GOVERNMENT FISCAL YEAR
January 1 – December 1

CURRENCY EQUIVALENTS
Currency Unit : CFA Franc (CFAF)
1 US$ : CFAF 441.89

WEIGHTS AND MEASURES
Metric System

ABBREVIATIONS AND ACRONYMS

AFD  French Development Agency
AfDB  African Development Bank
AICB  Association interprofessionnelle du coton du Burkina
ANVAR  Agence Nationale de Valorisation des Résultats de la Recherche
ARTEL  Telecommunication Regulatory Agency
AZ  Anglo Zimele
BCEAO  Central Bank of West African States
BNLA  La Direction de la Brigade Nationale de Lutte Anti-fraude de l’Or (National Brigade Against Fraud in the Gold Sector)
BUMIGEB  Bureau des Mines et de la Géologie du Burkina (Bureau of Mines and Geology of Burkina Faso)
CAS  Country Assistance Strategy
CAS-PR  Country Assistance Strategy Progress Report
CEAS  Centre Ecologique Albert Schweitzer
CEM  Country Economic Memorandum
CFAA  Country Financial Accountability Assessment
CFAF  Franc of the African Financial Community
CID  Computerized Expenditure Circuit
CIE  Government Integrated Accounting Software
CNRST  National Center for Scientific and Technological Research (Centre national de la Recherche Scientifique et Technologique)
COGES  Health Management Committee
CONAGESE  National Council for Environmental Management
CPAR  Country Procurement Assessment Report
CSPs  Community Health Centers
CRA  Regional Agriculture Chambers
CSO  Civil society organization
CSPs  Community Health Centers
DAAF  Directorate of Administrative and Financial Affairs
DCMP  Central Directorate for Public Procurement
DEP  Directorate for Planning and Studies
DGB  Directorate General for the Budget
DGCCOP  Directorate General for International Cooperation
DGE  Directorate General for the Environment
DGMGC  Direction Générale des Mines, de la Géologie et des Carrières (Directorate General of Mines, Geology, and Quarries)
DGTCP  Directorate General of the Treasury and Public Accounts
DHS  Demography and Health Survey
DSA  Debt Sustainability Analysis
DSA  Debt Sustainability Analysis
DTIS  Diagnostic Trade Integration Study
ECOWAS  Economic Community of West African States
EIA  Environmental Impact Assessment
EITI  Extractive Industries Transparency Initiative
EMP  Environmental Management Plan
ENEP  Teachers Training Colleges
EU  European Union
FASOCOTON  Private Cotton Company
FRSIT  Fire Service Improvement Team
GAMA  Environmental Management in Artisanal Mining (Peru)
GDP  Gross Domestic Product
GNP  Gross National Product
GoB  Government of Botswana
GTZ  German Technical Cooperation
HIPC  Heavily Indebted Poor Countries
HIPC-AAP  HIPC Accountability Assessment and Action Plan
ICA  Investment Climate Assessment
ICRR  Implementation Completion and Results Report
ICT  Information, Communication and Telecommunications
IDA  International Development Association
IFC  International Finance Corporation
IGAME  L’Inspection Générale des Activités Minières et Énergétiques (Inspection General of Mining and Energy Activities)
IGE  General State Inspectorate
IGF  General Finance Inspectorate
IMF  International Monetary Fund
INERA  National Institute for the Environment and Agronomic Research
INGO  International non-governmental organization
INSD  National Institute of Statistics and Demography
IRCT  Institute for the Development of Research
IRD  Institut de Recherche pour le Développement
IRSAT  Research Institute for Applied Science and Technology (Institut de Recherche en Sciences Appliquées et de Technologie)
JSAN  Joint Staff Advisory Note
LDP  Letter of Development Policy
MAMS  Maquette for MDG Simulations
MDGs  Millennium Development Goals
MDRI  Multilateral Debt Relief Initiative
MEBA  Ministry of Basic Education and Literacy
MEDEV  Ministry of Economy and Development
MEF  Ministry of Economy and Finance
MMCE  Ministère des Mines, des Carrières et de l’Energie
MnO2  Manganese Dioxide
MOH  Ministry of Health
MTEF  Medium-Term Expenditure Framework
NGO  Non-governmental Organization
OECD  Organisation for Economic Cooperation and Development
ONAPAD  National Poverty and Development Observatory
ONATEL  National Telecommunication Company
OPA  Producer Organization
ORCADE  Organisation pour le Renforcement des Capacités de Développement
P2O5  Phosphorous Pentoxide
PAMS  Poverty Analysis Macroeconomic Simulator
PAP  Priority Action Plan
PAFASP  Projet d'Appui aux Filières Agro-sylvo-Pastorales
PDDEB  Ten-year Basic Education Development Plan
PER  Public Expenditure Review
PNDS  National Health Care Development Plan
PNDSA  National Program for the Development of Agricultural Services
PNGT  National Program for the Management of Territory
PRECAGEME  Le Projet de Renforcement des Capacités Nationales du Secteur Minier et de Gestion de l'Environnement
PRGB  Budget Management Reform Plan
PRGF  Poverty Reduction and Growth Facility
PRSC  Poverty Reduction Support Credit
PRSP  Poverty Reduction Strategy Paper
PRSP-APR  Poverty Reduction Strategy Paper Annual Progress Report
ROSC  Report on the Observance of Standards and Codes
SBI  Sustainable Budget Index (Botswana)
SDR  Special Drawing Rights
SITARAIL  Société Internationale de Transport Africain par Rail
SME  Small and Medium-sized Enterprises
SMEELP  Small and Medium Enterprise and Empowerment Program (Mozambique)
SIGASPE  Budget Payroll Management System
SOCOMA  Private Cotton Company
SOFITEX  Largest Cotton Company
SONABEL  National Electricity Company
SONABHY  National Petroleum Product Distribution Company
SOPAFER  Société de Gestion du Patrimoine Ferroviaire du Burkina
SP-PPF  Permanent Secretariat for the Supervision of Financial Policies and Programs
STC-PDES  Technical Secretariat for the Coordination of Social and Economic Development
TOD  Decentralization Laws
TOFE  Government Financial Operation Table
UNDP  United Nations Development Program
UNIDO  United Nations Industrial Development Organization
UNPCB  National Union of Cotton Producers of Burkina Faso
VAT  Value Added Tax
WAMU  West African Monetary Union
WAEMU  West African Economic and Monetary Union
WHO  World Health Organization

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3.1 Long-term growth in Burkina Faso will depend on more than gains in international competitiveness and diversification of the country’s industrial structure. Fundamental factors of the country’s long-term production function, including its human, physical and financial capital, will be paramount to establish a robust basis for sustainable and shared growth. This section will explore successively “people”, “physical infrastructure” and “finance” and how they will contribute to the country’s economic development. People is seen as both a resource for developing labor supply and a challenge for coping with the demographic transition and mitigating population vulnerability through effective risk management instruments and social safety nets. Infrastructure highlights the role of transport and ICT in overcoming the country’s geographical isolation as well as the importance of the energy sector as a key factor for industrial development. Finance is essential from a private and a public perspective, through improved financial intermediation and better public spending with macroeconomic implications and impact on attaining the MDGs.

COPING WITH POPULATION GROWTH

Introduction

3.2 The prevailing consensus today is that the unabated population growth in sub-Saharan Africa is a major obstacle for the achievement of its development goals and, in particular, the fulfillment of the Millennium Development Goals (MDGs) (Ndulu et al., 2007). Rapid population growth expands the younger age groups (the base of the population pyramid), increasing the demand on public resources especially in the education and health sectors (Guengant, 2007). This in turn affects the savings potential of governments and individual households and leads to reduced investments both in human and physical capital, jeopardizing current and future economic growth. Yet, if a period of fast population growth is followed by slower population growth (usually triggered by a fertility decline), dependency ratios will come down. This may reverse the negative effects of the age structure into a potential “demographic dividend” of a larger share of working age people who could positively contribute to economic growth. This assumes that appropriate policies and programs are put in place first to trigger this “demographic dividend” and then capture its benefits (Birdsall et al., 2001). However, some researchers still contend that both population size and population density contribute positively to economic growth (Collier, 2007). They argue also that it is not clear how to reduce population growth, even if it were deemed desirable.

3.3 All these considerations apply to Burkina Faso, which has one of the fastest growing populations in sub-Saharan Africa. The annual rate of population growth was estimated at 3.1 percent between the 1996 and 2006 censuses, as compared to 2.5 percent per year for sub-Saharan Africa as a whole (Republic of Burkina Faso, 2008d). The rapid population increase of Burkina Faso, which has accelerated in recent years, will undoubtedly affect its socio-economic outcomes for the next 50 years. Since the economic growth has slowed down and poverty gains
have been stagnating, the main challenge will be to maintain socio-economic indicators at their current levels. This implies to create employment opportunities to absorb the growing labor force and manage the rural exodus through the creation of secondary growth poles and urban centers. The rapid demographic growth has also large budgetary implications for the financing of human capital investments. Despite substantial improvements in recent years, Burkina Faso continues to score poorly in terms of its human development achievements. The very youthful and rapidly growing population will exacerbate the need for a swift expansion of quality social services, particularly in education and health.

3.4 The rapid demographic growth calls for more proactive and hopefully efficient population and reproductive health programs. In particular, interventions to trigger a fertility decline and facilitate access to contraception are deemed most urgent and important. They will enable Burkina Faso to accelerate its demographic transition, and make faster progress toward achieving the Millennium Development Goals (MDGs). Moreover, the health benefits of the demographic transformation fulfill the aspirations of the population. Surveys in sub-Saharan African countries increasingly show large unmet demand for family planning, even in remote rural areas. In addition, higher fertility rates negatively affect the survival rates and health status of the children and their mothers. Therefore, the health benefits of the demographic transition are also very important. Just on their own merit, they call for population and reproductive health interventions.

A Phenomenal Population Increase

3.5 Most regions of the world have gone through the process of the demographic transition. This process is defined as a gradual shift from a traditional demographic regime with a high semi-equilibrium (high mortality and high fertility) to a modern demographic regime with a low semi-equilibrium (low mortality and low fertility). The shift results in accelerating the growth rate of the population and it brings also major changes in the age structure. During the demographic transition, the first important change is the decline of mortality, which occurs because of improvements in survival conditions, especially during early childhood. These improvements in mortality conditions are most often exogenous, as exemplified by immunization campaigns and programs to control malaria and diarrhea (the ensuing reduction in mortality is the main cause of the rapid rates of population growth). The onset of fertility decline, which often occurs with a time-lag, marks the second phase of the demographic transition. The fertility decline helps reduce the rates of population growth. As mentioned, age structures change as well throughout the demographic transition process as youngsters become less numerous because of the fertility decline (consequently, the weight of adults in the population increases). This has important consequences for human capital development and economic growth. Finally, the demographic transition is accompanied usually by several transformations in the socio-economic context and by increasing urbanization.

3.6 The estimated population of Burkina Faso in mid-2008 is 14.7 million (this is an extrapolation of the 2006 Census figures that yielded a total population of 14 million; Republic of Burkina Faso, 2008d). The total population was estimated at 4.0 million in 1950, 4.6 million in 1960, 5.4 million in 1970, 6.8 million in 1980, 8.9 million in 1990, and 11.9 million in 2000 (see Figure 3-1; United Nations Population Division data). This represents almost a quadrupling
in the size of the population in just more than 50 years (Appendix 9), a situation similar to the experience of some countries in Western and Middle Africa.

