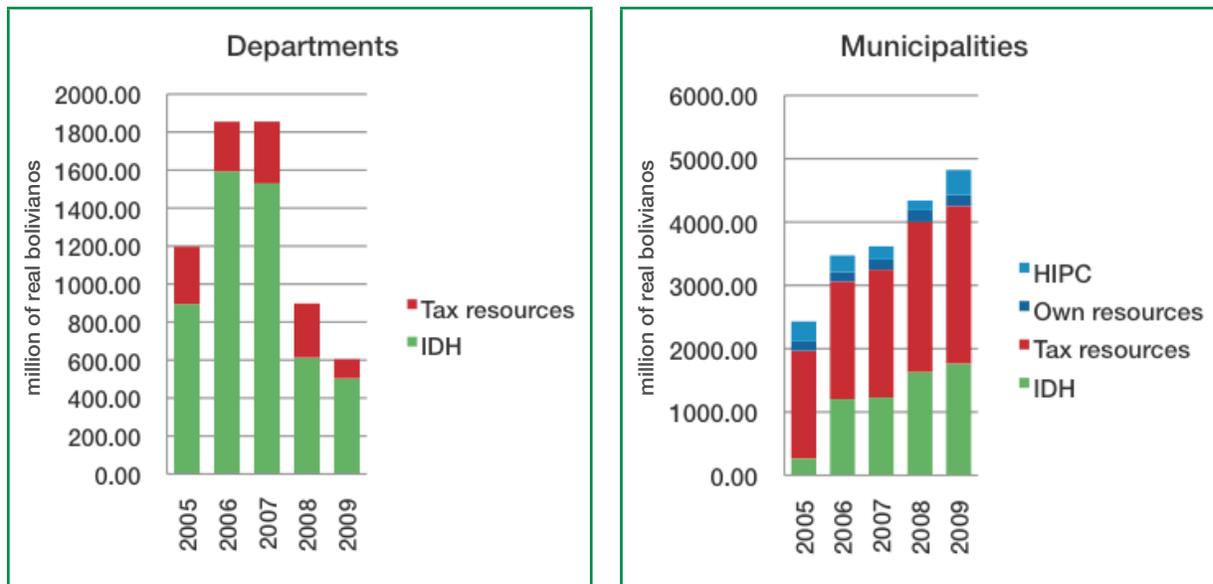
Public Transfer Mechanisms

4.19. There are different modalities of resource transfer to rural areas: 1) direct transfers (without counterpart) for food security and incorporating small rural producers to markets, through national programs like CRIAR and PASA; 2) financing through advance purchase contracts (provided by the State enterprise EMAPA) for inputs, seeds and equipment; 3) non-refundable transfers with producer counterpart for investment in infrastructure, equipment, inputs, seeds, technical assistance, though the program EMPODERAR; 4) subsidized credits from the Bank for Productive Development for a wide range of economic initiatives.

4.20. Fiscal dependency of sub-national governments is a fact. The resources of sub-national governments are largely (more than 90%) derived from transfers from the central government. Most of these transfers are regulated by law and the central government has little discretionary power to stop them. Although most of these transfers are block transfers (i.e. with little earmarking), there are expenditure rules defined by legal decrees as to how the money can be spent. The transfers are more restrictive at the departmental level, with their scope of use being wider at the municipal level. The tax base of departmental governments is virtually nonexistent with royalties from the extractive industries representing the bulk of their own resources. Although limited in volume, municipal governments have own resources from property and automobile taxes. However, there are large differences between rural and urban municipalities, with the former being more dependent on transfers than the latter (World Bank, 2007). There are three main groupings of transfers (based on the source of resources) – those derived from hydrocarbon taxes (IDH and IEDH), resources from the national government's tax revenue, and resources from debt relief (HIPC) (Figure 18 below). They are general purpose transfers without predetermined use or expected results. Each has its own set of rules (established under laws and decrees) on the distribution of resources across sectors and administrative levels (see Annex 11 for details by Law).

4.21. The roles and responsibilities of sub-national governments are defined by law and so is the proportion of resource allocations that they receive. The 9 Department governments (*Gobernaciones*) are responsible for construction and maintenance of roads, including secondary roads, rural electrification, irrigation infrastructure, support for production, scientific and technical research and extension in the productive sector, environmental conservation, tourism promotion, and social assistance programs. In coordination with municipal governments, they are also in charge of facilitating access of the productive sector to the financial system, as well as the financing of projects on applied technological innovation and transfer, and animal health and food safety. They provide counterpart resources for spending in these areas. The *Gobernaciones* can finance activities in the agricultural sector with up to 85% of the resources allocated through the *Ley de Descentralización Administrativa*. Department governments are responsible for assigning to investment projects 85% of the royalty resources and 25% from the special hydrocarbon tax, 100% of the IDH resources, and 100% of their own revenues.

Figure 18. Income sources of sub-national governments



Source: APER database

4.22. The law defines the responsibilities for municipalities as well, though they have greater autonomy for allocating resources. By law, municipal governments are responsible for health and education infrastructure, sports fields, micro-irrigation infrastructure and rural roads³³, school breakfasts, defense of children and adolescents, promotion of policies to support women (all of them, requirements from the LPP); health, education, fostering local economic development and employment promotion, including training and technical assistance to the productive sector through programs and research projects, as well as technological innovation, market research, quality management, strengthening productive organizations, quality, marketing, training for the processing of primary products, providing access to the financial system through support to micro, small and medium enterprises for the creation of guarantee funds, seed capital and others, provision of services, infrastructure and equipment storage facilities, organization of the bodies responsible for promoting local production (all of these, requirements by IDH); and health, education and infrastructure (requirements by HIPC). By law, municipalities have to spend 75% of the resources obtained from national revenue-sharing, 100% of HIPC, 25% of IDH and other transfers, as well as 100% of their own revenue.

4.23. Despite a decade of decentralization efforts and related re-distribution of fiscal resources, poverty in rural areas persists. Today, three quarters of Bolivians living in rural areas are poor and 63% live in extreme poverty. This has led to significant out-migration to urban areas. The number of migrants from rural to urban areas has doubled in the last decade. While increasing tensions in urban areas, this large movement out of rural areas is redefining agricultural production patterns in terms of the quantity and quality of labor.

International experiences of decentralized service delivery in agriculture

4.24. The evidence on the effectiveness of decentralization in improving the efficiency of resource use is mixed (Box 3). Outcomes depend critically on whether local authorities involved are accountable to the entire local population. Outcomes are also sensitive to existent mechanisms and incentive structures for revenue collection. While sub-national governments have been given greater autonomy for spending public funds (aligning expenditure flows with local priorities), there is evidence that re-centralization of revenues has widened the fiscal gap at lower levels as well as the information gap across government layers in a number of countries. The gaps are compounded by issues

³³ Rural roads (*caminos vecinales*) represent 51% (or 67,000 km) of the road system in Bolivia.

of coordination quality between federal and regional agencies, as well as the fiscal capacity of local governments. Furthermore, earmarked transfers from central governments or distortionary tax mechanisms implemented by local governments are some of the mechanisms used to alleviate the fiscal burden.



Box 3. International experiences with decentralization

Decentralization of agricultural extension services in LAC is generally characterized by delegation, i.e. when a sub-national government or parastatal organization acts as an agent of the central government in the implementation of agricultural extension services. Thus, sub-national governments have some freedom in implementing services, but they depend on the central government for financing. Only in Brazil is decentralization defined by devolution, i.e. states have to organize and finance their own extension services. In general, the level of decentralization varies widely across states, regions and municipalities, with experience being mixed (World Bank LAC, 2006).

In rural Mexico, federal spending is large, but its impact is limited. The capacity of state governments to influence the allocation of funds is inadequate. State governments contributed 16% on average (during 1996-2004) of the resources for agriculture, livestock and rural development programs in the form of voluntary matching funds. When measured in per capita of rural population, this allocation is regressive.

Evidence of fiscal centralization is found in China. Although 70% of the entire public expenditure in 2004 was made at the sub-national level, sub-national governments have become largely dependent on their shares of central taxes and grants. In 2003, sub-national governments financed 67% of provincial, 57% of Department and 66% of county and lower-level expenditures. In 2004, the transfer dependency at sub-national levels grew to 51%.

In Uganda, locally generated revenue is less than 10% of the funds administered by local councils. The remainder consists of transfers from the central government, most of which (84 % in 2000/01) are earmarked conditional grants (Bahiigwa, Rigby and Woodhouse, 2005).

A widening fiscal gap has made some local governments look for alternative sources of funding, such as local taxes. Evidence of decentralized authority becoming part of the problem of rural poverty, rather than part of the solution is provided by the experience in Tanzania. Local councils generate revenue from over 60 different taxes and fees. The cost of administering this complex tax system often exceeds generated revenues. The distortions they create are also large (Brosio, 2000).

4.25. In the context of effectiveness of decentralized public service provision, Vietnam and Indonesia are presented as examples of extension systems in agriculture (Box 4 below). Both East Asian countries (with similar contributions of agriculture to the economy as in Bolivia) have undergone a process of decentralization and have gained knowledge on effective approaches and possible limitations in decentralized service provision. The experiences of these countries can be useful for designing decentralized public sector interventions in agriculture in Bolivia. Several general insights emerge from both countries' experiences, presented below.

4.26. Sub-national governments have limited implementation capacity and require adequate financial and human resources to transition into new governance, planning and management structures. Matching decentralization with commensurate human and financial resources can speed up the effectiveness of the new competencies assumed by sub-national governments. Associating capacity building mechanisms to the different stages of decentralization (from transition to completion) can help equip lower levels of government for delivering better results.

4.27. In order for sub-national governments to capture the benefits of decentralized planning and implementation, it is important that they have mechanisms to avoid overlaps and duplications, foster efficiency gains and strategic coordination. Designing and testing information sharing mechanisms (i.e. one stop shop web sites) between levels of

government can help consolidate joint planning and cross-level monitoring and evaluation systems. Having rules and processes that enable synergies and facilitate inter-governmental decision-making can also help avoid conflicts and duplications across levels of government.

4.28. Sub-national governments with unified³⁴ extension systems are more likely to capture the benefits offered by decentralization. Ensuring that national programs led by line ministries are designed and implemented in harmony with sub-national plans and programs can help avoid creating disincentives to invest in the sector. Planning, budgeting for and implementing extension services is easier for unified than it is for fragmented extension systems. Having a unified extension system can help maintain strategic and operational coherence, and reduce transaction costs.



Box 4. Experiences of Indonesia and Vietnam

Indonesia: unified extension systems invest more and deliver better results

Decentralization spread the responsibility for planning and delivering extension services across central, provincial, district governments. This created three-fold and overlapping governance, financing and planning channels of public administration.

Before decentralization all the extension activities were represented by a single agency at the district level. This was met with difficulty by the villages due to the fear that they would lose their identity. As a result of decentralization, districts were able to choose how to organize their extension system. Two-thirds opted out of the unified agency system to create their own extension structures, most of them shifting towards commodity based agencies.

The districts that have established unified extension agencies are delivering better quality services; they are also better at aligning central and sub-national priorities, as well as in reflecting stronger linkages between their planning and budgeting.³⁵ Districts with fragmented extension systems elaborated isolated programs and did not capture the potential for joint planning offered by decentralization. In fact, districts with weaker planning spent a greater share of their budgets on administrative programs rather than on functional programs that directly benefit farmers.

Despite increasing transfers from central to district levels, extension activities have been underfunded, and fewer funds have been dedicated to operations and projects. With a national level program like the Agriculture Extension Revitalization which employs contractors, the central government is setting a perverse incentive to under-invest in extension workers at the district level.

Vietnam: decentralization depends on the capacity of sub-national agencies

Decentralization was a challenge for the Ministry of Agriculture and Rural Development (MARD) due to the insufficient capacity to implement the new institutional and competency designs. The lack of adequate financial and human resources to execute the new designs limited the effectiveness of decentralization.

The decentralization of functions and responsibilities was gradually implemented across levels of government, sectors and regions. As there were no monitoring and evaluation methods for signaling implementation problems and fixing malfunctions, decentralization was not implemented with the same success and scope across the country. The biggest stumbling block for Vietnam was setting up mechanisms and processes that enable decentralized decision-making, financial management, information sharing and monitoring.

(cont.)...

³⁴ Before decentralization, almost all districts in Indonesia had extension services fragmented into at least 4 technical services (livestock, staples, horticulture, perennials). A unification of these services was piloted in 16 districts. With the arrival of decentralization, the choice for unification was left to the districts.

³⁵ *Enhancing Agriculture by Investing in Extension Services*, Policy Note, Indonesia Agriculture PER, 2010.



... (cont.)

Decentralization of extension services is often synonymous with more resources for sub-national governments. But weak capacity to absorb, plan and manage those resources can stifle the objectives of decentralization. Quang Ngai is a poor province with little institutional, human and financial capacities. Long An is a richer province which counts with a robust governance capacity. Comparing the two provinces shows that richer provinces have more capacity to capture the benefits of decentralization than poorer provinces.³⁶

Deconcentration in the Quang Ngai Province	Deregulation in the Long An Province
<ul style="list-style-type: none"> • The Quang Ngai provincial administration has weak planning and management links with its local administrative units, functions and responsibilities overlap and work is often duplicated due to an unclear division of labor. • The provincial budget is derived from the central budget of national programs in addition to local revenue. • As a poor province with limited governance, financial and human capacity, Quang Ngai has not been able to benefit from the advantages of autonomy in planning revenue and spending. • Agricultural and rural services in Quang Ngai (agricultural supply company, its research and extension center and its cooperatives) are all affiliated to the State. • The Research and Extension Center receives its budget from the government (which pays for salaries) and from fee-based activities (which pay for research and development activities). The center now allows districts to draw their own plans. 	<ul style="list-style-type: none"> • The Long An provincial administration has a solid governance capacity and a strong linkage between planning and management. • Long An is a richer province, which has defined responsibilities and functions more clearly with the provincial department of agriculture (management and supervision) on one hand, and with local administrative units on the other hand (planning and implementation). • Agricultural service delivery is dominated by fee-paying agents. This has enabled Long An to provide services in a targeted and efficient manner. • Agricultural extension is the responsibility of the Research and Extension Center and all projects initiate from the district and commune level.