3.7 **The rate of population growth has accelerated in Burkina Faso over the past 55 years.** The net rate of growth (births minus deaths and taking into account the positive or negative out-migration balance) is estimated by comparison of the census results. The rate of growth was approximately 2 percent around 1960 and had increased to 3 percent per year in the early 1980s. It is estimated today at 3.1 percent (comparison of the 1996 and 2006 censuses), more than half a percentage point higher than sub-Saharan Africa. An annual growth rate of 3.1 percent implies that the population will double in about 22 years (United Nations Population Division data from the World Population Prospects: The 2006 Revision).

![Figure 3-1: Population Growth in Burkina Faso, 1950-2005 (thousands)](image)


3.8 **Out-migration has been heavy in the past but has decreased in recent years.** Burkina Faso has experienced heavy out-migration between 1950 and 2000. An estimated total of 1.5 million Burkinabé live in neighbouring countries, essentially in Côte d’Ivoire (another estimate gives 1.1 million emigrants; World Bank, 2008a). Between 1950 and 1980, emigration accounted for more than one-fifth of the net population growth (Figure 3-2). However, like in neighbouring Mali (World Bank 2009g: 27), emigration appears to have decreased in recent years with a phenomenon of return-migration (the top line of Figure 3-2 crosses the line of the population net increase after 2000). Therefore, emigration may no longer act as a security valve for the rapid population growth unless political and economic conditions improve in receiving countries (an optimistic assumption).
An Increasingly Young Population

3.9  **Given its rapid growth, the population of Burkina Faso has become younger as illustrated by the population age structure (age pyramid).** The population distribution by age and sex in 1960, 1990, and projected for 2010 is almost perfectly pyramidal (Figure 3-3). Such a young age structure is characteristic of the populations that have not yet entered the last stage of their demographic transition, i.e. the decrease of fertility, and is similar to the situation encountered in most Western and Middle African countries. In 2006, there were 100 women for 93.4 men in Burkina Faso (Republic of Burkina Faso, 2008d), a factor explained by the emigration of males.

3.10  **Burkina Faso has experienced a dramatic increase in the absolute number of births.** This is illustrated in Figure 3-4. There were about 200,000 live births in 1950, against 600,000 today. The number of births will continue to increase or will stabilize, according to the various projections scenarios of the United Nations, i.e. High, Medium, and Low fertility (United Nations, World Population Prospects 2006). Only under the Low fertility scenario would the annual number of births be stabilized at its current levels of 600,000 births (after a peak of 700,000 births) in about 35 years, i.e. around 2050. This large number of births has obviously huge implications, in particular for the education sector.

3.11  **The size of the younger age groups has increased dramatically as well,** as illustrated in Table 3-1. The number of people in the age group 0-14 has increased from 4.2 million in 1990 to more than 7 million in 2010, a 70 percent increase in twenty years. A direct consequence of this fast increase has been the lack of provision of education and health services to all youngsters. This is exemplified by poor achievements in education, as shown in the results of the latest Population Census conducted in 2006. Educational achievements are mediocre not
only at the primary level, but also and even more dramatically so at the secondary and tertiary levels.

**Figure 3-3: Age Pyramids in 1960, 1990 and 2010 (baseline)**

*Burkina Faso:*
- 1960: 4.6 million
- 1990: 8.9 million
- 2010: 16.1 million

**Source:** United Nations, World Population Prospects 2006.

**Figure 3-4: Annual Number of Births, Burkina Faso, 1950-2050**

### Table 3-1: Population in Age Groups 0-4, 5-9, and 10-14 (both sexes), Burkina Faso, 1990-2030 (thousands)

<table>
<thead>
<tr>
<th>Year</th>
<th>Slow fertility decline (TFR = 4.35 in 2030)</th>
<th>Fast fertility decline (TFR = 3.35 in 2030)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Age group 0-4 - Age gr. 5-9 - Age gr. 10-14</td>
<td>Age group 0-14 - Age group 5-9 - Age group 10-14</td>
</tr>
<tr>
<td>1990</td>
<td>1693 - 1357 - 1172</td>
<td>4222 - 1693 - 1172</td>
</tr>
<tr>
<td>2000</td>
<td>2240 - 1829 - 1534</td>
<td>5603 - 2240 - 1534</td>
</tr>
<tr>
<td>2005</td>
<td>2541 - 2092 - 1799</td>
<td>6432 - 2541 - 1799</td>
</tr>
<tr>
<td>2010</td>
<td>2977 - 2382 - 2057</td>
<td>7416 - 2739 - 2057</td>
</tr>
<tr>
<td>2015</td>
<td>3338 - 2811 - 2347</td>
<td>8496 - 2891 - 2347</td>
</tr>
<tr>
<td>2020</td>
<td>3665 - 3174 - 2775</td>
<td>9614 - 3009 - 2775</td>
</tr>
<tr>
<td>2025</td>
<td>3908 - 3511 - 3139</td>
<td>10558 - 3122 - 3139</td>
</tr>
<tr>
<td>2030</td>
<td>4134 - 3769 - 3479</td>
<td>11382 - 3153 - 3479</td>
</tr>
</tbody>
</table>


3.12 The base of the population pyramid will expand between now and 2030, but more rapidly so with a High fertility than with a Low fertility scenario. This is illustrated by the comparison of the population pyramids in 2030, either assuming a slow decrease in fertility (the UN High variant) or assuming a rapid decline in fertility (the UN Low variant) (Figures 1-5 and 1-6). As can be seen from Figure 3-6, only sharper declines in fertility – resulting rapidly in relatively fewer numbers of births – can start to change the shape of the bottom of the pyramid. The base of the pyramid needs to become rectangular in order to enable the formation of human capital, especially in the area of education (Appendix 10).

3.13 In 2006, the Burkinabè population between 0 and 14 years accounted for 46.4 percent of the total population (average for sub-Saharan Africa: 43 percent). In addition, young adults aged 15 to 24 years represented, also in 2006, 20 percent of the total Burkinabè population. Therefore, the 2006 population under 25 years in Burkina Faso made up almost two-thirds of the country’s population (Republic of Burkina Faso, 2008d). This youthfulness is fundamental for the demographic future of the country. It is the decisions made by the people in this age group regarding the number of children desired as well as those actually born that will determine the population growth in the 21st century. Even if these young people do have fewer children than their parents, the large number of young people in their reproductive ages will fuel the future population growth, a demographic phenomenon known as the population momentum.

3.14 In 2006, there were 99 dependents for 100 adults in Burkina Faso, which is typical of a country with a very young population structure, similar to those in Western and Middle Africa. This coefficient, called the dependency ratio, is defined as the number of dependents in

---

the population (the people under 15 years of age and those above 65) divided by the number of people in the active population (those between 15 and 64 years). The dependency ratio indicates the socio-economic weight placed on the active population. However, this is an approximation as those in age of working do not necessarily work and those accounted for as dependents are not necessarily dependent.

Figure 3-5: Age Pyramids in 1990, 2010 and 2030 (high variant)


Figure 3-6: Age Pyramids in 1990, 2010 and 2030 (low variant)

1990: 8.9 million, 2010: 16 million, 2030: 25 million

Demographic Change: Too Late, Too Slow

3.15 **The dramatic population growth experienced by Burkina Faso has been triggered by very substantial decreases in mortality levels while fertility levels have remained virtually constant.** This is illustrated in Figure 3-7, which shows the evolution of the Burkinabé crude birth rates and crude death rates between 1950 and 2005. The crude birth rate (CBR) is the annual number of births per 1,000 inhabitants and the crude death rate (CDR), the annual number of deaths also per 1,000 inhabitants. The natural rate of population growth is the arithmetic difference between these two crude rates (the rate of growth is expressed in percentage). The widening gap between the crude birth and death rates since 1950 explains the acceleration of the population growth. Again, this has happened in most Western and Middle African countries.

![Figure 3-7: Crude Birth Rates and Crude Death Rates, 1950-2005 (per 1,000)](image)

3.16 **Mortality has decreased significantly thanks to improvements in health care and services as well as in hygiene and sanitation.** The decrease occurred particularly in infant (before the age of 1) and child (before the age of 5) mortality. As a result, the crude death rate decreased by half in 50 years, going from 31.1 to 15.7 per thousand for the periods 1950-1955 and 2000-2005, respectively. The infant mortality rate decreased regularly and is now estimated at 89 deaths per thousand live births, which is slightly higher than the average rate for the sub-Saharan region estimated at 80 per thousand (Population Reference Bureau, 2009). The child mortality rate, estimated at 191 per thousand live births, is also decreasing. However, it remains higher than the average rate for sub-Saharan Africa, estimated at 146 per thousand in 2007. Although the infant and child mortality rates are still high in Burkina Faso, they should continue to decrease in the future. This would lead to an acceleration of the demographic growth if fertility does not decrease or if fertility decreases only at a very slow pace.

3.17 **Available (incomplete) data on adult mortality show that the expectancy of life at birth has almost doubled since 1950** (Figure 3-8). The expectancy of life at birth is estimated at 57 years for both sexes in 2009 (sub-Saharan average: 51 years). Burkina Faso is not
experiencing a severe HIV/AIDS epidemic. In 2007/2008, the HIV prevalence rate was estimated at 1.6 percent of adults between 15 and 49. At the same time, the HIV prevalence for sub-Saharan Africa was estimated at 5 percent, but at only 2.5 percent for Western Africa (UNAIDS data; see Population Reference Bureau, 2009). Although HIV/AIDS is a major cause of death in Burkina Faso, the HIV/AIDS epidemic should not interrupt the overall decline in mortality and should not jeopardize the completion of the demographic transition.

![Figure 3-8: Life Expectancy at Birth (Both Sexes) and Total Fertility Rate, Burkina Faso, 1950-2010](image)


3.18 The total fertility rate (TFR) was estimated at 6.2 children on average in the 2006 Census, the same level that was observed in the 2003 Demographic and Health Survey (DHS). The TFR, which is the average number of children a woman would have if she experiences current fertility levels throughout her lifetime, had peaked at 7.8 children per woman during the 1970-1980 period and is still very high. Fertility levels have decreased slowly since the 1980s so fertility levels in 2005 are quasi similar to those in the 1950s. Burkina Faso has not started the last phase of its demographic transition, namely a steady decline in fertility triggered by the contraceptive revolution.

3.19 In total, as compared to Latin America and Asia, demographic change in Burkina Faso appears to be too late and too slow (May, 2005; Ross and Robinson, 2007). Despite significant decreases in mortality levels, especially among infant and children, fertility levels have remained very high (at 6.2 children per woman). As mentioned, fertility levels have not declined much since the 1990s and are quasi similar to the figures observed in the 1950s. Moreover, the decline in fertility is very slow (the UN Population Division projects a slight decrease in fertility starting in the period 2005-2010). Overall, the last stage of the Burkinabè demographic transition experiences a delay of about 50 years as compared to the other parts of the world. Therefore, with respect to the rapid advancement of the demographic transition in Burkina Faso, the last 20 or 30 years appear to be “lost decades”.

16
Provisions on Human Capital Investments Jeopardized

3.20 **The first consequence of the past rapid demographic growth has been a dramatic increase in the population density.** Burkina Faso has 56 people per square kilometre, almost the double of the sub-Saharan density as a whole. The Burkinabè population density was only 15 people per square kilometre in 1950, but the density has increased rapidly over the past 55 years (United Nations Population Division data from the World Population Prospects: the 2006 Revision).

3.21 **The densification of the Burkinabè population will accelerate in the future.** However, future densification figures will depend on the levels of fertility. Table 3-2 shows the population densities in 2005 and those projected for 2030, according to the High and Low fertility population projections assumptions of the United Nations.

<table>
<thead>
<tr>
<th>Year</th>
<th>Projection with slow fertility decline</th>
<th>Projection with fast fertility decline</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(TFR = 4.35 in 2030)</td>
<td>(ISF = 3.35 in 2030)</td>
</tr>
<tr>
<td></td>
<td>Density (per sq. km)</td>
<td>Density (per sq. km)</td>
</tr>
<tr>
<td></td>
<td>Density/ cultivable land (per sq. km)</td>
<td>Density/ cultivable land (per sq. km)</td>
</tr>
<tr>
<td>2005</td>
<td>51</td>
<td>51</td>
</tr>
<tr>
<td></td>
<td>365</td>
<td>365</td>
</tr>
<tr>
<td>2010</td>
<td>59</td>
<td>58</td>
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<td></td>
<td>425</td>
<td>419</td>
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<td>2015</td>
<td>69</td>
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<td></td>
<td>493</td>
<td>476</td>
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<td>2020</td>
<td>79</td>
<td>74</td>
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<tr>
<td></td>
<td>569</td>
<td>535</td>
</tr>
<tr>
<td>2025</td>
<td>90</td>
<td>83</td>
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<tr>
<td></td>
<td>649</td>
<td>595</td>
</tr>
<tr>
<td>2030</td>
<td>102</td>
<td>91</td>
</tr>
<tr>
<td></td>
<td>735</td>
<td>656</td>
</tr>
</tbody>
</table>

*Source: Tabutin & Schoumaker (2004) and authors’ calculations*

3.22 **The population densification will be even more dramatic with respect to arable land.** The current population density per cultivable land, which was already estimated at 365 persons per square kilometre in 2005, is set to double between 2005 and 2030 with a slow decline in fertility. It will nearly double even though fertility would decline faster (Table 1-2). This will have huge consequences for the preservation of the eco-systems. Moreover, the rapid densification of the arable land will increase the fragmentation of plot sizes. In addition, population pressure may accelerate the reliance on wood burning for cooking. Finally, the increase of water runoff coefficients, despite a reduction in rainfall, points to soil erosion brought about by increased human activities on land-cover (Diello et al., 2006).

3.23 **As most sub-Saharan countries, Burkina Faso experiences a rapid urbanization.** According to the 2006 Census, 22 percent of the Burkinabè population is urban. Since Independence, the urban population has multiplied by a factor of 11 and the rural population by a factor of 3. Urban population will increase even further, more rapidly with a slow decline in fertility and less rapidly with a fast decline in fertility. One can expect a doubling of the urban population in about 15 years and a doubling of the rural population in about 30 years. The population of the capital city Ouagadougou and of its surrounding semi-urban periphery is also
growing rapidly, approaching 1.5 million in 2006 or 10.5 percent of the total population. The 2006 Census enumerated almost half a million people in the secondary city of Bobo-Dioulasso. About 10 other small-size cities are also growing very rapidly (Republic of Burkina Faso, 2008d). The rapid influx of population into the urban areas will have far reaching implications for the creation of new jobs in the modern sector of the economy. This will be achieved only through the creation of growth poles and the development of the currently small-size cities.

3.24 Despite the phenomenal increase in the urban population, the Burkinabé population still remains predominantly rural. According to the 2006 Census, 78 percent of the population is rural. As mentioned, the rural population doubling time (30 years) is twice as long as the urban population doubling time (15 years). Overall, the Burkinabé population is concentrated in the central area of the country and in the Volta River Basin in the Western region. Socio-economic indicators in rural areas are lagging behind those in urban areas (May et al., 2006). Moreover, a large and dispersed rural population poses logistical problems for services delivery, in particular for education and health.

3.25 The rapid demographic growth will jeopardize the provision of human capital investments, particularly in the areas of education and health. The demand on the Government’s resources to provide such services will increase rapidly. The public spending burden of universal primary education (not to mention secondary education) and health services will crowd out infrastructure spending for growth. The increasing dependency ratios (number of dependents per adult) will reduce savings and investments in physical capital, imposing a drag on economic growth and development.

3.26 The rapid population growth will also bring important consequences for the economy. The youthfulness of the population and the high dependency ratios do have implications for labor productivity, structural transformation, savings, and growth. In particular, the fast growing labor force will bring challenges for employment, structural transformation, and labor productivity. However, should Burkina Faso be able to reverse the high dependency ratios, it could possibly capture the benefits of a “demographic dividend” that will boost private savings and economic growth (Appendix 11).

Lost Decades: Lessons Learned

3.27 Sub-Saharan African (SSA) countries have engaged in major efforts to reduce poverty levels and reach the Millennium Development Goals (MDGs)\(^2\). Reaching the MDGs by 2015, however, will require a substantial expansion of social services (education and health). Such an expansion of services is problematic when population growth is very high, the age structure young, and the base of the population pyramid very large and expanding.

3.28 In fact, the achievement of seven out of the eight MDGs will depend on future demographic outcomes. The first MDG, namely to eradicate poverty, can only be achieved with a smaller family size. Poor households, with the largest number of children, have the

\(^2\) The MDGs are eight time-bound (2015) goals agreed to by member states of the United Nations and international development institutions. Their specific aim is to: (1) eradicate extreme poverty and hunger; (2) achieve universal primary education; (3) promote gender equality and empower women; (4) reduce child mortality; (5) improve maternal health; (6) combat HIV/AIDS, malaria, and other diseases; (7) ensure environmental sustainability; and (8) develop a global partnership for development.
greatest difficulties to secure access to education, health and food. They also have less access to monetary employment. The second MDG, aiming to achieve primary education, cannot be reached in 2015 with school-age populations that are doubling every 20 years. Gender equality (MDG 3) is crucial in a country where “reproductive rights” remain nominal. MDGs 4 and 5, on child mortality and maternal survival, will have a direct impact on demographic outcomes. They cannot be reached when half of the pregnancies are at risk because they are too early, too late, too many, and/or too close. The MDG 6 can only be implemented with adequate health facilities and personnel, which are difficult to muster when population is doubling every 20 years. Finally, the MDG 7 on the sustainable environment also implies a reduction of the rate of population growth. This is the only way to reduce population pressure on the ecosystems (Guengant, 2008).

3.29 The phenomenal population increase has put Burkina Faso “off track” to meet the MDGs goals by the target date of 2015 and the two decades since 1990 appear to have been “lost”. The number of people in need of health, education, economic, and other services is large and increasing. This means that the amount of resources, personnel, and infrastructure required to meet the MDGs is also increasing. Therefore, development efforts to reach the MDGs should not overlook the importance and the benefits of slowing population growth.

3.30 Meeting the need for family planning services can help reduce population growth and make achieving the MDGs more feasible and affordable. Unmet need for family planning is large in Burkina Faso: about 29 percent of married women of reproductive age want to space or limit births but are not currently using any method of family planning (current use of modern contraception is 13 percent of married women). Although “increasing access to and use of family planning is not one of the MDGs … it can make valuable contributions to achieving many of the (MDGs) goals” (USAID, n.d.). In addition, such family planning efforts will contribute directly to the goals of reducing child mortality and increasing maternal survival (MDGs 4 and 5). Satisfying unmet need for family planning would avert an estimated 240,000 child deaths and 5,000 maternal deaths by the target date of 2015. Finally, the cost savings in meeting five goals (MDGs 2, 4, 5, 6, and 7) by satisfying unmet family planning need outweigh the additional costs of family planning by a factor of almost three to one (USAID, n.d.). The impact of a slower population growth on the achievement of the MDGs is also illustrated by simulations with MAMS (Appendix 11).

Needed Changes: 50 Years or A Century?

3.31 Fertility outcomes are linked to changes in both the intermediate and proximate determinants of fertility. A balanced mix of interventions on these determinants is necessary. Both types of interventions are mutually reinforcing and the effects of the intermediate determinants need to be supplemented by interventions on the proximate determinants. Only the combinations of these two different policy levers will be make it possible to accelerate the fertility transition.

3.32 Changes in the proximate determinants of fertility that affect fertility directly are both feasible and effective. In Burkina Faso, during the period 2003-06, the contraceptive prevalence rate (CPR) for modern methods increased by 1.1 percentage points per year (and by 0.8 percentage point per year for all methods). In addition, a shift occurred from traditional to
modern contraceptive methods over the same period. However, more efforts are needed in this area and the future challenge will be to achieve CPR increases in the range of 1.5 percentage points per year for modern methods. This will help compensate for the decrease in the duration of the postpartum infecundability that has shortened by 2 months between 1996 and 2003 and is now estimated at 20 months. Nevertheless, there are fewer women exposed to the risk of conceiving: the number of women in union has decreased since 1996 by 0.5 percentage point per year. Today, 75 percent of the women are estimated to be in union and this proportion is projected to decrease even further, to reach 65 percent by 2030. This trend should also help decrease the level of fertility.

3.33 High fertility levels have also detrimental consequences for health outcomes, especially for the mothers and their children. One should first point to the level of human suffering that the policy neglect of family planning programs has imposed upon Burkinabè women and babies. That the average mother has 6.2 children and that child mortality is almost one in five (191 per 1,000 live births) equates to each Burkinabè mother watching at least one of their children die before age 5 – surely a higher likelihood for poor and rural mothers. Second, high fertility levels are detrimental to maternal mortality and morbidity ratios, complications in pregnancy, informal terminations of pregnancies, unattended births, teenage unsafe pregnancies, lack of birth spacing, and ultimately high infant mortality levels.

3.34 A slow versus rapid fertility decline over the next 40 years would bring the demographic changes in Burkina Faso either in 50 years or in one century. It would also bring significant differences in the size of the young age groups, as exemplified by the bases of the population pyramids (Figure 3-9 and Figure 3-10). With slow fertility decline, the bottom of the population pyramid will keep expanding (see Figure 3-9). With a faster fertility decline, however, the base of the pyramid starts to assume a more rectangular shape as soon as 2030 (Figure 3-10) and, in 2050, the fertility transition is well under way as illustrated by receding age groups 0-4, 5-9, and 10-14 (Figure 3-10).
Figure 3-9: Age Pyramids in 1990, 2010 and 2050

1990: 8.9 million, 2010: 16.0 million, 2050: 42.5 million

Source: Authors.