36 Source: Modified from Adam Fforde and Associates Pty Ltd for the Australian Agency of International Development, *Decentralization in Vietnam – working effectively at provincial and local government level: a comparative analysis of Long An and Quang Ngai Provinces*. 2003.

5. ANALYSIS OF PUBLIC EXPENDITURE IN AGRICULTURE

Strategic reallocation of public resources towards research and extension can raise agricultural output in Bolivia. There are signs that spending allocation decisions in the sector take into account vulnerability to food insecurity, which is a step in the right direction in terms of aligning expenditures to Government priorities. Regressivity of public expenditure in agriculture and agriculture-related investments is evident, but sectoral allocations across municipalities are showing signs of being more progressive in recent years. Increased participation of communities in the resource allocation process of municipalities could improve the prioritization of agricultural investments and increase the demand for their actual implementation.

Effectiveness of Spending

5.1. The previous section provides insights into the distribution of sectoral spending across levels of government and classifications, as well as the degree of utilization of planned resources. It does not, however, provide clarity about the impact of sectoral expenditures on sectoral performance, such as agricultural output growth, among other indicators. **This section provides an empirical assessment on how sub-national public spending in agriculture and agriculture-related investments affect agricultural output growth in Bolivia and how they relate with food security at the sub-national level.**

5.2. On the more macro level, economic evaluations of the impact of agricultural spending in Bolivia are scarce. On the more micro level, commodity specific studies are put together and updated by several agricultural organizations in Bolivia, both private and public, focusing on basic or applied research. At the national and sub-national levels, the efficiency of public spending is often evaluated by the percentage of actual spending (as compared to planned budget) rather than by the actual results (and their quality) it achieves. The number of beneficiaries is another indicator commonly used to assess impact at the more programmatic level. However, output based indicators are rarely measured and the physical impact is difficult to assess against a specific level of expenditure.

Public expenditure and agricultural output growth (at the departmental level)³⁷

GENERAL CONSIDERATIONS

5.3. **The impact analysis considers both the inter- and intra-sectoral dimensions of public expenditure at the departmental level.** The relative effectiveness of public expenditure across different sectors is an important factor in *inter-sectoral allocations* of public spending, considering the total budget resources of the Government. There is, however, limited empirical evidence on inter-sectoral allocations of public resources. From the perspective of *intra-sectoral allocations*, different categories of agricultural expenditure can have different impacts on growth in the sector, both in combination and individually. However, identifying those with the greatest positive impact is difficult. A priori, a certain balance between investments and maintenance is needed to ensure the productivity in the sector. Similarly, it is important to consider how much is spent on public goods, such as agricultural research and extension and irrigation, vis-à-vis items that can be provided by the private sector. An empirical analysis is required to determine how the *level* of public spending in the sector and its *composition* contribute to agricultural output growth.

³⁷ This section is based on a broader, comprehensive background paper: Edmeades, S., Misch, F. and B. Moreno-Dodson. Rural Public Expenditure and Agricultural Growth in Bolivia. 2010. This paper is available at: www.worldbank.org/bolivia

5.4. The growth rate of agricultural output (agricultural GDP) by Department per rural inhabitant³⁸ is the outcome of interest. To capture actual impact, actual (executed) expenditure rather than planned (budgeted) expenditure is used in the analysis. The data are disaggregated by level of government and by functional composition of expenditure at each level (national, departmental and municipal)³⁹. Total departmental expenditure for a given category is the sum of spending by the departmental government and by all municipal governments within this Department in that category. Agricultural output growth is affected by a number of factors other than public spending, such as land under cultivation (per rural inhabitant), density of roads, and climatic effects (precipitation and temperature).

5.5. There are four reasons why sub-national expenditure is used for the impact analysis. First, for sub-national spending, there is sufficient variation both over time and across Departments, which is not available for national data in Bolivia. In addition, data on sub-national public expenditure are centrally collected, which minimizes problems related to unobserved heterogeneity due to differences in the classification of budget items. Second, by focusing on sub-national variation, differences across Departments can be taken into account. This is important in the context of Bolivia with its geographic and climatic heterogeneity and related agricultural production patterns. Third, the use of sub-national data is further justified by our focus on the expenditure side of the budget. While expenditure assignments are shared among the three tiers of government, it is only the central government that has the responsibility for defining tax bases and tax rates for all broad-base taxes, and borrowing at the sub-national level is limited. Therefore in our analysis we assume that the budget is always balanced, i.e. there is no variation in borrowing at the sub-national level, neither among the Departments nor over time. Four, Departments in Bolivia are also increasingly more responsible for allocation of funds across and within sectors, which has an impact on the sectoral and overall economic growth of the country.

5.6. Two empirical approaches are considered in the context of departmental expenditures. The first one captures the growth effects of reallocating public resources from other sectors (such as health, education) to rural expenditure (*inter-sectoral approach*). The second one captures the effects of changes in the composition of rural expenditure, in other words, re-allocations within the rural expenditure portfolio (*intra-sectoral approach*).

FINDINGS

5.7. Spending on agricultural research at the departmental level is more effective in raising Departments' agricultural output than spending on other sectors or other functional classifications within the rural sector. Reallocating public resources from other rural expenditure categories (including productive development, inputs, animal and plant health, soil management, administration) and other non-rural expenditure categories (health and education) towards agricultural research and, to a lesser extent, to extension services and irrigation, has positive effects on agricultural output growth. **A 10% increase in the share of agricultural research expenditure could raise agricultural output growth per rural inhabitant by at least 2% and as high as 7%** (depending on the specification). This result is robust across estimated specifications for both inter- and intra-sectoral allocations of public resources. The result is also supported in the literature.

5.8. Public spending composition at the sub-national level matters. Allocating greater share of spending to the core public goods (agricultural research, extension services and, to a lesser extent, irrigation) has positive growth effects over the medium term. This has important policy implications for the decentralization policies related to the agricultural

38 As agricultural output is largely produced in rural areas, dividing agricultural output by the total population (rural and urban) of the Department could be misleading and underestimate the actual impact. Therefore, agricultural growth per rural inhabitant is considered to better capture the impact of spending.

39 All expenditure data used in the analysis is from the APER dataset developed for this Public Expenditure Review. Additional non-expenditure related data used in the empirical work was derived from UDAPE and INE.

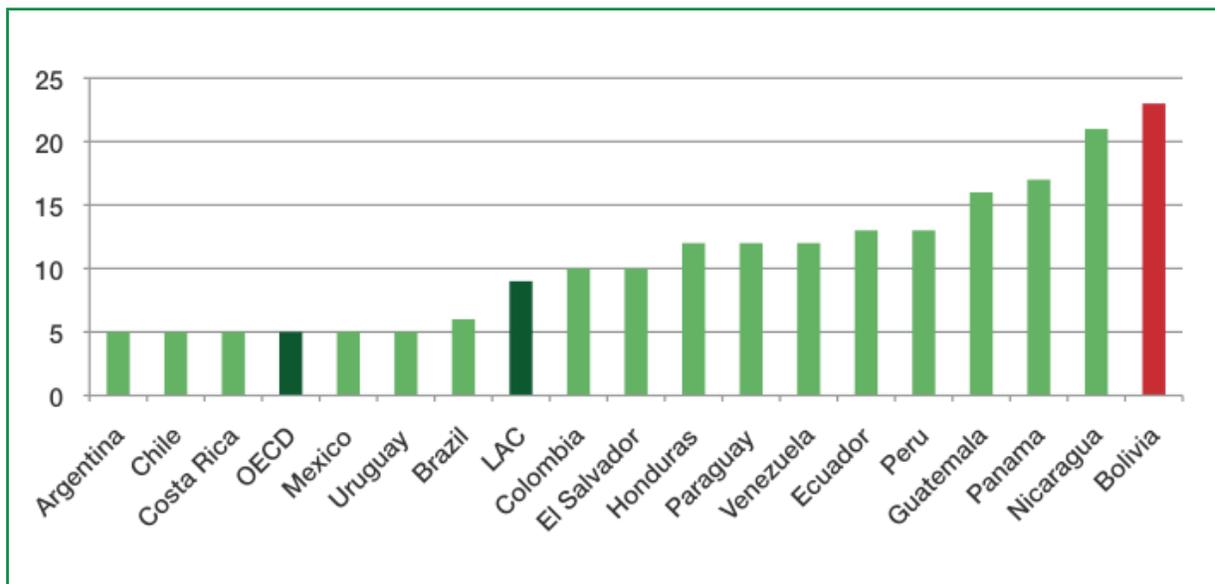
sector, for the roles and responsibilities of sub-national governments, for the provision of these services and for the management of public resources in the sector with clear measurement of impact.

Public expenditure and food security (at the municipal level)⁴⁰

GENERAL CONSIDERATIONS

5.9. Food security and sovereignty feature prominently in the current Government Plan 2010–2015 of Bolivia and are the key elements of several Government Programs currently implemented in the country. Close to a quarter of all Bolivians are undernourished, the largest share in LAC (Figure 19), and the depth of hunger is among the highest in the LAC region (Figure 20 below). The food price crisis and recurrent climate change phenomena have been estimated to adversely affect the country and have created a sense of urgency in better understanding and addressing food security in Bolivia. Climate related disasters are found to explain around a third of the food price increases (in 2003) through their effects on agricultural output. This effect can be further exacerbated through high regional specialization, making agriculture more vulnerable to contemporaneous weather shocks, leading to localized price increases (World Bank, 2010).

Figure 19. Prevalence of undernourishment (% of population)



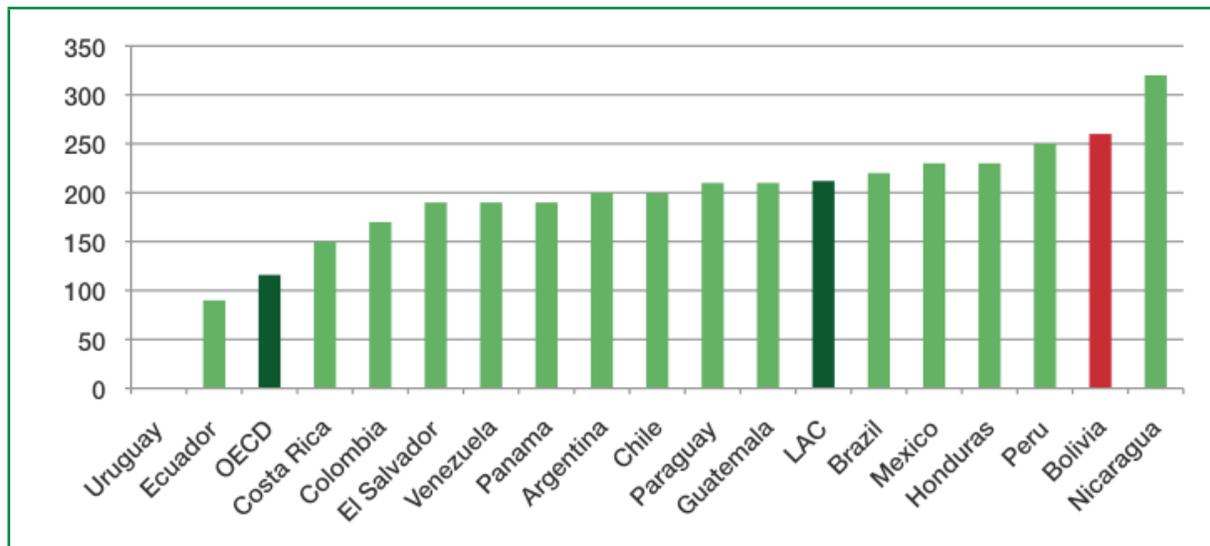
Source: WDI, 2010

5.10. Although a lot of resources have been devoted to food security⁴¹ in Bolivia, it is not clear how the numerous interventions have reduced the vulnerability to food insecurity in the country. Considering that food security interventions span several sectors, a rigorous attempt to assess their impact is challenging, requiring a careful categorization of food security related spending; the design of a counterfactual; the availability of data that enables the attribution of relevant interventions; and, possibly, strong instrumental variables to correct for potential endogeneity relationships between food insecurity and policy interventions.

40 This section is based on a broader, comprehensive background paper: Cuesta, J., Edmeades, S. and L. Madrigal. Food Insecurity and Public Agricultural Spending in Bolivia: Putting Money Where your Mouth is? 2010. This paper is available at: www.worldbank.org/bolivia

41 The definition of food security and sovereignty adopted in Bolivia goes beyond the availability of food and incorporates access to food, the use of food as part of an adequate diet and the stability of the aforementioned access.

Figure 20. Depth of hunger (kilocalories per person per day)



Source: WDI, 2010

5.11. The present analysis considers the association of agriculture and agriculture-related spending and food security in Bolivia. ARD spending captures a large portion of the public money allocated to food security in the country and as such is a good indicator of public interventions that aim at reducing vulnerability. It does, however, provide only a partial perspective on addressing food security, as spending in other sectors (health, education, infrastructure) is also important for reducing vulnerabilities. Using a local monitoring tool, the Vulnerability Analysis and Mapping (VAM)⁴² and disaggregated public expenditure data (the APER dataset), both defined at the municipal level, this analysis is a first step to guiding policy recommendations on food security in the country.

FINDINGS

5.12. Public agricultural and agriculture-related spending is associated with high levels of vulnerability, which may imply that resource allocation decisions in the sector take into account food insecurity. This finding is confirmed through a number of specifications. This relationship holds particularly in the case of agricultural expenditures, which capture most public goods in the sector, as well as for capital investments, making a difference in terms of infrastructural improvements. This is indicative of more agricultural and agriculture-related spending being destined to where it is more needed.

5.13. The composition of public expenditure matters, as the impact of resource allocations in agriculture and agriculture-related investments is not uniform across its categories. On one hand, there appears to be a strong association between agricultural spending and high levels of vulnerability and, on the other, between investment (rather than current) spending and spending in infrastructure, and vulnerability to food insecurity.

5.14. There are important temporal effects of sectoral spending on the vulnerability to food insecurity. When considering amounts of spending, short term effects are stronger than longer term effects – last year spending appears to have a larger impact on vulnerability than does the spending of four years in the past, especially when investments in research and extension are included. When considering the incremental effects of 2006–2007 spending, however,

⁴² Three measures of VAM are available for 2003, 2006 and 2007 for all the 327 municipalities across the 9 Departments that constitute Bolivia. The 2002–2003 VAM was constructed with community level data using principal components analysis. Among the components used are: urbanization rate; rural population density and its square; proportion of institutionally attended births; schooling years; log of per capita consumption; under-five malnutrition rate; altitude; rainfall; a flood propensity categorical variable (four values); dependency rate; life expectancy; agricultural potential; forestry potential; (main) road density; draught frequency; frost days per year; low weight at birth; per capita household food expenditures.

changes in the disbursed amounts do not appear to effectively reduce high vulnerability nor substantially deliver improvements in the vulnerability status. Hence, how much more is spent from one year to the next in agriculture and agriculture-related investments does not seem to have a strong impact on vulnerability. What matters is that spending is continuous, allocated across categories that have been found to have greater impact on reducing vulnerability (agriculture, investment spending and infrastructure) and, perhaps, better targeted to more vulnerable populations.

5.15. There are important Department-specific effects, which may point to a more 'regional' pattern of impacts of spending on municipal vulnerability. Chuquisaca and Cochabamba (Valley Departments) appear to be more likely to observe high or very high levels of vulnerability than the rest. For the Andean Departments of La Paz, Potosí and Oruro, no specific effects are identified. For the Media Luna Departments of Beni, Santa Cruz, Pando and Tarija, the identified effects point towards lower vulnerability to food insecurity.

5.16. To better assess the impact of spending on reducing the vulnerability to food insecurity, the scope of expenditure data needs to be amplified. Although the findings suggest that allocation of spending in agriculture and agriculture-related investments appears to go where it is most needed from the perspective of food security, they also imply that the measured impact is not strong enough to justify increases in agricultural spending alone for addressing food security. Agricultural spending is designed to improve agricultural output and productivity, which represent the food production dimension of food security. But food security is not only about producing food (except in isolated areas without access to food markets). It is about access to food, which can also (and often more efficiently) be secured by raising incomes, enabling poor households to buy the food they need, rather than producing it themselves. Hence, the partial effect of agricultural and agriculture-related spending on food security can be augmented through the allocation of public resources through other sectors as well (e.g. programs related to nutrition and other cash transfers). Future work on this subject intends to identify the portfolio of food security expenditures across sectors and their impact on reducing municipal vulnerability to food insecurity.

Technical Efficiency of Spending⁴³

GENERAL CONSIDERATIONS

5.17. The efficiency analysis provides a useful reference regarding the relative performance of different Departments (in terms of agricultural output) with respect to the use of public resources. *Given a fixed level of inputs (public expenditure in agriculture and other investments) and a given level of technical expertise, what is an optimal allocation that yields the highest possible agricultural GDP?* The analysis takes advantage of the panel nature of the dataset to incorporate dynamic effects of agricultural GDP. The basic unit of analysis used in the econometric specification is the municipality. Once efficiencies are estimated for each municipality, average efficiencies are calculated for the 9 Departments.

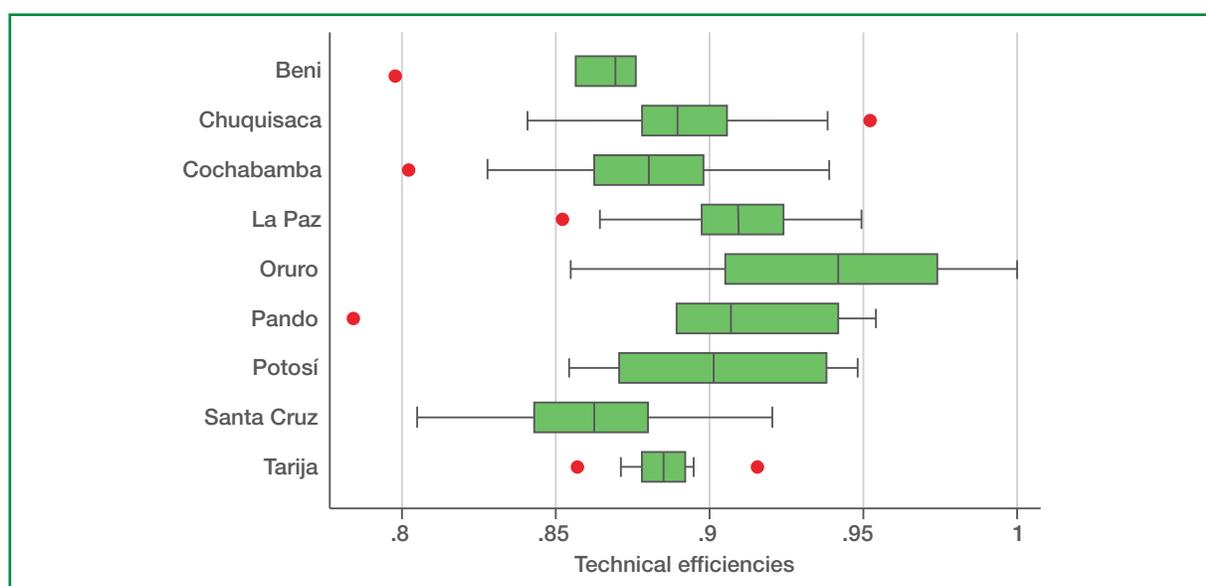
5.18. The technical efficiency measure employed provides only a partial assessment of efficiency. The notion of technical efficiency – as employed here – deals with the maximization of agricultural GDP given fixed levels of *public* inputs. This measure of technical efficiency does not consider *private* investments that contribute to agricultural GDP. Therefore, the efficiencies plotted in figures below show how a given Department utilizes the two *public* inputs (agricultural and agriculture-related spending) relative to their optimal use to maximize agricultural GDP. Since the output (agricultural GDP) is also influenced by private inputs, the calculated efficiencies should be interpreted as partial representations of the adequate use of resources.

43 This section is based on a broader, comprehensive background paper: Maghalaes, E. Public Investments in Agriculture in Bolivia: Efficiency and Equity Aspects. 2010. This paper is available at: www.worldbank.org/bolivia

FINDINGS

5.19. There is variation of technical efficiency of public expenditure at the sub-national level in Bolivia. This is captured by plotting efficiency distributions at the department level, showing how a given Department utilizes the two inputs (public expenditures in agriculture and agriculture-related investments) relative to an optimal use of inputs in a way to maximize agricultural output (Figure 21 and Table 3 below). Oruro is home to the most technically efficient municipality – the municipality of Sabaya – although the variation of efficiency across municipalities in Oruro is also the largest in magnitude. The least technically efficient Department appears to be Santa Cruz, although with a wide range of variability across municipalities. This, however, can be due to the fact that in Santa Cruz, private investment, rather than public interventions, drives agricultural output. The greater variability in the performance of municipalities in Departments like Oruro, Santa Cruz and Cochabamba highlights the considerable differences that exist in the way public resources are spent within Departments. Tarija and Beni, on the other hand, have very concentrated distribution of efficiencies suggesting a higher level of homogeneity of performance across municipalities in those Departments.

Figure 21. Distribution of technical efficiencies for 2000-2007, by Department



Note: The body of each bar (shaded in green) is bounded by the 25th and 75th percentile, and the line within the bar represents the median point (50th percentile). Outside the body, the two vertical lines point to the minimum and maximum efficiency points within each Department. Finally the dots represent outliers.

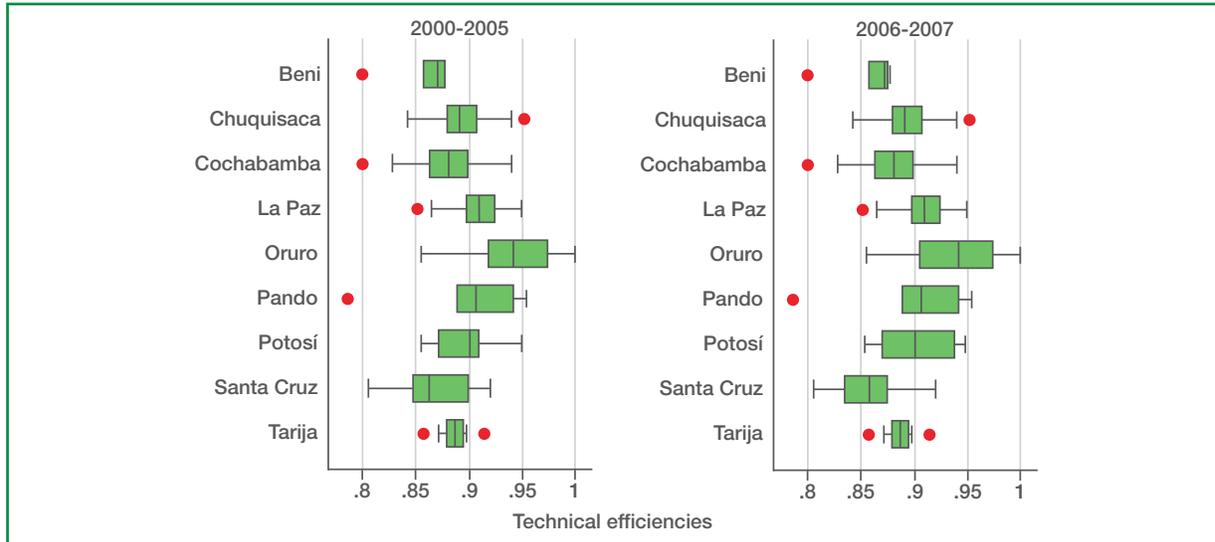
Table 3. Level of efficiency and average agriculture and agriculture-related spending for 2000-2007, by Department

Department	Efficiency	Agricultural Spending	Agriculture-Related Spending
Oruro	1.00	272,928	343,457
Chuquisaca	0.95	553,855	1,147,007
La Paz	0.95	256,000	1,041,940
Pando	0.95	280,055	458,317
Potosí	0.95	487,345	722,341
Cochabamba	0.94	426,719	1,423,347
Santa Cruz	0.92	281,110	768,151
Tarija	0.92	1,573,229	2,146,826
Beni	0.88	220,878	806,615

Note: Expenditures in 2005 real bolivianos.

5.20. In relative terms, there is room for improvement in the efficiency of use of public resources in agriculture and agriculture-related activities across municipalities and Departments in Bolivia. While it is important to remember that efficiencies for a given municipality are fixed over time, it is possible to gain insight into the changes in the distribution of efficiencies by Department. The distribution of technical efficiency is compared between a period before and after the beginning of the administration of the current Government (Figure 22). Although some changes are noticeable, namely the concentration of technical efficiencies in Santa Cruz and an increase in the spread, i.e. variability, in Oruro and Potosí, they are small in magnitude.

Figure 22. Distribution of efficiencies before and after the current administration



Note: The body of each bar (shaded in green) is bounded by the 25th and 75th percentile, and the line within the bar represents the median point (50th percentile). Outside the body, the two vertical lines point to the minimum and maximum efficiency points within each Department. Finally the dots represent outliers.

Institutional arrangements, participatory processes and public spending across municipalities in Bolivia⁴⁴

5.21. The institutional framework in Bolivia is becoming increasingly more complex especially when levels of territorial engagement and financial flows are considered. Under the new phase of decentralization in Bolivia, two more levels are being considered apart from the traditional central, departmental and municipal governing units – the regions and the indigenous peasant territories. This creates the need for clear definition of roles and responsibilities not only in terms of decision-making processes, but also in terms of resource allocations. There is already a myriad of regulations related to resource transfers, each with its own modalities in the scope of the allocations, but with limited definition of roles. The lack of clarity of resource transfers creates information asymmetries that inhibit development planning across levels of government, reduce transparency and increase the risk of duplication of roles and responsibilities, limiting the efficiency in allocation of public resources.

GENERAL CONSIDERATIONS

5.22. The understanding of the institutional mechanisms for local demand formulation is a critical dimension in the analysis of public expenditure at sub-national levels. Although investment in the agricultural sector has

⁴⁴ This section is a short summary of an extensive background paper by SISTEMATICA (Bolivia) titled “Análisis de los procesos institucionales del gasto público para la agricultura a nivel municipal en Bolivia”. This paper is available at: www.worldbank.org/bolivia

been found to increase with local need within the decentralization context of Bolivia (Faguet, 2004), the institutional mechanisms behind it are not well understood. A study of 40 randomly selected rural municipalities in Bolivia⁴⁵ was undertaken to compare the actual institutional arrangements and participatory processes of municipalities with those defined by norms (laws and decrees).