Figure 3-10: Age Pyramids in 1990, 2010 and 2050

1990: 8.9 million, 2010: 16.0 million, 2050: 32.8 million

Source: Authors’ calculations.
Fertility Levels Are Crucial in Completing the Demographic Transition

3.35 One can expect that mortality levels will continue their rapid decline in Burkina Faso. First, as mentioned earlier, initial estimates about the impact of the HIV/AIDS epidemic have been recently revised downward. Second, the improvement of mortality levels may accelerate with the extension of the infant and child mortality reduction interventions (programs of vaccination, malaria control, and oral rehydration). Consequently, the rate of population growth will continue to increase rapidly, unless fertility levels start to decline as well. Out-migration, which has been important in the past, appears to have slowed down in recent years and will not alleviate the rapid population growth unless conditions improve in receiving countries (as mentioned, this is an optimistic assumption).

3.36 Fertility levels are the main engine of the demographic transition. As it has been demonstrated, fertility levels are very high in Burkina Faso and have not declined significantly over the past 50 years. Persistent high fertility levels, whilst mortality levels have declined, explain the acceleration of the population growth. Therefore, the only way to restore the balance between the main demographic components is to trigger a decline in fertility.

3.37 The key determinants of fertility are socio-economic (intermediate determinants) as well as biological and behavioral (proximate determinants). The indirect or intermediate determinants include variables such as education, income, child mortality, and the status of women. In addition, researchers have stressed the importance of cultural or ideational changes (changes in attitudes), as these may induce also couples to have fewer children (Cleland and Wilson, 1987). The direct or proximate determinants include the exposure to the risk of conceiving (percent of women who are in union), the use of contraceptives (linked in part to the availability of family planning services), the rates of abortion and pathological sterility, and postpartum infecundability (a direct result of the postpartum abstinence and the duration of breastfeeding).

3.38 Intermediate determinants of fertility are crucial although there is often a time-lag between changes in these variable and fertility outcomes. Female education, in particular, appears to be one of key variables that help trigger the fertility decline (Hugon, 2007). Moreover, female education offers added intergenerational effects (this means that children of educated mothers will have themselves lower fertility levels and better health outcomes). Other intermediate determinants of fertility include, but are not limited to, labor-market improvements for women, gender equality policies (better status of women), and age at marriage legal reforms. Although all these changes are desirable and necessary, they do not always translate into an immediate reduction in the levels of fertility.

3.39 Policy interventions on the proximate determinants are crucial for the future course of fertility (Guengant and May, 2007). They have not only an immediate effect on fertility levels but they are also prone to direct program interventions. They include, but are not limited to, access to contraceptive methods, involvement of males in reproductive decisions, advocacy.

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3 The relative effect of each of the proximate determinants on the total fertility rate (TFR) has been captured in a model developed by Bongaarts (1978) and Bongaarts et al. (1994). This model is often used to study the effect on fertility of changes in age at marriage and contraceptive use.
programs, and information, education and communication (IEC) as well as behavior communication change (BCC) campaigns.

An Urgent Need to Address Demographic Issues

3.40 **The key Burkinabé development strategies should address population issues more directly.** The demographic evolution generally assumed in the strategic documents (from the Poverty Reduction Strategy Paper [CSLP] to the Burkina Faso 2025 study), will not happen automatically but will be more likely achieved by more proactive policies (2003, 2005 and 2007a). Moreover, these strategies use population and family planning statistics and projections that are very optimistic, such as inflated services statistics instead of survey results (Republic of Burkina Faso, 2008a). Similarly, net and crude education rates estimated by the Ministry of Education are higher than those yielded by the 2006 Census. Finally, the coordination between these strategies could be strengthened as currently these documents are often drafted by different teams, using various statistics.

3.41 **The National Population Policy, revised in 2000, is encyclopedic and too broad to address effectively the huge demographic challenges** (Republic of Burkina Faso, 2000b). The efforts in the area of population and reproductive health will require consistent and sustained programmatic efforts along with a strong Monitoring & Evaluation (M&E) system. Instead, the population policy presents a broad spectrum of interventions that are not time-bound and do lack precise quantitative targets. Programmatic documents, such as the health strategies do not address directly the issue of the contraceptive prevalence rates (Ministry of Health, 2000 and 2001). Even specific documents, such as the contraceptive security strategy, remain too vague and do not use quantitative planning tools (Ministry of Health, 2005).

3.42 **It is urgent to legitimate again interventions in the area of population and reproductive health.** This can be done by highlighting five paramount rationales, as follows:

- The need to accelerate the fertility transition, especially when mortality decreases faster than before;
- The impact of demographic growth on social sectors (e.g., education and health), and employment including the new entries on the job market, especially in the urban areas, which will increase because emigration prospects have worsened recently;
- The importance of demographic growth with respect to economic growth per capita (Ndulu et al., 2007). The economy has been doing well in Burkina Faso (several bumper crops, boom in construction linked to external aid, etc.), but the economic situation remains fragile. Bad crops are always possible and external aid may decrease. Moreover, the recent food crisis and related riots in the cities, the reduction of State’s receipts and expenditures, and the fragility of the cotton sector (on which 3 to 4 million persons live) – all these factors do jeopardize the prospects for socio-economic sustainability;
- The need of information, education, and communication (IEC) and behavior change communication (BCC) programs to promote gender and reproductive health rights; and
- The need to expand quality contraceptive services to foster the demand and satisfy the unmet needs for family planning.
Conclusions and Policy Recommendations

3.43 Demographic change in Burkina Faso has been too late as compared to Latin America and Asia and too slow in particular with respect to the decline of fertility. Despite impressive efforts to reduce mortality levels, fertility has remained very high at 6.2 children per woman on average. The emigration safety valve is no longer available as it was the case in the second half of the 20th century. Burkina Faso has not entered in earnest the last stage of its demographic transition. The rapid population growth has prevented Burkina Faso from reaching its Millennium Development Goals (MDGs). In particular, and despite major efforts in the education sector, Burkina Faso has not been able to enroll all its children in primary school, not to mention the secondary and tertiary levels of education where attainments have been dismal.

3.44 As a result of the delayed fertility transition, Burkina Faso has experienced a phenomenal population increase. This is exemplified by the densification of the population, in particular on arable land. Since independence, the urban population has increased 11-fold, whilst the rural population has tripled in size. Today, Burkina Faso must accommodate 600,000 live births every year, as compared to 200,000 in 1950. The size of the young age groups is increasing rapidly as well, although the number of youngsters would be reduced should fertility start to decline. Finally, rapid population increase has also far reaching consequences for the economy in the areas of labor productivity, structural transformation, savings and growth. Urbanization is increasing very rapidly and small-size cities, in addition to Ouagadougou and Bobo-Dioulasso, will need to accommodate a swelling labor force.

3.45 The decades lost for triggering a fertility decline do bring some lessons. First, development strategies including poverty reduction programs have not taken into account the importance of the population variables. Moreover, such strategies have not been coherent vis-à-vis the population variable and are based on too optimistic statistics and projections. The revised National Population Policy (Republic of Burkina Faso, 2000b), has been too broad and too timid to tackle the formidable task ahead. Second, the developmental challenges of rapid population growth have not been fully understood and acted upon in Burkina Faso. This calls for enhanced advocacy in the area of population and reproductive health as well as a better understanding of the consequences of rapid population growth for human capital investments.

3.46 The needed demographic changes in Burkina Faso can be ushered in 50 years with decisive interventions on fertility or will take one century with laissez-faire policies. Rapid demographic change in Burkina Faso will require proactive and efficient interventions on both the intermediate and proximate determinants of fertility. This will call for sustained commitment and results-based policies on the part of the Burkinabé Government and support from its development partners. Such policies would enable the formation of human capital, particularly in education. They would also carry huge benefits for the health of the mothers and their children. Last but not least, they would respond to the deep-rooted aspirations of the country’s most important development actors, namely the Burkinabé themselves.

3.47 To address demographic, population and reproductive health issues, the report recommends the following:

- Reposition population issues within development strategies, develop a positive public discourse on family planning, and prepare a well-documented component on “Population,
Development and Reproductive Health” to be included in the new Strategy for Faster Growth and Sustainable Development for 2011-2015 (SCADD). In particular:

- Update the population projections and simulate various objectives for contraceptive prevalence rates, within the overall framework of reproductive rights;
- Articulate the objectives and deadlines spelled out in the new «Declaration of the Government on Population and Reproductive Rights» in the National Health Policy, the Reproductive Health Policy, the Strategy of Reproductive Health Products Security, and the Gender Policy — and formulate those with quantitative objectives, using updated population projections;
- Fully budget population policies in the new SCADD;
- Disseminate a short brochure and a poster to raise awareness among high-level leaders and decision-makers of the criticality of population and reproductive health dynamics;

- Enhance the supply-side approach to family planning services to meet pent-up demand for modern contraception. In particular:
  - Provide a specific item line in the Budget for the purchase and distribution of contraceptive and reproductive health products;
  - Organize nation-wide information, education, communication and behavior change communication campaigns to help increase the contraceptive prevalence rate by at least 1.5 percentage point per year;
  - Mobilize development partners to raise funding for contraceptive and reproductive health products in order to reach the objectives of the «Declaration». 
PUBLIC POLICIES AND MARKET INSTRUMENTS TO REDUCE VULNERABILITY

Burkina Faso’s Vulnerability to Shocks

Risk Typology

As a poor developing country located in the Sahel and highly dependent on one commodity crop, the Burkinabé economy remains highly vulnerable to adverse climatic and external shocks, including terms of trade, food and fuel price increases. Box 3-1 provides a typology of the risks to which the country is directly exposed.

Box 3-1: Typology of the Main Risks to Which Burkina Faso is Exposed

**Economic risks (terms of trade shock)**

Agriculture constitutes more than one-third of Burkina Faso’s GDP. Until the recent mining boom, cotton and livestock were Burkina’s two major export items. The country’s limited export capacity makes the country vulnerable to volatility in world prices for agricultural products and leads to unpredictable swings in household incomes in rural areas, apart from inducing volatility in country’s export earnings and government finances. Such economic risks can reduce the access to food through the loss of income, either as a result of unemployment or of lesser income-generating activities in farming, small trade and small-scale manufacturing.

**Natural risks (food insecurity)**

As in most other sub Saharan countries, there is a strong correlation between agricultural output and rainfall levels in Burkina. High risks are associated with agricultural activities within the country because of the intra-year fluctuations. In addition, the rainfall varies a great deal from one year’s peak to another. Variability in agricultural outputs and hence farmer’s income (consumption/welfare) levels as well as increased production costs related to higher losses, irrigation, treatment of infections and insecticides. Environmental risks affect mean production negatively, in the case of declining soil fertility through lower yields but also through increased unit production costs.

**Regional stability**

Burkina is a landlocked country which depends on its neighbours for the delivery of goods to and out of the country, and this geographical dependence makes the country’s economy vulnerable to any political instability in the region. For instance, there are many channels through which the economy of Burkina has been affected by the conflict in Côte d’Ivoire: (i) trade disruption due to the difficulty to transport goods from and to the port of Abidjan by road and railway; (ii) government revenue shortfall: a slowdown in imports would result in lower tax revenues (customs); (iii) higher expenditure for returning Burkinabés; and (iv) reduced worker remittances.