FINDINGS

5.23. The organization and articulation of roles and responsibilities (*competencias*) at the national and sub-national levels have a different logic for each sector. For productive infrastructure and roads, the model of responsibilities adheres to government levels with the municipal level being only in charge of rural roads. For irrigation, the central level defines policies and operates national programs, Departments invest in irrigation systems and municipalities invest in micro-irrigation systems. For productive support to agriculture, investments such as sanitary and phytosanitary control and technical assistance, although considered a responsibility of the municipality, are also executed through national programs and their de-concentrated offices at the Department and municipal level, using Treasury resources and a diverse set of transfer mechanisms of resources to beneficiaries. The responsibility for operation and maintenance of productive infrastructure is not clearly assigned.

5.24. The joint management (*gestión concurrente*) of public resources across levels of government adds a grade of complexity to the roles and responsibilities of each level. *Gobernaciones* can co-fund and jointly manage municipal investment projects; the public financial non-banking institutions, ministries and their dependent entities can also co-fund projects with *Gobernaciones* and municipalities. Within these autonomous processes of joint implementation and co-funding, different procedural arrangements, responsibilities, counterpart levels, etc., are established across Departments and municipalities, making compliance difficult and impact assessment virtually impossible.

5.25. The joint management of public resources also brings important non-municipal institutional processes within the formal municipal participatory planning process. Sectoral entities from national, departmental and special programs are considered within the formal municipal participatory planning process. These have different scope of intervention and incentive mechanisms to implement agricultural projects, including technical support, support with inputs, cash or machinery. The administrative capacity of municipalities is often insufficient to absorb the many procedural standards of other non-municipal institutions.

5.26. While there is a general convergence of formal (defined by norms) and actual roles of public and private municipal actors, evidence of an increasing role of collective mechanisms for consensus building and decision-making is emerging across municipalities. Within the participatory planning process, decision making for resource allocations for public investments is increasingly driven by collective action, rather individual participation of different actors representing municipal institutions and organizations. The formulation of the demand for agricultural projects starts in the communities. Communal organizations decide (by consensus) on the distribution of resources taking into consideration territorial and population factors. These decisions are validated and consolidated through the district level and presented at the municipal levels. This process is more pronounced in municipalities where inhabitants identify themselves as indigenous peasants.

5.27. There is limited articulation between municipal development plans and annual operational plans of municipalities, making the gap between planning and execution an important limitation in the participatory process. There is little correlation between medium term planning (under the municipal development plan) and short term implementation (under the municipal annual operations plan). The correlation between agricultural investment projects prioritized in 25 municipal development plans and their appearance in the annual operations plans is as small as 17%. This is also driven by the fact that financial planning does not adhere to agricultural cycles and there is little

⁴⁵ Information on sample selection is provided in Annex 12.

articulation with private initiatives in the sector. The current organizational structure of municipalities was designed for urban territories and the management approach was meant for the provision of basic services and infrastructure.⁴⁶ In this context, agricultural demand has focused on infrastructure for supporting production (irrigation, roads, bridges), which at present is the main destination for agricultural sector investment at the municipal level.

5.28. There appears to be a positive association between the importance of agriculture in a given municipality and sectoral presence in the municipal structure. In the low elevation parts of the country (*Llanos*), where agriculture is an important sector of the economy, 92% of municipalities include agricultural management in their institutional structure. In the *Valles* region, where agriculture is also an important contributor to the economy, this figure is 79%, while in the high elevation parts of the country (*Altiplano*), where a traditional small holder agricultural system predominates, this figure is as low as 29%. Most municipalities have only one person in charge of oversight of agricultural investment, with a median of 3.5 people across the 40 municipalities studied in the sample. Municipalities in the *Llanos* region are the ones with the greatest capacity of oversight, with an average of 10 people responsible for the agricultural sector.

Equity of Spending

5.29. Equity in expenditure distribution is far from being achieved at the sub-national level. Expenditure distribution has been based on population formulas to ensure equitable allocation of public resources across administrative units. During the first phase of the decentralization process, this per capita criterion led to a large shift of resources towards, mainly, rural municipalities, thus reducing existent inequalities (Faguet, 2004). For the period of 2000–2008, however, a negative correlation is evident between population size and investment per capita for a number of Departments in Bolivia. Departments with larger populations have received smaller allocations per capita of public funds. Also, public expenditures appear to have increased substantially over time for Departments with a relatively smaller population. Departments in Table 4 are sorted in descending order of population size in 2008.

Table 4. Public per capita expenditures (real bolivianos at 2005 prices)

	2000	2002	2004	2006	2008	% change	Population
La Paz	32.5	38.6	67.2	85.0	89.0	174	2,756,986
Santa Cruz	40.2	165.0	26.8	73.8	63.9	59	2,626,699
Cochabamba	134.2	117.8	70.3	226.1	88.1	-34	1,786,035
Potosí	89.5	86.5	94.8	113.3	414.3	363	780,392
Chuquisaca	111.7	87.5	135.7	144.3	114.6	3	631,059
Tarija	249.8	178.6	325.1	1690.4	951.7	281	496,988
Oruro	72.3	86.4	102.1	327.6	385.9	434	444,092
Beni	68.8	84.4	69.3	412.1	222.7	224	430,048
Pando	400.5	249.1	202.4	1862.7	295.5	-26	75,335

Source: APER dataset (for public expenditure) and INE (for population)

Note: Public expenditure includes spending from all sectors.

5.30. Richer municipalities tend to spend more on agriculture than poorer ones. Using a constructed variable of GDP at the municipal level as an indicator of wealth, municipalities are grouped by decile for 2000 and 2007. There is a marked decrease over time in the share allocated to rural roads by both groups of municipalities. Over time, poorer

⁴⁶ This seems to be changing with greater communal participation and its emphasis on agricultural productive processes.

municipalities have allocated more to irrigation, while richer ones to agriculture. While richer municipalities allocate close to a third of their resources to agriculture alone, this share is only 15% in poorer municipalities (Table 5).

Table 5. Municipal share of spending, by category (in %)

	2000	2007
10 % poorest		
Agriculture	17.4	15.4
Irrigation/drainage	1.2	20.2
Rural roads	60.5	34.2
Other	20.8	30.2
Total	100	100
10 % richest		
Agriculture	5.9	28.5
Irrigation/drainage	2.8	7.3
Rural roads	68.8	25.2
Other	22.5	39.1
Total	100	100

Note: All years between 2000 and 2007 showed statistically significant differences between the top and bottom deciles. Other includes all type of expenditures that were classified as agriculture and agriculture-related spending, but were not explicitly considered in the three spending groups, i.e. agriculture, irrigation/drainage and rural roads.

GENERAL CONSIDERATIONS

5.31. The equity of spending analysis takes on a broad perspective, providing insights into the distribution of sectoral spending across and within sub-national level administrative units (*Gobernaciones* and municipalities). It does not consider equity of different agricultural support programs. Here, a two-stage approach is adopted to provide an understanding of the equity dynamics of public spending in Bolivia. First, by obtaining information on Department levels of poverty, based on a 2005 nationally representative household data, concentration (or Lorenz) curves of agricultural and agriculture-related expenditures are drawn to show the degree of inequality of sectoral spending across Departments. Second, a comparison via tables is made between poverty incidence and sectoral expenditures over time. Combining these two aspects aims to provide a more integrated understanding of the dynamics of public agricultural and agriculture-related expenditure in Bolivia.

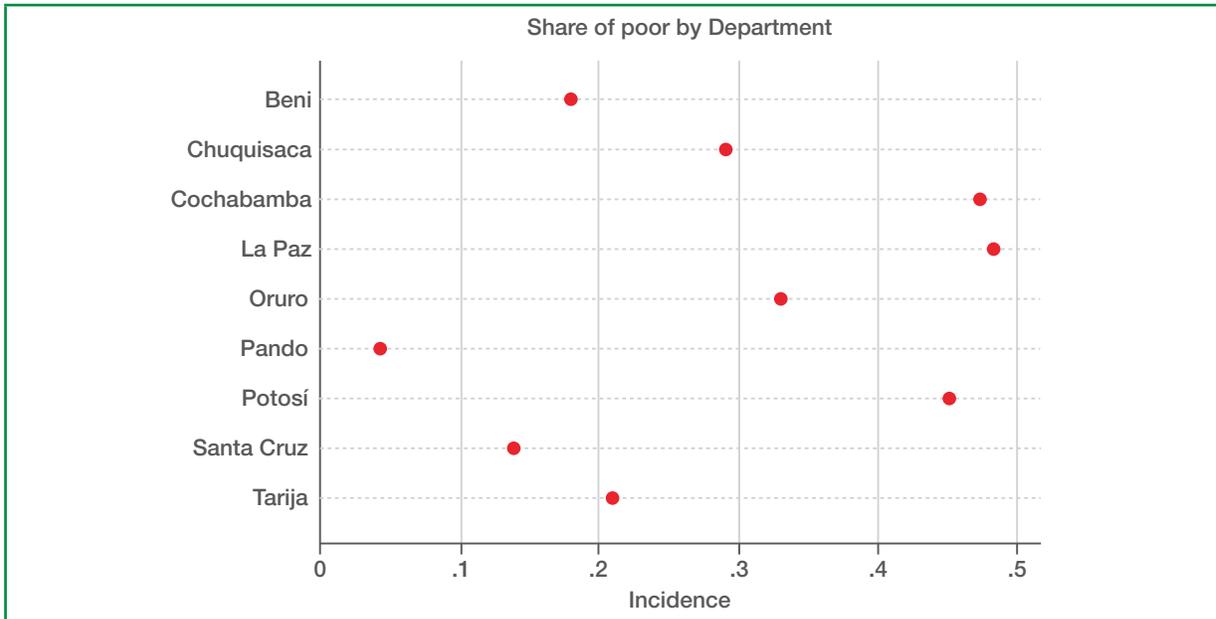
FINDINGS

5.32. There are large differences in the incidence and depth of poverty across Departments in Bolivia. Using the 2005 household survey⁴⁷, Figures 23 and 24 provide estimates of the average poverty incidence and depth by Department in Bolivia.⁴⁸ While Pando, Santa Cruz and Beni have less than 20 percent of people considered poor, La Paz, Cochabamba and Potosí approach nearly 50 percent (Figure 23). Similarly, the average poverty gap is much smaller for the former than it is for the latter group of Departments (Figure 24 below).

⁴⁷ When the analysis for this document was undertaken, the 2005 was the most recent household survey available.

⁴⁸ Estimates based on data of the head of the household only. Poverty lines vary slightly by department oscillating between US\$1.2 and 1.53 a day (US\$1 = 7.95 bolivianos on December 31st, 2005).

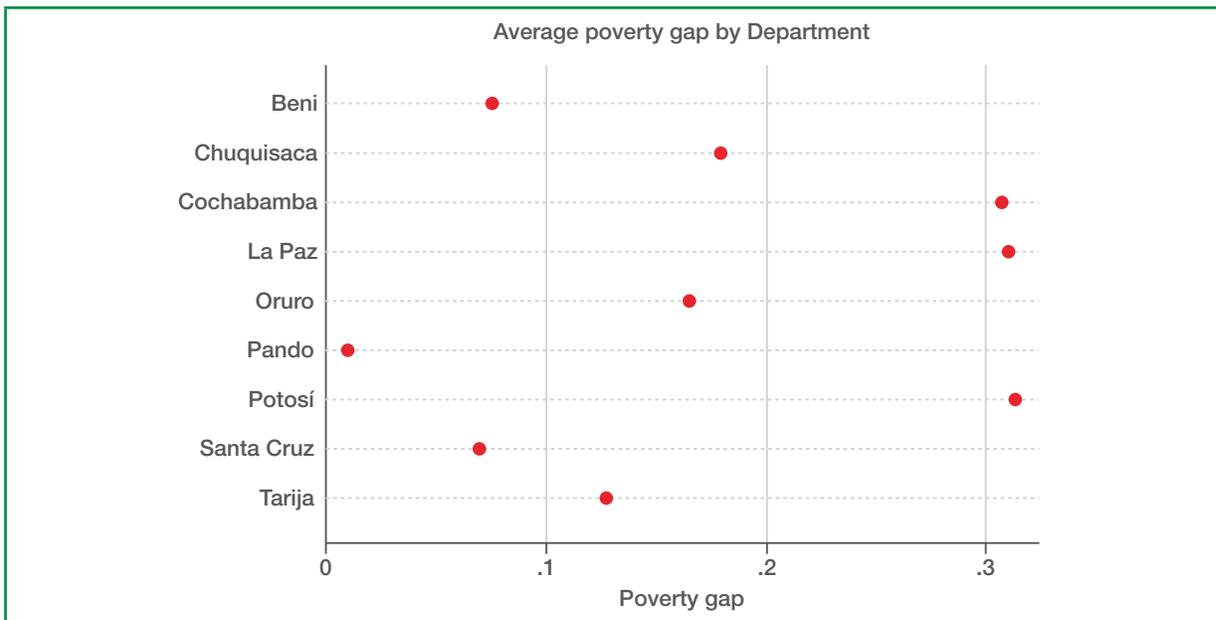
Figure 23. Poverty incidence, by Department



Source: Bolivia household survey, 2005

Note: Poverty headcount (incidence) is an indication of the number of people (or share in the population) that falls below a given poverty line (here a 2 dollar a day poverty line is used).

Figure 24. Poverty gap, by Department

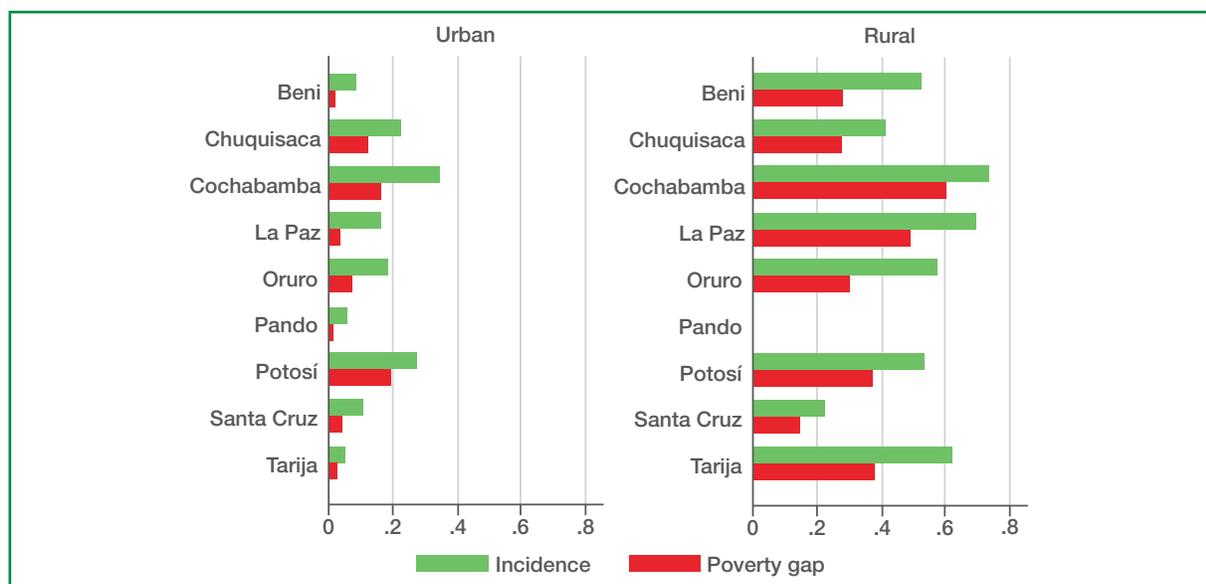


Source: Bolivia household survey, 2005

Note: Poverty gap (depth of poverty) reflects the average distance between households and the poverty line; it compares the per-capita income of a household/individual to the poverty line and calculates the difference between them.

5.33. Within and across Departments, there is a clear concentration of poverty in rural areas in Bolivia. Both the incidence and the depth of poverty are more pronounced in rural areas (Figure 25). With the exception of Pando, Santa Cruz and Chuquisaca, more than 50% of the rural population across Departments in Bolivia is considered poor. The poverty gap also appears to be quite large in rural areas, suggesting that many rural households live in extreme poverty.

Figure 25. Incidence and poverty gap across rural and urban populations, by Department



Source: Bolivia household survey, 2005

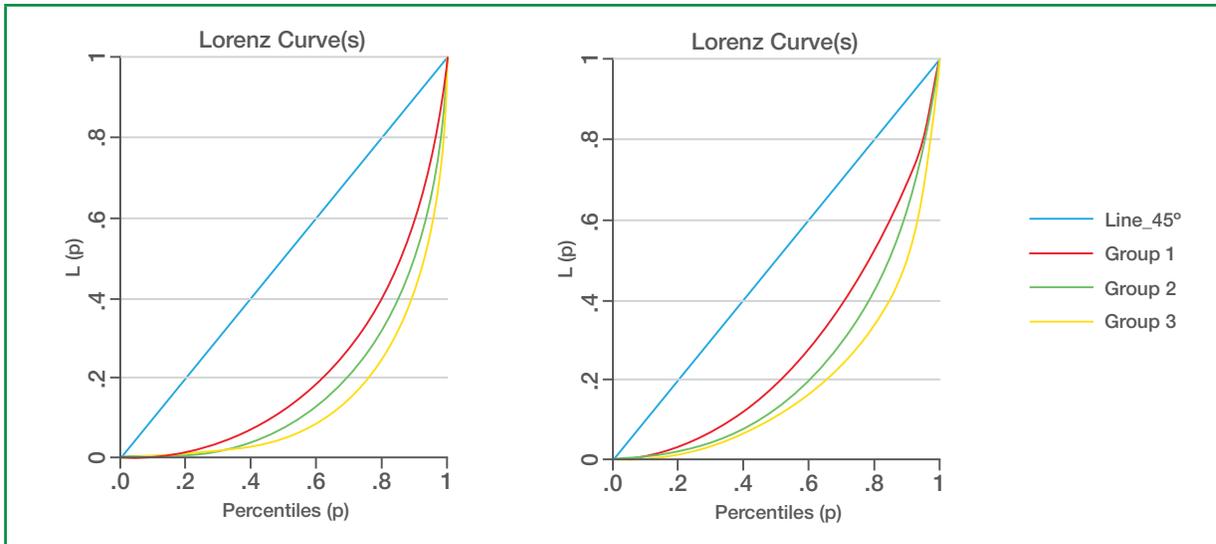
5.34. The differences in the magnitudes of poverty incidences and poverty gaps inevitably raise the issue of inequality. From a public investment perspective, inequality translates into the possibility of very different outcomes depending on what region or Department investments are made. In light of the analysis done so far, the issue of inequality raises two questions: first, *is the distribution of investments also geographically unequal?* And second, *what is the link between dramatically different levels of poverty across Departments and efficiency in public spending?* To stay within the context of the analysis, equity considerations are examined from the perspective of agricultural investments.

5.35. The system of transfers to the Gobernaciones is very unequal, which is one of the principal obstacles to improving services and distributing public expenditures more equitably among Departments. The municipal transfers system is in principle more equitable as hydrocarbons revenues are allocated to the municipalities on a per capita basis (World Bank, 2008).

5.36. Although richer Departments appear to be less unequal than poorer ones, inequality of public agricultural and agriculture-related expenditure is widespread in Bolivia. Concentration curves (also known as Lorenz curves) of three groups of Departments are used for the analysis of inequality (Figure 26). The Departments are grouped into rich (Group 1=Beni, Santa Cruz and Pando), medium (Group 2=Tarija, Oruro and Chuquisaca) and poor (Group 3=La Paz, Cochabamba and Potosí). Rich Departments are those with low incidence of poverty, while poor ones are those with high levels of poverty incidence. The cumulative distribution of per capita expenditures is graphed for the three groups of Departments (the curved lines) with the straight (45 degree) line representing a perfect equality scenario.⁴⁹ The farther away a line is from the 45 degree line, the more unequal a group is, indicating that municipalities within a given group receive considerably different amounts of resources relative to what would be an equitable distribution. The bottom 20% of municipalities has around 2% of total expenditures in agriculture and agriculture-related investments, as shown in Figure 26.

⁴⁹ In an ideal equality scenario, a given percentile of the income/investment of a group (for example, 20%) would correspond to the same percentile of the total income/investment in that group (20%).

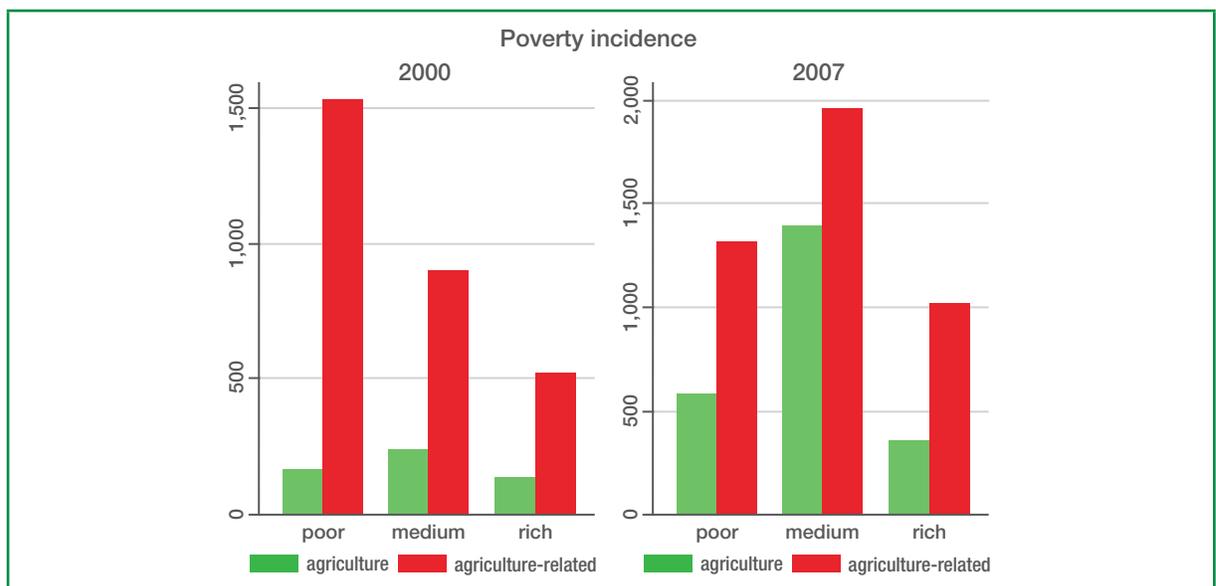
Figure 26. Inequality in public agricultural and agriculture-related expenditure across groups of Departments (period 1996 to 2008)



Note: The percentage of municipalities is plotted on the horizontal axis, while the percentage of per capita expenditures is plotted on the vertical axis.

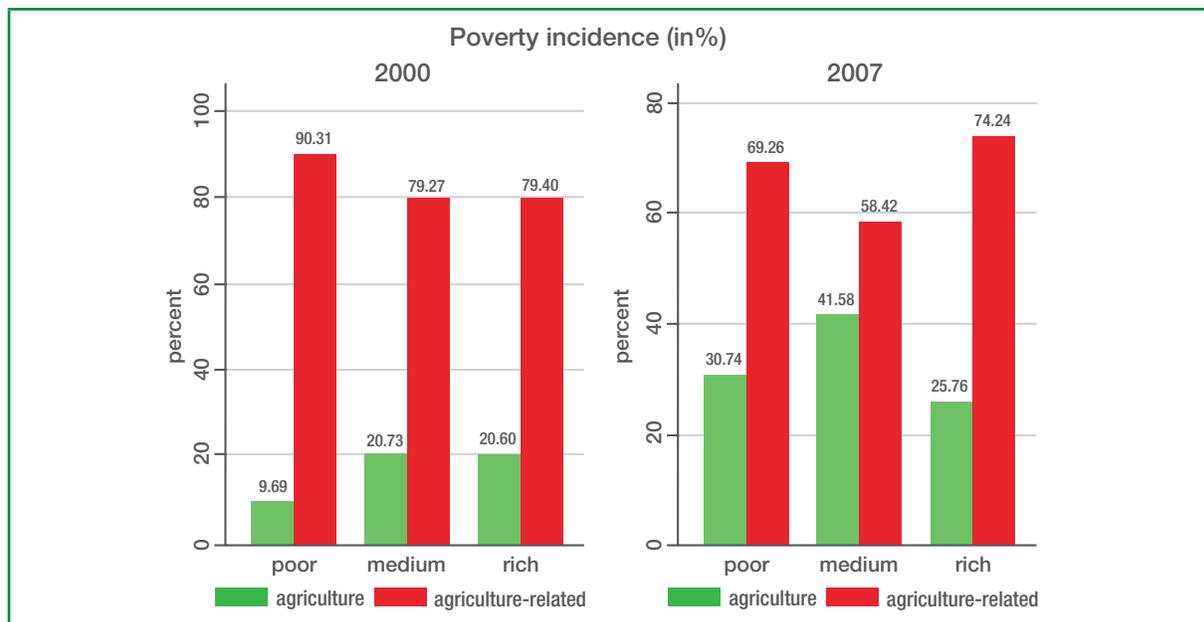
5.37. There are signs of agricultural spending becoming more progressive. Average spending in agriculture and agriculture-related activities by group (defined by the level of wealth, measured as poverty incidence) and by time period are presented in Figure 27 (in levels) and Figure 28 (in percentages). In 2000, poor Departments were spending considerably more money than wealthier (medium and rich) Departments on agriculture-related investments. In terms of agricultural spending, poor Departments spent a smaller share in 2000 than the one allocated to medium and rich Departments. In 2007, the investment of poor Departments in agriculture increased significantly (in real terms) both in terms of their levels and as a share of total agricultural and agriculture-related spending. There is a significant increase in the share of agricultural spending in poor and medium wealth Departments as compared to the more marginal increase noted for rich Departments.

Figure 27. Average agriculture and agriculture-related spending (in levels), by wealth group and year



Note: Spending in 1000's of 2005 real bolivianos.

Figure 28. Average agriculture and agriculture-related spending (in percentage terms), by wealth group and year



6. POLICY OPTIONS AND RECOMMENDATIONS

Three main recommendations, and supporting arguments, emerge from this report:

I. Re-balance the composition of public expenditure in agriculture



6.1. There is a need for re-organization and re-prioritization of spending within the sector before an argument for more resources to the sector can be made. Spending in agricultural research and development is undoubtedly important for agricultural growth and poverty reduction in rural areas. The need for more spending in research and development, however, does not directly translate into an argument for more investment in agriculture *per se*. Underinvestment in research and development may or may not justify greater public spending in agriculture, but it does highlight the importance of the composition of public expenditure in the sector. In the context of Bolivia, two major re-allocations should be considered – one related to the functional composition of the agricultural budget and the other related to its economic composition.

6.2. Functional composition: Allocate more resources towards agricultural public goods (such as research and extension among others) to improve sectoral performance and to support a heterogeneous agricultural sector in the context of rapid technological change, climate pressures and food price volatility. Though an appropriate level of funding for research and development is related to the stage of development of the country, a level of 2% of agricultural GDP is often mentioned as a desirable target for developing countries (World Bank, 2005). This amounts to US\$35 million in 2008, compared to the actual spending of US\$7 million in 2008. Public spending in research and extension, however, is not the only factor of success. To ensure a long-term expenditure planning and productivity enhancement in agriculture, and to reduce the historic volatility of spending on research and development, unprecedented Government commitment is required. Agricultural innovation processes require long term political commitment, financial stability and institutional strength.