**Health risks**

The country’s poor health status is characterized by high rate of child and infant mortality, maternal mortality and fertility and relatively high prevalence of HIV/AIDS. Malnutrition is also widespread. Malaria is the main source of infant morbidity and mortality in Burkina, with diarrhoea related diseases and acute respiratory infections being the next most common causes. Recurrent epidemics of measles and cerebrospinal meningitis are also major concerns in Burkina Faso. The main burden of such risks falls on children increasing their immediate food insecurity. These health-related risks also increase vulnerability by reducing educational achievements because of higher absence and lower cognitive capacity due to poor nutritional status. In addition, health risks imply loss of labor time either periodically or permanently, meaning lower income and less food access, reduced ability to absorb both macro- and micro nutrients, and in cases where a large part of a community is affected, reduced food production locally.

**Drought and hunger**

Drought impacting food production and hunger are the predominant risks faced by the Burkinabé villagers. A risk and vulnerability assessment was initiated in 2002 based both on quantitative and qualitative surveys (World Bank, 2002). Nearly all villagers have been affected by these two shocks repeatedly over the period 1999-2002, with none fully recovering from the negative effects of the shocks. Although famine could be seen as a consequent of drought, villagers perceive these as two separate risks.

**Social risks**

At the household level, risks (health, lifecycle related, social and economic) primarily affect the access to food and food utilization. For households based on subsistence farming without alternative income source or no access to markets, such shocks can also reduce food availability. Lifecycle events, such as funerals or weddings, also often imply significant extra expenditures, reducing the resources available for food purchase. Similarly, illnesses, disability and injuries involve additional expenditures, but also reduce labour supply and income and can lead to poor food utilization.
Risks Along the Agricultural Value Chain

3.49 **Agents at different stages of the agricultural value chain are exposed to differing risks.** The Burkinabè farmers and supply chain intermediaries are particularly vulnerable to exchange rate risk and commodity price volatility.

3.50 **The cotton sector’s competitiveness has been made more vulnerable to external shocks due to CFA-USD exchange rate volatility and multiple fund transfers related to export proceeds and import payments.** The exchange rate is one of the key macroeconomic variables that impact the overall competitiveness of the economy as well as the cotton dynamic and sector performance. Cotton is traded in world markets in dollars, but West African farmers are paid in CFA francs. An appreciation of the euro vis-à-vis the dollar worsens the competitiveness of cotton producers by eroding their profit margins. The appreciation of the euro coupled with a rising CPI has led to fiscal difficulties for the cotton farmers. An unfavorable exchange rate worsens the financial viability of the sector, and has adverse effects on poverty. Currently, no mechanism exists to offset US Dollar import payments against US Dollar export proceeds prior to currency conversion into CFAR by the Burkinabè cotton ginning companies, thereby avoiding sizeable transactions costs in currency conversion to the detriment of the cotton sector’s profitability. (See section on Exchange Rate Dynamics and Competitiveness)

3.51 **Burkinabè farmers face two distinct price risk problems.** The first relates to *price uncertainty* over the crop year: farmers commit time and material inputs based on their expectations at the start of the crop year. If prices turn out lower than expected, farmers may fail to cover input costs, while if prices are higher farmers will have failed to take advantage of market opportunities. The second problem is that of *sustained low prices* which undermine livelihoods. Risk aversion will lead farmers to reduce inputs to the extent that harvest prices are subject to uncertainty. Therefore, price uncertainty tends to reduce yields and hence revenues. Because adverse shocks are likely to impact investment as well as consumption, these effects can be long term and endure after prices have recovered (Raddatz, 2005).

3.52 **Intermediaries are sensitive to price variability and even a small price fall over the period can easily wipe out profit margins.** Exporters face both currency risk and political risks, in particular risks associated with the availability and terms of export permits. Banks have indirect exposure which results from default risk associated with lending to intermediaries with specific price exposures. A fall in the commodity price can result in inability to repay on the part of intermediary who is long on the commodity and has borrowed in order to finance operations in the supply chain. Once banks have experienced such defaults, they become unwilling to advance credit to the sector. Diminished access to credit in the supply chain and increased cost of credit (where it is available) thus become direct results of poorly managed price risks.

3.53 **Governments also have direct or indirect exposure to the profitability of the cotton sector.** Direct exposure arises when tax revenues or fiscal subsidies depend on the level of prices. Exposure also arises indirectly when governments act either implicitly or explicitly as guarantors of stabilization funds and parastatal organizations. This is certainly the case in Burkina Faso where the recapitalization of the *Smoothing Fund* has led to contingent liabilities on the government balance sheet at a cost of almost 1% of GDP and a resulting ownership stake of 65%. In addition, the government is exposed through its guarantee of the debt of the cotton corporations. As of the end of 2006, CFAF 44 billion was restructured over a five year term (FSAP, 2008).
Burkina Faso and the *Fonds de Lissage* (Price Smoothing Fund)

3.54 The *Fond de Lissage* (FdL) which is managed by the Association du Fonds de Lissage (AFDL) was set up in agreement with the Burkinabe cotton trade association (includes producers and cotton companies). A new mechanism for setting a guaranteed floor price for cotton producers was introduced at the beginning of the season in April 2007, which was based on five-year moving averages of the world price of the Cotlook Index A expressed in CFAF at FOB level. The gap between the floor price and world price is financed through the price smoothing fund. However, after paying market participants price support following the severe crisis of the 2005/2006 season; current estimates suggest that unless additional capital can be accessed, a credit line of at least 30 million euros will be needed for the smoothing fund to be credible in providing price support going forward (FSAP, 2008).

3.55 Price smoothing funds do not address risk management. Price smoothing funds, aimed at softening the effect of price shocks, are not meant to prevent these shocks from happening or to remedy the downward trend. The objective is two-fold. In the short run, these funds help avoid a possible explosion of the link between fixed costs and variable costs in the event of a dramatic drop in production. The objective in the medium run is to maintain predictable trends in production. Price smoothing funds can only absorb a limited part of the potential effects of price shocks. Smoothing funds do not eliminate risk management problems; they simply transfer short-term price exposure from the farmers to the fund, while leaving the transferred risk unmanaged.

3.56 Hedged stabilization schemes are more likely to be financially sustainable than unhedged stabilization schemes. Price stabilization (or smoothing) is fundamentally different from price risk management (Gilbert 2007). Stabilization is an activity which relates to saving while risk management is a contracting activity. Burkina Faso’s cotton smoothing fund is structured as a stabilization scheme as it provides a collective savings program which operates according to the principle that disbursements are constrained by the level of accumulated savings from previous years. The cotton smoothing fund itself, however, has not yet hedged its risk exposure, whether to price, exchange rate fluctuations or rainfall.

Moving Closer to a Market Based Determination of Producer Prices

3.57 Exposure to a declining trend in world cotton prices can only be addressed through diversification and efficiency enhancement strategies. Lack of incentives for cotton companies to minimize their costs or maximize their selling price is a concern when the actual selling price (as opposed to the market price) determines the level due from the Price Support Fund as well as the premium will be paid to producers. Cotton is no longer profitable for smaller farmers who are not able to reach a minimum profitable yield of 900 kg/ha. (Gergely, 2008) The Smoothing Fund should be clear in its goal to reduce the impact of cotton price volatility on producers without interfering with market signals regarding the impact of the global increase in cotton supply coupled with sluggish demand which has led to lower export prices for the cotton industry worldwide.

3.58 The guarantee of an unhedged producer floor price backed by the Smoothing introduces commodity price exposure for the Burkinabe cotton industry and therefore for
the Government of Burkina Faso. Producer prices fixed without adjustment mechanisms become unsustainable when world prices fall substantially below the floor price. The repeated depletion of the price support mechanism and the current lack of funds remaining in the smoothing fund suggest that a more robust hedging mechanism needs to be instituted. However, current alternatives proposed so far tend to call for more capitalization of the stabilization fund and increased access to credit lines in order to staunch the regular outflow of funds for what is effectively an income stabilization scheme for the cotton producers against declining world cotton prices.

3.59 Moving towards market based price determination by fixing the producer price at the start of the season based on the price quoted in the commodity futures exchanges. The stabilization fund should use the global futures markets to determine the producer price commitment for the harvest year. A producer price announcement that is based on cotton prices in the world futures exchanges reaffirms the authorities’ commitment to wean its cotton sector from a dependency on subsidies and its ginning companies from repeated calls for capitalization. The advantages of a producer price based on futures exchange prices will ensure that the price signaling mechanism of the marketplace is not muted by the announcement of the producer price. Thus producer incentives at the start of the season will be aligned to the market forces of supply and demand for cotton in the international markets thereby spurring production efforts through measures such as efficient use of cotton by-products as well as the embracing of GM technology. Impetus will also be provided to the Burkina government and the cotton corporations to promote diversification strategies and increase the cotton sector’s flexibility to adapt to changes in relative profitability. Conversely, the GPCs may resist moving away from the existing mechanism to a new methodology for determining the producer price which does not serve to ensure a minimum price and at least a subsistence level income at harvest. In effect, the risk is being transferred from the stabilization fund and the ginning companies to the GPCs.

Managing Agricultural Price Risk through Commodity Futures Markets

3.60 Existing credit and regulatory access problems give multinational supply chain actors, and their developing country affiliates, a clear competitive advantage relative to intermediaries located in the producing countries themselves. International market regulation limits Burkina Faso’s ability to take advantage of risk management instruments. Supply chain actors need to use commodity futures and forward contracts to offset exchange rate risk and commodity price volatility. But access to these instruments is more difficult for actors located in developing countries. An adequate line of margin credit in a convertible currency is prerequisite for taking futures positions on a developed country exchange. In the absence of a line of credit, actors are restricted to non-margined options-based hedges with full up-front payment.

3.61 Overcoming developing country access constraints in the use of futures exchange instruments by leveraging the Burkina smoothing fund as Euro denominated collateral against a USD line of credit. Futures’ trading requires sizeable credit lines, and daily monitoring against margin calls by the futures brokers. Margin calls are based on a mark to market process which nets open positions against current market prices to establish a dollar value of the net liability to the futures broker and limits this liability by requiring either a cash deposit or a credit line to allow coverage of a percentage of the overall liability. (Dana et al., 2008) The Smoothing Fund can be used as Euro based collateral to establish a USD credit line and allow
Burkina’s cotton industry to be a credit worthy counterparty in the futures market. This structure also leverages the appreciating Euro against the USD to the benefit of Burkina Faso. The futures contract limits the use of the Smoothing fund to support producer prices that are unlikely to materialize in the world cotton markets at harvest time and thereby ensures its financially sustainability in the long run. In addition, the futures prices will ensure that the cotton producers receive an early signal at planting, regarding the profitability of their crop at harvest.

3.62 Outsourcing the annual execution of the futures contract with the help of trading companies who are also shareholders in the Cotton Ginning Companies. Local capacity to address risk management strategies in developing countries is generally limited. The futures contract can be executed by the local bank currently managing the operations of the Smoothing Fund with the help of an outside consultant. Moreover, in order to address concerns arising due to risks related to (i) cotton price (market, quality); (ii) losses in storage and local transportation; and (iii) shipping and final delivery; Burkina should hedge less than 80%-85% (or another estimate of expected losses) of its production estimates, leaving the remaining production volume unhedged. This will serve as a safety mechanism against the situation where the ginning companies are overhedged at cash settlement at maturity of forward contract. However, there will be a need to build capacity at the local administering bank level to manage the USD credit line against margin calls throughout the life of the futures contract.

3.63 Addressing constraints related to basis risk and the impact of the financial crisis on the cotton futures markets. Establishing USD denominated export L/Cs by the cotton ginning companies will serve to minimize basis risk concerns. The establishment of an export regimen based on USD denominated export L/Cs is part of a larger exchange rate management strategy which is currently being proposed to facilitate the netting of USD import payments against USD export proceeds at year end. Availability of futures contracts that are longer than four months in the current post-financial crisis environment will remain a constraint on the hedging strategy of the Burkina cotton industry. However, the cotton industry has been in existence for over a century and as the global markets stabilize, the futures markets will offer more alternatives with regards to the available maturities of futures contracts.

3.64 Alternatives to futures hedging strategies include purchasing disaster insurance in the form of an out-of-the money put option which would guarantee a minimum price to avoid depletion of the Smoothing Fund. Price floors offered by the government can be naturally hedged by purchasing out-of-the-money put options which, pay off in exactly the circumstances that the Government’s guarantee is required. However, this is an expensive strategy which would not address the annual calls for refurbishing the Smoothing fund post depletion.

3.65 Burkina Faso would gain by using financial risk management instruments at the macroeconomic level, notwithstanding existing West African Monetary Union (WAMU) restrictions on hedging products. In WAMU countries, exchange regulations actually prohibit use of financial instruments for hedging. However, governmental exposure to export prices is high. Governments often find themselves offering a more or less explicit price cap. A price stabilization fund, such as the Fond du Lissage in Burkina Faso is costly in terms of the capital tied up in the reserve, deterioration and bureaucracy. Subsidizing the price of food staples for consumers is costly and as experienced by the Burkina authorities, difficult to sustain over time. In addition, there is an existing framework originally proposed by the AFD that intended to use market instruments such as OTC puts to ensure that ginners could offer the committed producer
price. Recent publications by the IMF (FSAP, 2008) also support recommendations for cotton ginning companies to use market hedging instruments and improve risk management capabilities to enable them to secure cotton sector financing.

3.66 The Burkinabé Government could also enhance the administration’s capacity in risk management, while pursuing enhanced access to risk management instruments over time. Possible transmission intermediaries include producer cooperatives, banks and exporters. Cotton companies in Burkina Faso have the size to aggregate. They buy the commodity from farmers’ cooperatives and export after ginning. They also supply inputs to cooperatives at the start of the crop year, on a credit basis. Cotton companies might sell the product forward or establish a short futures position enabling them to offer farmers a fixed price at the start of the crop year. When properly implemented, this gives the farmers the security required in deciding what quantities of inputs to purchase and how much labor time to supply. But access to the international commodity futures markets remains limited. Few major banks and brokers are willing to invest in building-up relationships with cotton companies from a developing country and work with them to overcome regulatory hurdles. Some have proved insufficiently sophisticated from a financial and accounting standpoint to use the full array of products financial markets could offer. Technical assistance to Burkina Faso’s cotton companies could help them benefit from the improved competence in managing risks.

Weather Risk and Agricultural Production

3.67 While rainfall risk on cotton production has proved difficult to assess quantitatively, drought does not appear to have constituted a systemic nation-wide or recurrent risk for the cotton sector. The bulk of cotton production in Burkina Faso is centered in the reliable, high rainfall areas of the country rather than in areas that share a more Sahelian, drought-prone, climate. Consequently, cotton yield data for Burkina Faso shows remarkably low variability for a rain-fed crop. Interannual yields for 1978-2007 are presented in Figure 3-11. Drought risk does not appear to have an impact in the SOFITEX area, which covers 85 percent of the country’s cotton production and has a denser network of weather stations, nor overall in the Vieux Bassins and the Zones Nouvelles, the two other cotton producing areas in the country. Yield data at the provincial level exhibit much less spatial correlation than rainfall data, which suggests that rainfall variability in recent years has not had a significant impact on aggregate yields. Droughts, overall, have a more systemic and recurrent impact on staple food production than on cotton, particularly in the country’s North. The recent 2007 adverse rainfall season also more severely impacted the cereal crops and therefore the country’s food security.

3.68 Rainfall risk, however, is more prevalent at the local level, particularly in the northern most cotton-producing areas. Meteorological data broken down at the sub-provincial level show how average rainfall conditions vary across the country with very favorable conditions in the core SOFITEX cotton growing areas in the South-West and more marginal areas in the North. The disaggregated data also shows that the frequency of adverse weather conditions increase with the location’s latitude (they are more frequent in the North). While there is only limited evidence of national, or even regional, catastrophic drought risk to cotton production in the past 30-year period, a major weather event could still happen in the future, particularly if cotton production continues to expand into the drought prone areas. Climate change could also impact this relationship over the medium and long term.
Figure 3-11: Cumulative Seasonal Rainfall vs. National Cotton Yields, 1978-2007


3.69 **Rainfall risk can also come from an excess rather than a deficit in rains.** This is illustrated by the severe flooding of 2007/2008, when the rainy season started late but with excessive rainfall leading to floods, followed by an abrupt cessation of rains that impacted cotton production severely.

Developing Commercial Agricultural Insurance: Towards A Weather Index Insurance Pilot in Burkina Faso?

3.70 **Risk mutualization helps assume basic risks, which are inevitable in agriculture.** Minor losses are a normal part of crop production and have to be managed by self retention of risks. The promotion of mutual funds, systems of saving and insurance, linked to community based mutualization, would increase the resilience at the individual and the group levels. In the Burkinabé cotton sector, this is already done at the GPC level (described in the cotton section in the second chapter of this report). Small amounts of surpluses are formally saved into mutual funds, leading to an improved ability to meet the internal solidarity payments by producers within GPC’s, and improving the ability of GPC’s to maintain their external credit status.

3.71 **Stand-alone commercial agricultural insurance, outside the realm of subsidies, can be ineffective in developing economies if not bundled with a service package for farmers.**

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4 The dashed thin line represents a straightforward average of the cumulative seasonal rainfall at all 47 weather stations each year; the solid thin line represents a weighted national average rainfall, where the cumulative seasonal rainfall of stations within a specific province are averaged first and then weighted by the 5-year (2003-2007) average cotton area planted in that province, so that stations in parts of the country that grow more cotton are given more importance in the national average. Forty weather stations of the 47 fall within the SOFITEX region; 3 fall within the FASO COTON region; 3 fall within the SOCOMA region; 1 falls in the marginal growing areas in the north.
Commercial agricultural insurance is a product farmers are entitled to buy, so they can participate more actively in markets during shocks. To be viable and sustainable, additional services such as credit, inputs, quality oversight and access to markets must be provided to enhance the return of this instrument for farmers. This is often a necessary condition for farmers to be willing to pay a premium for an event that will rarely happen.

3.72 **Given its overall organization around the provision of services to producers, the Burkinabè cotton sector might consider a pilot case to develop a sustainable weather insurance market.** In Burkina, ginned cotton is marketed through cotton companies, which seem well positioned in the value-chain to offer structured insurance products to farmers. Strong linkages exist for input supply, collection and sale of output, and credit provision (as described in the cotton chapter). This provides a strong opportunity to integrate insurance into a package of services to the farmer. Though quantitatively, the correlation between rainfall and output is more significant for food crops than for cotton.

3.73 **Index insurance products can overcome implementation difficulties experienced with more traditional forms of crop insurance.** Traditional forms of crop insurance, which rely on in-field assessment of losses (Box 3-2), are not feasible where there are large numbers of small scale farmers, limited capacity of insurers, low insurance awareness amongst producers, and limited data. Index insurance overcomes many of these constraints, as insurance payments are based solely on measurements of average yields or of rainfall made at specific weather stations. For weather index insurance, the index is designed so that there is as close a correlation as possible between the expected crop loss, and the amount and timing of deficit or excess rainfall measured at the station. This has the advantage of increasing transparency for the insurer and the producer, and further reducing insurance administrative and loss assessment costs. From the point of view of farmers, the main advantage of area yield index compared to a weather index insurance is that, since it measures the average final yield\(^5\) on a given area (by means of crop sampling), it captures all causes of loss, rather than just losses from lack of or excess rainfall. It is also an affordable product with lower loss costs. In Burkina, critical localized yield data on which to establish an index are lacking and would make it difficult to transfer this risk to the commercial insurance market.

3.74 **Opportunity to implement a pilot commercial index-based excess and deficit rainfall insurance product for Burkina Faso might be possible.** Organizationally, many questions need to be resolved, particularly regarding limited capacity to deal with a technically complex product and the existence of robust mechanisms for reaching farmers and disseminating training and education on a commercial product to them. A technical support unit would provide needed assistance and project coordination, initially for a pilot project. Dissemination of information to the risk aggregator, producers and all stakeholders on weather index insurance would be a critical aspect of implementing such a program. Stakeholders for such a project include the cotton producers’ union UNPBC, cotton companies, insurers, the insurance regulator, the Direction de la Météorologie and technical institutions.

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\(^5\) Insurance companies will not offer insurance on the yield on a particular farm since this generates a clear incentive to the farmer to reduce effort (moral hazard). However it is practical to offer insurance on the yield in a well-defined administrative area, if this can be measured, since an individual farmer will have a negligible impact on overall yield.
3.75 Designing weather insurance products at the “aggregator level” where a cotton company, a bank, or some other entity with financial exposure to the aggregate production of many producers is the policyholder may be more realistic. The aggregator holds the policy, pays the premium, and receives the settlement of claims. The aggregator is responsible for setting of rules for onward settlement of the payouts to its clients, in this case the GPCs, if any. This approach, with aspects of onward benefits to farmers in times of a payout, could be a more appropriate and simple interim solution to manage the marketing and educational challenges in the early phase of developing an insurance program.

3.76 Since weather is just one of the many risks faced by cotton producers, grafting an index-based risk management solution, which has commercial insurance and reinsurance potential, into a mutual fund framework may be a solution for GPCs. Operationally such an arrangement would minimize the educational and training requirements to key decision makers involved in managing the community-based funds, rather than many GPC groups. A GPC-level insurance product, for agricultural lenders, could protect against extreme deviations in rainfall reflected by the local interannual variations and at the same time protect aggregated losses, if when these risks manifest themselves over a larger number of stations in the same year. Coverage against extreme excess, deficit and erratic rainfall deviations would have to be considered to design adequate insurance products.

3.77 Prerequisites are needed at the local weather stations before any operationalization of an insurance system. The lack of real-time data communication capability from the majority of the local weather stations is currently not up to risk transfer standards and an investment in radios or cell phones would be needed for the selected weather stations if the data from them was to be used in an operational sense. Rain gauges are not secure enough for risk transfer. Therefore if rain gauges were to be used for operational or risk transfer purposes, they would have to be upgraded beforehand by installing automatic weather stations or rainfall logging systems (i.e. automated rain gauges) next to the existing rain gauge equipment so that data could be reported in real-time via the GSM-network. Such an investment would also be needed if SOFITEX rain gauges were to be leveraged for insurance purposes. An agreement would also be needed between SOFITEX and the Direction de la Meteorologie in such a case, to allow the latter to manage and maintain these new stations and to receive and ensure quality control of the data reported from them. A further point of concern is the density of rainfall monitoring stations in Burkina Faso. The density is adequate for performing a rainfall risk analysis at the national, province and in some cases département level and to capture extreme weather events at these spatial scales. However, the current network is not adequate to capture localized rainfall events for all current cotton producers in Burkina Faso, particularly those outside the SOFITEX area. As a guideline, the maximum distance between weather stations and insured farmers should be small, for example 20 km, to reduce basis risk (differences between rainfall at the nearest station and at the GPC). Investments to expand the weather observing network with additional local automatic weather stations would be needed if a farmer-level insurance program was to become fully scalable throughout the country outside a limited pilot based on existing stations. This could take significant time and investment.