6.3. Resource allocations towards research and extension, as well as productive development, have to be strategic and targeted, and adhere to the types of production systems in the country, as well as take into consideration the decentralized nature of decision-making and expenditure allocations. While the national government should maintain the oversight of research, coordination with the Departments is needed for adaptation of this research to different production environments. Public provision of extension services is justified given the large number of poor small agricultural producers in Bolivia, but it has to be demand driven. Participatory processes at the municipal level are well established and could be used for more focused sectoral discussion, to identify local extension needs and to ensure that they are reflected in municipal budgets. This is important as allocation of resources towards the core public goods in agriculture seems to be associated with reducing vulnerability to food insecurity in Bolivia. Investments in productive development have to be well defined and include a clear time horizon and exit strategy.

6.4. Economic composition: Improve the balance between current and capital expenditures in agriculture, while investing more in human capital. Capital investments in the sector are needed to support production and sector performance. With sub-national governments allocating most of their funds to capital investments, little resources are left for investing in human capital. Yet, well-trained human resources are critical for the delivery of agricultural services to rural areas, supporting the productivity of agricultural investments.

6.5. Within the current component of sectoral expenditures, more money should be spent on human capital, both to increase the number of people working in the sector, as well as to enhance their training and capacity. This is particularly true at the national level, as it is critical for institutional strengthening and coordination in a context of decentralization in Bolivia. To ensure the long-term oversight of sector productivity, strategic re-allocations of current expenditures will be required towards investment in human capital and away from support categories. Capacity building and retaining qualified staff would ensure the institutional sustainability of the sector.

II. Improve the instruments for prioritization and targeting of agricultural investments



6.6. Prioritization and targeting of public agricultural investments is a good starting point for improving sector performance. The emphasis on extension of the agricultural frontier, rather than on long-term improvement of productivity of agriculture, continues to be a policy choice of preference in the country, now in the context of food security. This would need to change to enable the country to address intensifying pressures from increasing food prices and weather variability. There are two complementary ways to address this:

6.7. *Ex-ante* or before investments are made: Because agriculture is an important sector in Bolivia's economy and it is one of the main employers in rural areas, the expectations for the sector are high in terms of delivering agricultural output, providing food security and leading to poverty reduction. Food policies and poverty reduction policies, however, require a range of multi-sectoral interventions that often go beyond the scope of agricultural sector policies. The objectives of the latter should be the improvement of agricultural productivity, which can bring other positive externalities (e.g. food security through higher yields and poverty reduction through employment and higher incomes) if successfully implemented.

6.8. Prioritization within the agricultural sector should consider the diversity of production systems and agricultural economic units in rural areas. Different typologies of producers can be established (based on producers' capacity to innovate, linkages to local markets, etc., rather than only on size of unit of production or poverty levels) and different policies and incentives targeted towards improving the performance of each typology, such that agricultural output of the country as a whole is increased. This can have positive spillover effects on food security and poverty reduction outcomes.

6.9. *Ex-post* or after investments are made: Bolivia needs a coordinated (across levels and institutions) monitoring and evaluation system that enables the tracking of results of the sector as a whole and facilitates the planning of investments. The lack of such a system not only has serious implications for measuring actual impact of agricultural expenditures, but it also constrains the prioritization of future resource allocations in the sector and its stance in the budget process of Bolivia. The Ministry of Agriculture (MDRyT) in coordination with the Department governments can oversee the sector's monitoring and evaluation framework (where clear roles are defined at each level of oversight) which includes information at the program and project levels, and their implementation at all levels of government, as well as allowing for categorization by functional and economic classification of spending, with clearly defined results indicators and a time frame within which each indicator can be assessed. This would require a significant investment in human resources and capacity not only at the national level, but also in each Department. Coordination with the Ministry of Planning is also warranted, as the agency responsible for oversight of the performance of all investments in the country.

III. Ensure better implementation of available resources in agriculture



6.10. How can the sector better absorb its resources? No more than 80% of planned budgets in agriculture are being absorbed in the sector. This issue requires serious scrutiny, as increasing budgets may lead to greater under-spending, hence compromising the future allocation of public resources in the sector. Different tools can be used for the tracking of top-down flow of expenses, such as the Public Expenditure Tracking Surveys (PETS). Although the limitations in implementation capacity of public funds in the sector go beyond the objectives of the current document, they bring important insights that justify the need for further research:

A. Improved institutional capacity: More and better-trained human resources would be required to facilitate the absorptive capacity in the sector. Retention of human resources is also important for sustainability of acquired capacity.

B. Better coordination across levels of government and clarity of expenditure mandates: Considering that most of the resources in the sector are now decentralized, defining clear roles and responsibilities at each level is important for the implementation and oversight of investments. While adherence to the roles and responsibilities defined by the laws of public resource transfers in the country is required, these do not provide sectoral detail to guide a coordinated spending effort in agriculture. Specific sectoral guidelines may be required, clarifying mandates and focusing on the implementation of sectoral allocations. This can be done in the Sector Strategy, which should be revised and updated.

C. Delivery of resources: Does spending arrive at the intended delivery point? Bottlenecks in the process of public service delivery need to be identified and addressed. With an increased focus towards local procurement of goods and services in Bolivia, such evaluation should not be difficult to undertake.

D. Budget process: The under-utilization of public resources is often linked to the weaknesses in the budget process; while this issue goes beyond the scope of the sector, it has a direct implication on its financial performance and requires further scrutiny. Sectoral norms can be established with strict timetables for disbursement of funds and delivery checks and balances to ensure that the sectoral budget is used as planned. This will require careful planning and oversight, which brings the attention back to the capacity of human capital.

6.11. Public expenditures in agriculture ought to be better rationalized. Clear sector priorities need to be defined and carried forward through the budget process in coordination with the sector entities at the different levels of government. A revision of the Sector Strategy is required, where these priorities and the specific roles and responsibilities are defined. The formulation of the sector priorities has to be result-based to enable the tracking of progress, the assessment of impact and future planning in the sector.

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8. ANNEXES

Annex 1. Definition of Agriculture and Rural Expenditures

United Nations (COFOG) Definition of Agriculture:⁵⁰

- Administration of agricultural affairs and services; conservation, reclamation or expansion of arable land, agrarian reform and land settlement, supervision and regulation of the agricultural industry;
- construction or operation of flood control, irrigation and drainage systems, including grants, loans or subsidies for such works;
- operation or support of programmes or schemes to stabilize or improve farm prices and farm incomes; operation or support of extension services or veterinary services to farmers, pest control services, crop inspection services and crop grading services;
- production and dissemination of general information, technical documentation and statistics on agricultural affairs and services;
- compensation, grants, loans or subsidies to farmers in connection with agricultural activities, including payments for restricting or encouraging output of a particular crop or for allowing land to remain uncultivated.
- Excludes: multi-purpose development projects.

FAO Expenditure Classifications: Agricultural and Rural Public Expenditure (in Spanish)

Rural Productive Development

1) Gastos administrativos en fomento productivo y otros; 2) Comercialización interna y externa, Fomento de las exportaciones agrícolas, Ayudas, estímulos y promoción a la comercialización interna de productos agrícolas; 3) Infraestructura de riego o irrigación agrícola; 4) Investigación científico-tecnológica y extensión técnica agrícolas; 5) Conservación de suelos, recursos naturales y medio ambiente dirigidos a los productores rurales; 6) Fomento forestal; 7) Patrimonio fito y zoo sanitario; 8) Comunicaciones y servicios de información; 9) Fomento productivo rural focalizado, Programas especiales o territoriales; 10) Programas de desarrollo rural integral; 11) Fomento en el sector pesca y acuicultura

Rural Infrastructure

1) Vivienda; 2) Obras viales y caminos; 3) Electrificación rural; 4) Saneamiento rural básico; 5) Agua potable para comunidades rurales; 6) Regularización de propiedad agraria, titulación y procedimientos agrarios; 7) Regulación sobre derechos de agua para fines agrícolas; 8) Infraestructura social para comunidades rurales; 9) Programa de compra de tierras y expropiaciones para dotación agraria

Rural Social Investment

1) Gasto en servicios sociales en áreas rurales no desglosados o gasto administrativo; 2) Salud y nutrición; 3) Educación; 4) Justicia; 5) Recreación y deportes; 6) Promoción de grupos étnicos; 7) Promoción de grupos etarios; 8) Promoción de mujeres; 9) Promoción familiar; 10) Promoción de asociatividad y otros gastos administrativos; 11) Capacitación

⁵⁰ Definitions are obtained from COFOG's website: <http://unstats.un.org/unsd/cr/registry/regcs.asp?Cl=4&Lg=1&Co=04.2>

Annex 2. The matrix definition of public agriculture and agriculture-related expenditure used to generate the APER database

TYPE OF SPENDING	CATEGORY NAME	SYNONYMS USED UNDER EACH CATEGORY (in Spanish)
AGRICULTURAL EXPENDITURES	RESEARCH	Innovación, tecnológico, investigación, estudios, diagnóstico, sistematización, planes de manejo, banco de germoplasma, pre inversión, diseño final, perfil, mejoramiento (genético, de semillas), centro de investigación (agrícola, pecuaria, agropecuaria), producción invitro, estudios agroecológicos, instituto de investigaciones agropecuarias.
	EXTENSION	Asistencia técnica, transferencia de tecnología, capacitación, taller, seminario, parcela demostrativa, apoyo técnico, estación (centro) experimental, modelo de granja familiar, proyecto piloto, introducción de cultivos, centro de compostaje.
	IRRIGATION	Represa, presa, azud, toma de agua, galería filtrante, bocatoma, aljibe, aducción, tanque, tocare (tomave), goteo, aspersion, gravedad, canales, atajados, pozo, bombeo, qhotañas, reservorios, salinización, tajamar, vigiñas, acequias, recursos hídricos (para pecuaria, agropecuaria, silvicultura, piscicultura), bebederos para ganado.
	PRODUCTIVE DEVELOPMENT	Fortalecimiento institucional, apoyo a la producción (agrícola, pecuaria, agropecuaria, forestal), mejoramiento de cultivos, mejoramiento agrícola, mejoramiento de forraje, desarrollo de la cadena productiva, centro de producción, lombricultura, apoyo a la crianza de ganado, hato ganadero, compra de semovientes, rebaño, implementación (instalación, establecimiento) de granjas avícolas, desarrollo de una cadena productiva, apoyo a la producción de conejos, cunicultura, desarrollo alternativo, apoyo a la forestación, reforestación, bosques, agroforestería, apoyo a la actividad silvoagrícola, silvoagropecuario, arborización, implementación de viveros (para frutales, forestal), apoyo a la transformación implementación (instalación, establecimiento) de granjas apícolas, (instalación, establecimiento) de módulos lecheros, faenado, faeneo, servicio de faeneo, instalación (funcionamiento, implementación, establecimiento) de matadero, transformación, industrialización, beneficiado, peladora, procesadora, matadero, cámara frigorífica, tostadora, curtiembre, empacadora, tratamiento, secadora, embotelladora, ordeñadora, construcción e implementación de granjas apícolas, producción serícola, fomento lechero, deshidratado, aserradero, implementación (instalación, establecimiento) de granja acuícola, apoyo a la producción acuícola, apoyo a la producción piscícola, apoyo a la crianza de peces, alevines, piscícola, piscicultura, pesquero, criadero, incubadora, peces, apoyo a la crianza de peces (trucha, salmón, dorado, etc.), aprovechamiento pesquero.
	MACHINES AND EQUIPMENT	Tractores, arados, maquinaria, cosechadora, fumigadora, segadora, bomba, motor, rastra, balanza, bomba, moto sierras, sierras, peladora, procesadora, ordeñadora, tanque de enfriamiento, tanque de frío, tanque de leche, tostadora, secadora, embotelladora.
	AGRICULTURAL INPUTS	Semillas, fertilizante, combustible, diesel, agroquímicos, abono, plaguicidas.
	INFRASTRUCTURE FOR AGRICULTURE	Vivero, invernadero, abrevadero, establo, potrero, cobertizo, aprisco, alambrado, amurallamiento, cercos, cercado, carpa solar, corral, cobertizo, enmallado, construcción de aviario, construcción de granjas avícolas, construcción de porquerizas, construcción de plantas (fábricas), playa de faeneo, cachi (playa de secado), molinos, construcción de aserradero, construcción (mantenimiento, mejoras) de mataderos.
	PLANT AND ANIMAL HEALTH	Plaga, enfermedad, fitosanitaria, mosca de la fruta, sanidad vegetal, polilla, roya, gusano, hormigas (tujo), vacunas, fiebre aftosa, parásitos, cancrisis, baño antiséptico, sanidad (animal, vegetal), zoonosis, desparasitación, desinfección, implementación de centro fitozoosanitario, control sanitario del matadero.
	ADMINISTRATION AND REGULATION	Normas, regulación, contraparte, unidad, oficialía, secretaria, Superintendencia Agraria, Superintendencia Forestal, administración, monitoreo, seguimiento.
	OTHER AGRICULTURAL EXPENDITURES	Desarrollo agropecuario, desarrollo económico local, apoyo al sector agropecuario.
	OTHER INTEGRAL EXPENDITURES IN AGRICULTURE	Desarrollo integral, desarrollo económico local, programa de apoyo a empresas rurales, desarrollo productivo, proyecto de apoyo a las empresas rurales (PAER), seguridad alimentaria, apoyo a iniciativas empresariales, políticas de desarrollo agropecuario.
	NATURAL RESOURCE MANAGEMENT	Conservación de suelos, manejo de suelos, mejoramiento de suelos, manejo de cuencas, cárcavas, terrazas de crecimiento, recuperación (construcción) de terrazas, recuperación de praderas, biodiversidad, zanjas de infiltración, agua subterránea, trasvase de agua, vida silvestre.