3.78 The weather risk insurance would need to be provided by commercial insurers that would transfer catastrophe risks to international reinsurers. GPC’s or cotton companies, would be insured as part of the credit package for inputs, with a premium payment. Perils covered would be rainfall deficit (drought) and excess rainfall. The product needed would be
relatively complex, and some basis risk would remain. The full extent of the potential for basis risk cannot be fully defined until the product is designed.\textsuperscript{6} By contrast, the mutualization approach recognizes that a wider solution than weather index-based insurance is needed, and that rainfall is only one hazard facing farmers. Under the proposed scheme, each GPC or cotton company would be insured for rainfall measured at the nearest weather station. Additional local automatic weather stations would be added to the network over time, to reduce basis risk (differences between rainfall at the nearest station and at the risk aggregator level). Insurance payouts would be triggered when rainfall exceeds or falls below thresholds set out in the policy, during the specified time periods, on a scale as set out in the insurance policy. The contract parameters would be set to reflect, as closely as possible, expected loss of crop yield resulting from deficit or excess rainfall. There would be no field assessment of losses, with payment being made only on rainfall measurements at the nominated weather station.

**Household Vulnerability**

3.79 **Burkinabès are exposed to severe shocks, which render most of the poor and near poor vulnerable to severe consumption shortfalls.** Most rural households in Burkina Faso are vulnerable to terms-of-trade or weather-induced shocks. Those shocks are a major factor in exacerbating the poor’s vulnerability to severe shortfalls in consumption and seasonal hikes in the incidence of poverty. The study on households’ vulnerability (World Bank, 2002) shows without exception that all the households underwent one or more shocks during the period 1999-2002. As such, their limited ability to recover from shocks contributes to their poverty status.

3.80 **Households’ idiosyncrasy can emphasize vulnerability.** Whether individuals or households are exposed to risks, or susceptible to risks, depends on various factors such as the existing health and nutritional status of individuals, their physical assets such as housing, infrastructure and household location, as well as on their educational levels and available information, and their cultural and behavioral practices. The poor are more vulnerable than other population groups because they are typically more exposed to risk, face many risks simultaneously, and have fewer assets and resources to be able to cope with them if realized (Table 1-3). A household is more likely to be exposed to adverse shocks and have limited earnings prospects and income-generating capacity if it:

- has low levels of human capital, know-how and access to information;
- suffers from physical and psychological disabilities;
- has few productive and financial assets;
- suffers from social exclusion or inadequate networks of social support;
- has limited access to credit and risk management instruments;
- lives in a setting with adverse agro climatic and limited natural resources;
- lives in a community where there is insufficient entrepreneurial activity and job creation;

\textsuperscript{6} Other causes of loss exist, which may affect producers. These are principally flood (for example, flood events are difficult to index and payments arising from excess rainfall will not mirror all flood losses); uncontrollable pest (e.g. locust); controllable pests; plus a range of infrastructure related risks (input supply; seed quality; market disruption; GM related risks; and others).
- works in a sector that is particularly sensitive to macroeconomic volatility and sectoral shocks.

3.81 Access to land, means of transport, and literacy tend to reduce vulnerability. Interviewed villagers quoted as the main factors that determine vulnerability: (i) the lack of work; (ii) the absence of social capital; (iii) the heavy responsibilities tied to large families; (iv) famine; and (v) droughts. The survey also shows that a smaller household size, better endowment of assets, access to land and means of transport, literacy and smaller distance to schools and clinics are conducive to reducing vulnerability. On the contrary, distance to markets and schools increases the variance of consumption both in rural and urban areas.

### Table 3-3: Differences in Households Characteristics by Vulnerability Status

<table>
<thead>
<tr>
<th>Households’ Vulnerability Index</th>
<th>Not vulnerable</th>
<th>Transient vulnerable</th>
<th>Chronic vulnerable</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Household size</td>
<td>6.0</td>
<td>10.5</td>
<td>11.8</td>
<td>7.58</td>
</tr>
<tr>
<td>Male household head</td>
<td>89%</td>
<td>96%</td>
<td>98%</td>
<td>91%</td>
</tr>
<tr>
<td>Age of household head</td>
<td>43.6</td>
<td>51.8</td>
<td>53.0</td>
<td>46.2</td>
</tr>
<tr>
<td>Adult male literate</td>
<td>11%</td>
<td>1%</td>
<td>1%</td>
<td>8%</td>
</tr>
<tr>
<td>Adult female literate</td>
<td>6%</td>
<td>1%</td>
<td>1%</td>
<td>4%</td>
</tr>
<tr>
<td>Poor soil materials</td>
<td>57%</td>
<td>94%</td>
<td>94%</td>
<td>68%</td>
</tr>
<tr>
<td>Has motorbike</td>
<td>31%</td>
<td>6%</td>
<td>9%</td>
<td>24%</td>
</tr>
<tr>
<td>Has radio</td>
<td>61%</td>
<td>34%</td>
<td>33%</td>
<td>53%</td>
</tr>
<tr>
<td>Rooms per capita (crowding)</td>
<td>0.64</td>
<td>0.38</td>
<td>0.37</td>
<td>0.57</td>
</tr>
<tr>
<td>For rural areas:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Received extension services</td>
<td>29%</td>
<td>24%</td>
<td>22%</td>
<td>26%</td>
</tr>
<tr>
<td>Used fertilizers</td>
<td>33%</td>
<td>21%</td>
<td>18%</td>
<td>28%</td>
</tr>
<tr>
<td>Has plough/oxen</td>
<td>27%</td>
<td>24%</td>
<td>21%</td>
<td>25%</td>
</tr>
<tr>
<td>Has cart</td>
<td>25%</td>
<td>21%</td>
<td>23%</td>
<td>24%</td>
</tr>
<tr>
<td>Receives foreign remittances</td>
<td>22%</td>
<td>33%</td>
<td>35%</td>
<td>27%</td>
</tr>
<tr>
<td>Receive domestic remittances</td>
<td>16%</td>
<td>16%</td>
<td>15%</td>
<td>16%</td>
</tr>
<tr>
<td>Rainfall</td>
<td>94%</td>
<td>94%</td>
<td>93%</td>
<td>94%</td>
</tr>
<tr>
<td>Distance to health center</td>
<td>2.6</td>
<td>2.7</td>
<td>2.6</td>
<td>2.6</td>
</tr>
<tr>
<td>Distance to primary school</td>
<td>2.0</td>
<td>1.9</td>
<td>1.9</td>
<td>2.0</td>
</tr>
<tr>
<td>Distance to market</td>
<td>2.0</td>
<td>1.8</td>
<td>1.9</td>
<td>1.9</td>
</tr>
<tr>
<td>For urban areas:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Distance to health centre</td>
<td>1.3</td>
<td>1.6</td>
<td>1.7</td>
<td>1.3</td>
</tr>
<tr>
<td>Distance to primary school</td>
<td>1.1</td>
<td>1.3</td>
<td>1.2</td>
<td>1.1</td>
</tr>
<tr>
<td>Distance to market</td>
<td>1.2</td>
<td>1.6</td>
<td>1.7</td>
<td>1.2</td>
</tr>
</tbody>
</table>


3.82 Across all demographic groups in Burkina, women, children and the elderly remain the most vulnerable to different socio-economic risks in the country. When asked their perceptions, two out of three villagers stated that those most vulnerable were the elderly, followed by handicapped persons, widows/widowers and orphans. Women are vulnerable because they face an unequal treatment at many levels- from lack of control over household resources to social acceptance of gender violence and legal discrimination. The gender differences are eventually visible through (i) higher rates of poverty among female-headed households compared with those headed by males; (ii) higher levels of illiteracy among women than men; and (iii) lower labor force participation rates for women than men. Women do not have the same level of tools and assets to face shocks and manage risks. Children, especially orphans, are also victims of poverty, malnutrition, high prevalence of HIV/AIDS and other communicable diseases. Widespread poverty forces parents to send their young children to work
in agricultural farms or to sell things on the streets. This too early economic activity by kids comes at the expense of education. Early exposure to hard physical work on land has also negative impacts on children’s health and long run capacity to face difficulties.

3.83 Households’ size and polygamy tend to emphasize vulnerability. If all rural households are vulnerable to weather-induced shocks, households’ characteristics emphasize or tend to reduce vulnerability. For instance, there is a positive correlation between household size and poverty incidence. Larger households seem to experience more shocks, and be able to react to them less well once shocks hit. Vulnerability also varies according to matrimonial situation. Polygamists’ households are more vulnerable than monogamous households, and they tend to make up the majority of the vulnerable households.

3.84 Education is an important asset of the individual, increasing his/her ability to manage risks. Households whose head is not literate represented up to 85 percent of total poverty in 2007. Analysis of the determinants of food insecurity clearly shows a lower incidence among households whose head attained a secondary level of education and more. In 2005 for instance, the probability of experiencing food insecurity was about 24 points lower in rural households whose head attained a higher secondary level of education (high school) in comparison to households whose head has no education at all. This probability drops to 13 points in urban areas for the same year and households with the same level of education. Indeed during surveys on vulnerability focus groups clearly identified illiteracy as a risk.

3.85 Health is a crucial asset in dealing with risks. The empirical literature underlines the narrow link between climatic and non-climatic shocks and individuals’ health status. Those ones tend to affect households’ income and consequently their ability to produce and ask for health services. As an example, Hoddinott and Kinsey (2000, 2001) and Hoddinott (2006) noted that a drought has a negative and permanent effect on the height of children aged 12-24 months. They might loose from 1.5 to 2 cm in height due to the drought, and this growth retardation is not compensated by later growth of the child. Yamano, Alderman and Christiaensen (2005) observed the same effects in rural Ethiopia and indicated in addition that food contributed to correct children growth retardation induced by drought. Growth retardation which is not compensated entails permanent consequences on children learning ability, on productivity and on future income levels of those children.

3.86 Households’ risk coping strategies are poorly effective in the long run. The Burkinabé villagers interviewed during the 2002 vulnerability survey indicated that most of the mechanisms they used when facing one or more shocks were of little effectiveness. While households actively tried to manage risk, only a partial smoothing of welfare and nutrition was achieved. Their livelihoods and ability to generate future income was affected. To make matters worse, in case of natural shocks, there is a tendency for local interest rates from moneylenders to increase since many households are looking for credit, for local wages to drop because of an excess supply of labor, and for livestock prices to decrease because of distress sales by many herders. Among the 80 households interviewed in the vulnerability survey, 62 percent were not able to recover their initial standard of living before the shocks hit, no matter which coping mechanisms were chosen (World Bank, 2002). This outcome is explained not only by the initial impoverished, but also by the repetitiveness and chronic character of the shocks.