AGRICULTURE-RELATED EXPENDITURE	SERVICES	RURAL ROADS AND BRIDGES	Caminos vecinales, sendas, puentes, badén, aprovechamiento de áridos para caminos, construcción de puentes peatonales, construcción de puentes vehiculares, alcantarillas para caminos, oroyas, pontón, mantenimiento de carreteras.
		RURAL ELECTRIFICATION	Paneles solares, fotovoltaicos, biodigestores.
		MARKETS AND STORAGE	Ferias, mercado, ruedas, venta, subasta, exportación, promoción, festival, silos, precios, mercados, pizarras, contratos, alianzas, fletes, centro de acopio (construcción, funcionamiento, mejoramiento).
	ENVIRONMENT	RISK MANAGEMENT	Rios, defensivos, prevención, rehabilitación, inundación, granizo, sequía, helada, calicantos, zanjas de coronación, incendio, rehabilitación, emergencia, desastres, torrenceras, rehabilitación de terrazas, gaviones, muro de contención.
		TERRITORIAL DEVELOPMENT AND LANDS	Saneamiento (SAN, SAN SIM), catastro (CAT), titulación, ordenamiento territorial, uso de suelos, planes (PLUS, POT, POD), suelos, registro, territorial, propiedad, titulación, tierra, reordenamiento, expropiar, expropiación.
		INSTITUTIONAL STRENGTHENING	Comunidad, sindicato, asociación, organización, fortalecimiento, comunitario, ayllu.
	SUPPORT	EDUCATION TARGETED TO AGRICULTURE	Facultad de ingeniería agronómica, formación de agrónomos, formación de veterinarios, educación técnica agropecuaria, formación de profesionales agrícolas y pecuarios, postgrados en ciencias agronómicas y pecuarias, formación en ingeniería agronómica, postgrado en ciencias agrícolas y pecuarias, maestría en agroecología, postgrado en agronomía, maestría en riego y drenaje, maestría en gestión del medio ambiente, maestría en producción animal, maestría en agro negocios, maestría en producción orgánica, ingeniería ambiental, diplomado en manejo de plagas.
SPENDING FOR OTHER SECTORS	OTHER SECTORS	Considera los otros sectores económicos (educación, salud, defensa, etc.).	

Source: Jointly prepared by WB, UDAPE, FAM

Note: The synonyms in the table were used for identifying budget lines related to each category of spending. To verify that a word corresponds to a given category, the economic activity, the project and the program associated with the word were checked and used for determining the category that the budget line belongs to.

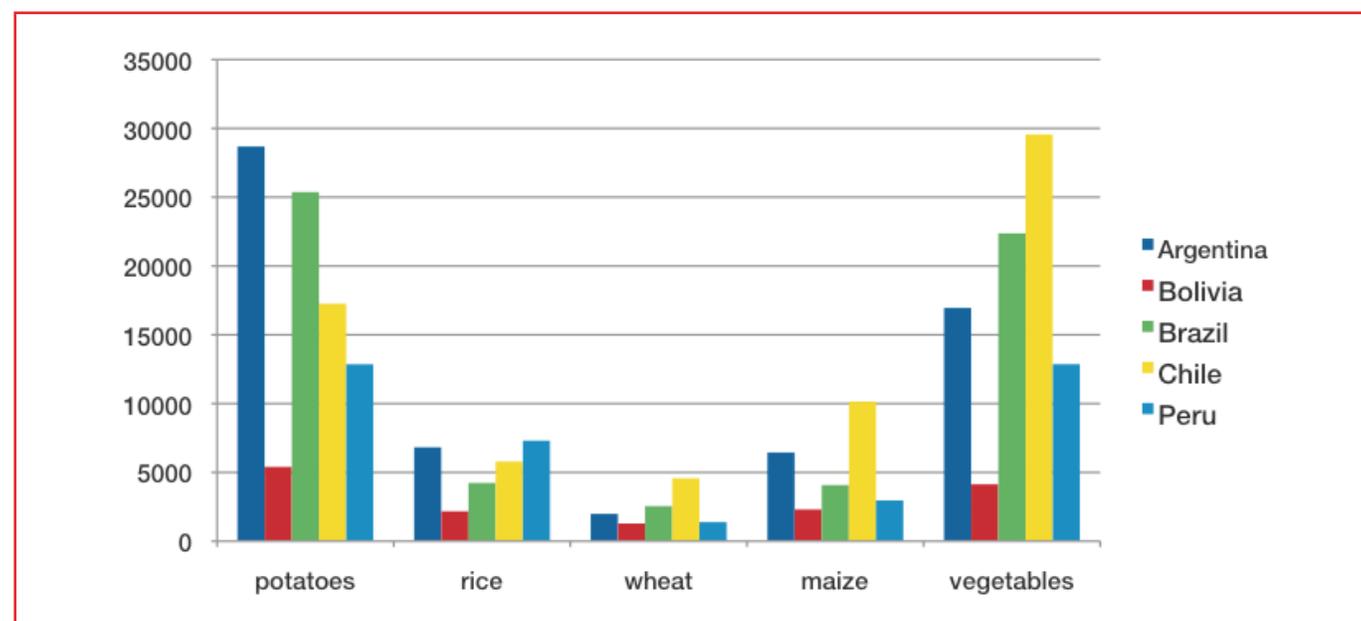
Annex 4. Agricultural output growth and yields in Bolivia

Table: Sources of output growth in agriculture for selected crops

	1970-2008				1998-2008				Harvested area Hectare		
	Production percent change	Decomposition Percent point			Production percent change	Decomposition Percent point			1970	1998	2008
		Area effect	Yield effect	Interaction effect		Area effect	Yield effect	Interaction effect			
Barley	18	0	17	0	21	9	11	1	93	86	93
Coffee	127	92	18	17	13	9	4	0	13	24	26
Maize	170	65	64	41	61	38	16	6	221	264	364
Potatoes	12	44	-22	-10	25	4	20	1	95	132	137
Quinoa	174	273	-26	-72	31	21	9	2	12	38	45
Rice	409	208	65	136	25	20	4	1	55	142	170
Sorghum					178	166	4	7	0	45	120
Soybeans	106	96	11	11	42	63	-12	-8	1	589	958
Sugar cane	337	230	32	75	83	48	24	11	39	86	128
Sunflower					67	-14	95	-14	0	143	123
Wheat	274	128	64	82	-6	-26	27	-7	63	194	144

Source: FAOSTAT

Figure: Yield of major crops (in kg/ha), 2008



Source: FAOSTAT

Annex 5. Current list of Programs under the mandate of the MDRyT

1. National Plan for land titling

2. National Plan for land distribution and human settlements

3. Planting the right for food

Objective: operationalize at the municipal level all the policies, strategies and actions for stimulating food security.

4. Creation of rural food initiatives (CRIAR)

Objective: strengthen peasant family agriculture on the basis of a community, and support food production for local markets.

5. Organized Enterprises for Development (EMPODERAR)

Objective: Support the development of productive initiatives in agriculture, strengthening local institutional capacity to boost rural productive development, including agroforestry and non-agricultural rural producers through non-reimbursable transfers, through partnerships with local counterpart financing. The Rural Alliances Project (PAR) financed by the World Bank is an important component of this Program. Another one is the Local Agricultural Economic Development Project (DELA), financed by Denmark.

6. Renewal of the role of the state in rural food businesses (RECREAR)

7. Development of territorial, integrated and cross-sectoral production complexes

8. National Plan for Coca Development

9. Sustainable use of natural resources (SUSTENTAR)

10. Conservation of nature and environmental quality (CONSERVAR)

Annex 6. Budget process in Bolivia

The budget system in Bolivia has two administrative levels: 1) the policy level, which comprises the Ministry of Economy and Finance and the Ministry of Planning and Development and their technical units, respectively, the Vice Ministry of Budget and Accounting (*VMPC – Vice Ministerio de Presupuesto y Contaduría*) and the Vice Ministry of Public Investment and External Financing (*VIPFE – Vice Ministerio de Inversión Pública y Financiamiento Externo*); and, 2) the operation level - all public entities.

The budget process is set within the framework of a Government Plan and it has 4 stages:

1. **Formulation** (*duration 7 months – March to October*) – the VMPC sets the budget codes and the systems for budget formulation and execution; the projections of income (e.g. tax revenues, royalties, sales of hydrocarbons) are made, and then used to estimate the amounts that the Treasury (*TGN – Tesoro General de la Nación*) will transfer to the public institutions. Budget ceilings for each public entity are set; special programs are treated separately. Public entities are required to prioritize their expenditures keeping their respective ceilings in mind and also formulate requests for additional programs; with this, each entity prepares its preliminary budget draft for operating expenses (*current expenditures*), which is sent to and verified by VMPC. At the same time, each entity provides VIPFE with information on its respective programs and projects (*investment expenditures*), which VIPFE verifies, assigning a SISIN (*Sistema de Información sobre Inversiones*) code to each project. Based on the provided information by all public entities, VMPC and VIPFE do a joint analysis of public investment, prioritizing spending from the Treasury with counterpart resources. VMPC aggregates the operating and investment budgets, consolidating all the preliminary budget drafts from the public entities, thus establishing the National Budget (*PGN – Presupuesto General de la Nación*). The National Budget draft then goes through a chain of approvals before it gets to the Legislative Assembly.

The systems used for budget formulation are SFP (*Sistema de Formulación Presupuestaria*); SFPM (*Sistema de Formulación Presupuestaria Municipal*); and SIGMA (*Sistema Integrado de Gestión y Modernización Administrativa*).

2. **Discussion and Approval** (*duration 2 months – November – December*) – the Economic Commission of the Congress revises the proposed National Budget and incorporates adjustments, a process which is then repeated by the Economic Commission of the Senate. The output is the Law of PGN, which is enacted by the President of Bolivia.
3. **Execution/Implementation** (*duration 12 months – January – December*) – this is the process of producing the goods and services so as to fulfill the objectives of the budget; adjustments of the approved budget are made at this stage as well, but they are not approved until the end of the fiscal year. Liquidity mismatches often occur with public entities not registering their full range of expenditures at the beginning of the execution period, with the bulk being registered at the end of the fiscal year.

The public entities use a diverse set of transaction registry systems: SIGMA is used by public entities at the national level and by some of the decentralized entities; Municipal SIGMA is used by municipalities that house Department capital cities; the remainder of the municipalities uses SINCOM (*Sistema de Contabilidad Municipal*). Some entities continue using previous systems, like SICOPRE (*Sistema de Contabilidad y Presupuestos*).

4. **Control and Evaluation** (*should be periodic, as well as at the end of the fiscal year*) – although Law 2042 on Budget Administration (1999) states that public entities must make both physical and financial assessment of budget execution against the set objectives, in practice this connection is not made and the budget is used only as a mechanism for resource allocation to the entity.

Public investment in Bolivia is undertaken within the framework of SNIP (*Sistema Nacional de Inversión Pública*) - a set of rules, tools and procedures for public sector entities to formulate, evaluate, prioritize, fund and implement public investment projects within the framework of the national, departmental and municipal plans.

Annex 7. Under-utilization of public resources across public entities in the agricultural sector

DE-CONCENTRATED ENTITIES:

1. National Service of Agricultural Health and Food Safety (SENASAG)

It is responsible for 3 programs, two of which are national and one is implemented in 5 Departments. The entity implements directly its projects and not through transfers. SENASAG's executed budget represents around 8% of overall MDRyT executed budget between 2005 and 2008. The share of actual spending (out of planned budget) is below 80%, with 2008 being particularly low (56%). During the period 2005-2008, SENASAG's budget has increased 30% from 60 to 77 million bolivianos. On average 51% of the resources for SENASAG were from Treasury, the remainder coming from foreign sources and local counterpart money (the latter is, on average, 14% of total budget).

2. National Fund for Alternative Development (FONADAL)

It has the objective to promote and support alternative development and substitution of coca crops. FONADAL's executed budget represents around 3% of overall MDRyT executed budget between 2005 and 2008. Similar to SENASAG, the share of the budget that is executed is below 80%, with 2008 being particularly low (57%). During the period 2005-2008, FONADAL's budget has increased 674% from 6 to 44 million bolivianos. The majority of the FONADAL's budget is from foreign grants, with an average of 12% during this period coming from Treasury and 18% being local counterpart.

3. Food Security Support Program (PASA)

Established in 1997, it is financed by the European Union as a support program to the sectoral budget. The objective of the program is to promote, enhance and improve the availability, access and use of food for the poorest sectors of society by financing investment projects. The Program operates in all 9 Departments of Bolivia. PASA I (1997-2008) has implemented 342 projects and PASA II (2005-2010), 109 projects. It became a de-concentrated entity in 2007 and it has a national mandate for food security. The investment is done through transfers –85% of the project amount with the remaining 15% being local counterpart. The average budget execution for PASA during the period 2006-2009 is 49%.

DECENTRALIZED ENTITIES:

1. Tropical Agriculture Research Center (CIAT)

During the period 2005-2008, CIAT's budget has increased by 56% from 23 to 36 million bolivianos.

2. National Institute for Agrarian Reform (INRA)

There is little coordination with MDRyT in the budget formulation process of INRA. Average budget execution for INRA during the period 2005-2008 is 57%, generally below 70%. During this period, INRA's budget has been reduced by 17% from 155 to 128 million bolivianos. The majority of INRA's resources come from foreign sources, with an average of 14% during this period coming from Treasury and 18% being local counterpart.

3. National Institute for Agricultural and Forestry Innovation (INIAF)

It was created in 2008 and started its activities in 2009. It will be supported by a World Bank project, currently under preparation.

4. National Fund for Forestry Development (FONABOSQUE)

5. Bolivian Aquaculture Research and Development Center (CIDAB)

During the period 2005-2008, CIDAB's budget has increased by 356% from 1 to 4 million bolivianos. The budget execution in 2008 was of 71%.

6. Authority for Fiscal and Social Control of Forests and Lands (ABT)

This is a new agency created in 2009 bringing together the *Superintendencia Agraria* and *Superintendencia Forestal*, keeping the functions of both to regulate and control the use of land. During the period 2005-2008, ABT's budget has increased by 43% from 42 to 60 million bolivianos. Of the approved budget for 2010 of 91 million bolivianos, 94% is destined to current expenditures with only 7% going to capital investment.

7. Development Fund for Indigenous Peoples and Rural Communities (FDPPIOYCC)

This entity is supported with 5% of the resources of IDH, with a budget in 2010 of 228 million bolivianos, of which 46% represent current expenditures.

Annex 8. Ratio of executed to planned expenditures

Under-utilization < 0.8; Over-utilization > 1

	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
Agriculture													
Beni	0.7	0.6	0.8	0.9	0.8	1.0	0.7	1.2	1.0	0.8	2.0	1.7	19.4
Chuquisaca	0.7	0.9	1.0	1.2	0.9	0.9	0.5	0.9	1.3	0.8	0.7	0.6	0.6
Cochabamba	0.9	0.4	0.5	0.6	0.6	0.8	0.9	0.8	0.8	1.4	0.7	1.1	0.7
La Paz	0.4	0.4	0.4	0.3	1.4	2.2	0.7	0.9	0.9	0.6	0.7	0.9	1.3
Oruro	0.6	0.6	0.8	1.2	1.1	1.0	1.4	0.9	1.1	1.3	0.6	1.0	1.1
Pando	0.7	0.6	1.1	0.8	1.0	1.3	1.0	0.7	0.9	1.1	1.0	1.5	4.8
Potosí	1.6	0.8	0.8	0.8	0.7	0.8	0.7	0.5	1.2	0.9	0.9	0.9	0.6
Santa Cruz	0.5	1.1	1.2	0.5	0.6	1.1	0.8	0.6	0.8	0.9	0.7	0.9	4.5
Tarija	0.8	1.0	0.7	1.1	1.7	1.7	0.8	1.0	1.0	1.5	1.9	1.1	0.6
Average	0.8	0.7	0.8	0.8	1.0	1.2	0.8	0.8	1.0	1.0	1.0	1.1	3.7
Irrigation/Drainage													
Beni										0.2			
Chuquisaca	0.5	0.8	0.3	0.9	1.5	0.6	0.2	0.3	1.5	0.9	0.5	0.4	0.3
Cochabamba	0.5	0.5	0.7	0.3	1.6	0.8	0.7	0.7	5.0	1.7	0.7	1.1	0.7
La Paz	0.1	0.7	0.3	0.0		0.0	0.5	0.1	0.4	0.6	0.5	1.7	2.1
Oruro	0.9	0.2	0.3	2.9	0.4		0.3	0.8	0.2	0.3	0.3	0.4	0.4
Pando											0.4		
Potosí	1.7	0.0	0.9	0.4	1.1	1.3	0.7	0.0	0.5	0.6	1.5	1.1	0.8
Santa Cruz		0.4	0.5	0.1	0.6	1.3	2.7	0.9	0.4	0.4	0.4	0.8	
Tarija	0.3	0.5	0.4	0.9	0.8	0.9	0.6	0.6	0.5	0.3	0.5	0.5	0.6
Average	0.7	0.4	0.5	0.8	1.0	0.8	0.8	0.5	1.2	0.6	0.6	0.9	0.8
Rural roads													
Beni	0.8	0.3	2.1	1.1	1.1	1.3	1.1	1.1	0.9	2.6	4.3	2.8	21.6
Chuquisaca	0.7	0.9	0.4	2.8	1.5	0.8	1.5	1.6	1.1	0.7	0.6	0.8	0.5
Cochabamba	1.6	0.8	0.6	0.8	1.2	1.2	1.1	1.5	1.5	1.9	1.1	1.0	0.7
La Paz	0.7	0.6	0.9	0.8	0.9	1.3	0.6	1.2	0.9	0.8	1.1	1.1	1.2
Oruro	0.5	0.6	0.3	1.4	1.8	1.7	1.0	1.2	1.0	1.1	1.4	2.1	1.1
Pando	0.4	0.4	1.0	0.0	1.1	0.6	0.7	0.6	0.5	0.8	14.9	1.0	2.2
Potosí	0.9	0.3	0.4	0.5	1.1	1.4	1.8	1.0	1.6	1.0	0.6	1.1	1.1
Santa Cruz	0.6	0.6	1.1	0.9	1.0	2.5	3.5	1.3	0.6	0.7	0.8	0.8	2.6
Tarija	0.7	0.7	0.9	0.6	1.1	0.9	0.7	1.0	0.7	1.4	1.7	0.8	0.9
Average	0.8	0.6	0.9	1.0	1.2	1.3	1.3	1.2	1.0	1.2	2.9	1.3	3.5

Annex 9. Frequency distribution of the gap between planned and executed expenditures at the municipal level in 2008

Agriculture		Irrigation		Roads	
	Frequency		Frequency		Frequency
<0.05	284	<0.05	214	<0.05	250
0.05-0.1	3	0.05-0.1	1	0.05-0.1	0
0.1-0.15	3	0.1-0.15	0	0.1-0.15	2
0.15-0.2	3	0.15-0.2	1	0.15-0.2	3
0.2-0.25	3	0.2-0.25	0	0.2-0.25	1
0.25-0.3	3	0.25-0.3	0	0.25-0.3	1
0.3-0.35	0	0.3-0.35	0	0.3-0.35	1
0.35-0.4	2	0.35-0.4	2	0.35-0.4	1
0.4-0.45	1	0.4-0.45	2	0.4-0.45	1
0.45-0.5	1	0.45-0.5	1	0.45-0.5	2
0.5-0.55	0	0.5-0.55	1	0.5-0.55	2
0.55-0.6	0	0.55-0.6	1	0.55-0.6	0
0.6-0.65	0	0.6-0.65	1	0.6-0.65	0
0.65-0.7	0	0.65-0.7	1	0.65-0.7	0
0.7-0.75	0	0.7-0.75	0	0.7-0.75	1
0.75-0.8	0	0.75-0.8	1	0.75-0.8	1
0.8-0.85	0	0.8-0.85	1	0.8-0.85	1
0.85-0.9	0	0.85-0.9	0	0.85-0.9	0
0.9-0.95	0	0.9-0.95	1	0.9-0.95	1
>0.95	13	>0.95	24	>0.95	47
Total	316		252		315

Annex 10. Spatial concentration of spending, by functional classification and Department

	1996	2000	2005	2008
Agriculture				
Beni	0.7	2.7	4.0	9.2
Chuquisaca	10.7	7.5	7.7	6.3
Cochabamba	27.1	23.9	20.2	12.8
La Paz	2.6	8.0	4.3	4.0
Oruro	5.2	4.0	3.3	9.7
Pando	2.3	4.9	5.1	1.3
Potosí	16.0	11.5	10.9	2.6
Santa Cruz	21.5	5.5	22.9	24.0
Tarija	14.0	31.9	21.7	30.1
Total	100	100	100	100
Irrigation/Drainage				
Beni				
Chuquisaca			0.1	
Cochabamba	16.7	3.7	51.6	6.1
La Paz	15.3	30.4	22.4	28.6
Oruro	5.9	0.5	1.3	3.8
Pando				
Potosí	49.4	13.0	1.8	14.8
Santa Cruz		45.7	3.2	4.2
Tarija	12.6	6.7	17.5	40.5
Total	100	100	100	100
Rural roads				
Beni	5.1	4.4	3.7	5.9
Chuquisaca	10.0	13.5	2.5	3.8
Cochabamba	2.4	33.9	18.4	8.2
La Paz	28.7	18.1	14.7	16.0
Oruro	2.0	4.9	2.9	11.5
Pando	1.7	3.6	0.7	1.4
Potosí	7.1	5.6	0.9	22.0
Santa Cruz	31.0	11.3	9.9	7.2
Tarija	11.9	4.6	46.2	24.2
Total	100	100	100	100

Source: APER dataset

Annex 11. The Laws governing resource re-allocations in Bolivia relevant to the agriculture and rural development sector

Law 1551, 1994 Popular Participation (PP) - <i>Participación Popular(PP)</i>			
Treasury	Department	Municipality	Sector
		For municipalities with a population ≥ 5000 <i>Source:</i> <ul style="list-style-type: none"> • 20% of national tax revenues • 5% of national tax revenues for public universities <i>Allocation:</i> <ul style="list-style-type: none"> • 85% towards public investments • 15% for current expenditure 	Roads Micro-irrigation R&D for production
Law 1606, 1994 Special Tax on Hydrocarbons and its Derivatives (STHD) - <i>Impuesto Especial a los Hidrocarburos y sus Derivados (IEHD)</i>			
Treasury	Department	Municipality	Sector
75%	25% (Department Compensation Fund)		
Law 1654, 1995 Administrative Decentralization - <i>Descentralización Administrativa</i>			
Treasury	Department	Municipality	Sector
	Departmental taxes: <ul style="list-style-type: none"> • 85% for capital expenditure • 15% for current expenditure Departmental Compensation Fund resources: <ul style="list-style-type: none"> • 85% for capital expenditure • 15% for current expenditure 25% of Special Tax on Hydrocarbons and its Derivatives: <ul style="list-style-type: none"> • Based on 50% as f (population number) and 50% equally across Departments • 85% for capital expenditure • 15% for current expenditure National transfers (from Treasury)		Public Investment Programs Highways and roads Irrigation and production support R&D and extension services
	Internal and external credits: <ul style="list-style-type: none"> • 85% for capital expenditure Regional Development Corporations: <ul style="list-style-type: none"> • 15% of current expenditure 		
Law 2235, 2001 National Dialogue (ND) - <i>Diálogo Nacional (DN)</i>			
Treasury	Department	Municipality	Sector
		Fondo de Inversión Productiva y Social <i>Source:</i> Special Dialogue Account with resources from the Multilateral Debt Relief Program <i>Allocation:</i> <ul style="list-style-type: none"> • 70% based on population recalculation formula according to poverty indexes • 30% equally divided amongst 9 Departments and distributed to municipalities For mancomunidades ≤ 5000 <ul style="list-style-type: none"> • 25% of municipal counterpart funding For mancomunidades ≥ 5000 <ul style="list-style-type: none"> • 75% of municipal counterpart funding 	Productive investments Roads Irrigation and electrification Land cadastre Technical assistance Agriculture Disaster risk management

Law 3058, 2005 Direct Tax on Hydrocarbons (DTH) - <i>Impuesto Directo a los Hidrocarburos (IDH)</i>				
Treasury	Department	Municipality	Sector	
<p><i>Royalties:</i> 6% of national production goes to the Treasury</p>	<p><i>Royalties:</i></p> <ul style="list-style-type: none"> • 11% of departmental royalties go to producing Departments • 1% of national production goes to Beni and Pando <p><i>Direct Taxation:</i></p> <ul style="list-style-type: none"> • 32% (of which 4% go to producing Departments and 2% to non-producing Departments) <p><i>Patents:</i></p> <ul style="list-style-type: none"> • 50% for producing Departments 	<p><i>Patents:</i></p> <ul style="list-style-type: none"> • 50% for producing municipalities 	<p>Roads Irrigation Electrification Rural access to finance R&D and Extension</p>	
Law 031, 2010 Autonomy and Decentralization - <i>Autonomías y Descentralización</i>				
Treasury	Department	Municipality	Autonomies	Sector

Annex 12. Sample selection for institutional work at the municipal level

The sample selection builds on the following criteria: (i) The population only includes municipalities with at least 20 percent rural population and municipalities with no protected forest areas; (ii) The 40 municipalities included in the sample were proportionally distributed among the three representative production regions in the country: Highland (14), Valley (14) and Lowlands (12); and (iii) The sample in each geographical area was selected using an ordered sampling frame based on population to ensure heterogeneity— every *k*th element in the frame of municipalities ordered by population was selected, where *k* is defined as the ratio among the number of municipalities and the sample size in each geographical area, and the starting point is randomly selected among the first *k*th observations. This procedure has yielded a sample with similar descriptive statistics as those observed in the restricted population of municipalities used (Table 1).

Table 1. Key statistics of population and sample municipalities

	Unit of measurement	All municipalities	Restricted population of municipalities	Sample
Population	Habitants	30054	14216	11338
Urbanization	% of population	0.21	0.15	0.15
Rural population density	Habitant per km ²	14.27	15.00	16.50
Years of schooling	Years	6.04	5.81	6.27
Per-capita consumption	Bolivianos	952	878	907
Secondary road density	km per km ²	0.05	0.05	0.14
Primary road density	km per km ²	0.03	0.03	0.02
Area	km ²	3246	3346	3132
Elevation	Meters above sea level	2443	2495	2440
Temperature	Celsius	15.02	14.81	15.55
Rainfall	mm	83.43	82.53	73.43
Slope greater than 30°	% area	39.55	40.97	38.08
Public expenditure per-capita	Bolivianos	61.66	59.97	60.92

Source: VAM, 2007