3.87 Feelings of insecurity resulting from high exposure to risks discourage poor households from engaging in more profitable activities and reduce their ability to make
plans in the long term. The vulnerability survey shows that 80 percent of Burkinabé households were afraid of not being able to cope with future risks (World Bank, 2002). Gathering the financial and human capital required to improve their living conditions is considered by many households as excessively risk-taking in a context where any exogenous misfortune – such as illness, loss of employment or harvest failure - could precipitate them into misery. Households prefer liquidity rather than investing, belonging to diversified networks, multiplying jobs and postponing decisions. Households may refuse to introduce changes and then prefer to deal with a daily life not necessarily satisfying but easily predictable. The feeling of insecurity resulting from a high exposure to risks largely explains the reluctance of low-income populations to engage in more profitable activities that turn out to be also more risky.

3.88 Risk is an important cause of persistent poverty and poverty traps. Households may have to choose to remain relatively poor, to avoid even more serious hardship and destitution, induced by shocks. Poor households are unable to take advantage of profitable activities, even if growth opportunities may be present in the economy, due to risk aversion. Nouv6 and al. (2009) show in the case of Burkina Faso that existing risks increase the part of the population living below poverty threshold. Despite growth opportunities, some households are left behind, unable to take on risky profitable activities, which affect the possibility for broad-based growth.

Social Investments and Safety Nets Programs

3.89 Policy interventions to reduce household vulnerability are needed. The presence of risk-reducing but low-return strategies on the part of households trying to reduce their vulnerability as well as the occurrence of shocks with long-lasting effects both suggest that uninsured risk may lead to poverty traps: there is persistence in poverty, caused by market imperfections, the presence of risk and the household’s responses to it. Therefore, households are trapped in equilibrium levels of poverty from which there is no possible recovery without outside intervention. That temporary support may avoid households to fall into the trap, and may also lift them out. Given that market failures contribute to the existence of these traps, there may be efficiency gains from interventions, so that transfers focused on these groups may be productivity enhancing, without an efficiency-equity trade-off (Dercon, 2005).

3.90 Poverty reduction strategies need to incorporate both alleviation and prevention efforts. For policy purposes, what really matters is the ex-ante risk that a household will, if currently non-poor, fall below the poverty line, or if currently poor, will remain in poverty. While state involvement is an obvious but costly option, there is also a need to design poverty-reducing policies that reduce risk and vulnerability through interventions that address the dynamic nature of household incentives.

3.91 Informal risk management instruments can be relatively effective to manage individual risk of low frequency and low intensity. This ideally works better in close-knit communities with long-term interpersonal relationships based on trust and equality. However, informal insurances appear insufficient in the management of socioeconomic risks as they offer only a limited protection against repeat disasters and/or low-frequency and high-intensity shocks. Moreover, the solidarity bonds required by this informal system may be unevenly distributed. Poorer households may be unable to reciprocate or to afford the ex ante investments (in social assets) required by the system. As a result, some community members receive more support than others and some groups are excluded on the basis of ethnicity, case, sex or socioeconomic status.
The consequences can be that informal risk management instruments serve the interests of the more influential community elites and/or marginalize the less powerful. In addition, if this system can temporarily absorb some shocks, the price paid both in financial and social terms is most often prohibitive.

3.92 **Formal micro insurance can enhance poverty fighting strategies.** Through a network of local institutions and organizations that become the logical partners of micro insurance players, microfinance can overcome obstacles such as high transaction costs and the difficulty to guard against adverse selection and moral hazard phenomena when covering the most vulnerable and/or poor people. In Burkina Faso, microfinance institutions have expanded rapidly over the past few years and play an increasingly important role. BCEAO recorded almost 600,000 people on December 2005 that used the services of the main networks of microfinance institutions. Since starting operations at the beginning of the 1990s, the sector has moved towards increased professionalism. The average portfolio loss rate has improved over the last five years, reaching 5 per cent in 2005, down from 12.5 percent in 1999. Nouvé and al. (2009) assess the potential market size for micro insurance against consumption shortfalls in Burkina Faso. Based on household-level data collected for a Community Driven Development (CDD) project developed for Burkina Faso (PNGT-2), they conclude that a private operator could have met a 40 CFAF billion market (approximately 1.5 percent of GDP).

3.93 **For the poorest of the poor and for households that cannot effectively participate in markets, public policies promoting social investments and safety nets will more effectively reduce households’ vulnerability.** The ideal role of a safety net is to protect the vulnerable against shocks and to help the chronic poor to climb out of poverty. However, given the budget constraint in Burkina, a sensible strategy for safety nets is to aim at reducing the most extreme forms of destitution and food insecurity and to target the poorest of the poor. International best practice emphasizes the role of safety net programs to encourage and provide resources for poor households to make the necessary investments in human capital development (as in the case of school stipends and other similar programs) or physical capital (through public works). This way, expenditures not only alleviate poverty today, they also help remove the obstacles to growth and poverty reduction in the future.

3.94 **Food security is a particularly relevant public good.** It has an impact on economic growth, poverty and productivity, mainly because of the malnutrition and under nutrition issues it engenders (World Bank, 2006). The need to correct asymmetry information makes a case for a bold government intervention (mainstream community-based programmes for nutrition learning for instance). Furthermore, the Copenhagen consensus ranks the provision of micronutrients as the second best potential investment by countries to achieve the Millennium Development Goals. Instruments for stabilizing food availability must aim at ensuring the supply of nutritionally adequate food. This can be achieved through domestic production, domestic food stocks changes and food imports. Empirical research indicates that among these instruments, improved food productivity and non-concessional imports are more useful in dampening volatility in food availability than concessional imports (Barrett, 2001). Instruments for improving national production were described in the agriculture section in the second chapter of this report.

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3.95 In Burkina Faso, existing policy instruments mainly focus on poverty, food security, health risks, low school attendance, unemployment, and child labor. A formal social protection system also exists, though it only provides a limited range of social benefits to public sector employees and their dependents, not targeting the poorest in the country. Administered by different ministries, the majority of these social protection instruments concentrate on pure risk coping, and these programs, as such, are not always sustainable. The Government mostly helps poor people to deal with a shock once it has already occurred. Then, as far as it is possible to assess, most programs seem to have limited impact, mainly because of inadequate financing, lack of institutional structures to implement programs, and lack of coordination between Ministries and among donors. Most programs fall beyond the control of Government and the ability and willingness of donors to coordinate and collaborate at the overall strategy and program levels is critical. High dependence on external financing sources shows clearly that sustainability of public programs is very difficult. A significant challenge for the Government will be to address the sustainability of existing public safety net programs, which currently rely almost exclusively on external funding. Another problem is the lack of even basic data on beneficiary profiles, costs and targeting effectiveness. As such, it is difficult to say much on either cost effectiveness or targeting effectiveness for most of the existing programs.

3.96 However, Burkina does not have a coherent policy on social safety nets. The PRSP puts high on the Government’s agenda vulnerability reduction and food security. Currently, Burkina disposes of several programs managed by the Government, donors and NGOs, but adopting a more coherent approach to social protection is essential, especially in the aftermath of the food, oil, economic and financial crises. A 2009 review of the PRSP highlighted that (i) there is a disconnect between growth and poverty reduction; (ii) the demographic growth brakes the impact of economic growth; and (iii) the country does not dispose of an effective social protection policy. The regulatory framework provides a solid legal basis for social protection, including the Constitution, the Labor Code, the Penal Code, the Family Code, laws guaranteeing access to education and health, and on the children’s tribunal, the Code on the local communities.

3.97 Nevertheless, Burkina adopted two strategic documents for social protection. The National Strategy for Social Protection (2003) aims primarily at providing social protection to poor individuals, households and communities in order to reduce their vulnerability. The overarching principle of the strategy refers to social protection as an investment and not as a type of assistance or aid, ensuring that costs are reduced for the poor and the society (based on the social reallocation of resources). The strategy has three main objectives to: (i) ensure access of vulnerable indigent populations and groups to basic social services; (ii) ensure an adapted social coverage for the operators in the informal sector; and (iii) to reform and strengthen social security institutions. Similarly, the National Policy for Social Support (2007) aims at promoting the population well-being, in general, and that of vulnerable individuals, families and groups, in particular. Its guiding principle is the prevention and the promotion of social security and not necessarily addressing crises or specific difficult situations. Its objectives are to: (i) improve households’ living conditions; (ii) promote national solidarity; (iii) ensure the protection and the promotion of the marginalized social groups; (iv) contribute to fighting HIV/AIDS; and (v) strengthen institutional capacities. However, some of these objectives are difficult to measure or are too general, which makes it difficult for the Government to implement them as well as to monitor and evaluate their implementation.
Several other strategies include similar social protection and food safety objectives. For example, the National Strategy for Food Security (2001) primarily aims at reducing by 50 percent the number of persons suffering from hunger and malnutrition by 2010, by (i) ensuring sustainability of the national food production; (ii) strengthening the markets and addressing price fluctuations to ensure access to food for all populations; (iii) improving the economic conditions and nutrition of poor and vulnerable groups; (iv) strengthening the crisis prevention and management mechanisms, while consolidating structural food security; (v) strengthening institutional capacities and promoting good governance in the food security area. In addition, an Emergency Plan to Ensure Food and Nutrition Security (2008) has been put in place to address the spike in the food prices in 2007/2008 and ensure medium- and long-term food security based on an adequate national production of certain strategic products, such as rice, vegetables, and animal products. Furthermore, the National Population Policy (1992 and under revision in 2009) aims at identifying measures to address the recent demographic increase (population growth rate of 3.1 percent based on the 2006 census), in particular through the education of female population.

However, in practice, the numerous social safety net programs have not always succeeded to provide widespread support, especially to the most deprived social groups. There are five broad types of such programs that cover: (i) education; (ii) health; (iii) food-for-work; (iv) food security; and (iv) social protection activities targeting vulnerable groups.

The social safety net programs in the education area aim at strengthening the principle of free access to education, but better coordination among them is needed. In particular, they aim at reducing school drop-outs, improving the education environment, reducing the schooling costs for certain social categories, facilitating access to school canteens and drinking water, and developing satellite schools and informal education centers to facilitate education catching-up for older children (9-10 years old), literacy for young persons (over 15 years old) and school supplies in 20 deprived provinces. In 34 provinces, the country runs a hot meal program for school children (56 percent of the target population is covered). The program is designed to increase school attendance, and impact evaluations are under preparation. Some of the programs, such as the supporting school canteens are managed both by international donors (World Food Program – WFP) and the Government, but the quality and calories content of food varies substantially, making it necessary to develop a single such program. Similarly, there are several programs targeting women and young girls, which are run by international donors and complement the Government support in this area. For example, the WFP piloted a project to support women literacy (food-for-education), while the BRIGHT program of the Millennium Challenge Corporation supports the primary education for young girls. Nevertheless, the programs targeting deprived social categories have only had limited funds.

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programs. Similar programs grant subsidies to support orphans and vulnerable children. However, many times, financing health subsidies seems difficult. The Government does not always reimburse the health centers which are the main service providers, while the supply of subsidized products is irregular. Several challenges relate to the definition of indigence criteria and the identification of indigent populations. Le Centre de Recherche en Santé de Nouna launched a study meant to identify the most deprived populations, and several donors initiated a study to compare the effectiveness of programs targeting the poorest.

3.102 The food-for-work programs are meant to complement the national employment policy, but several of them were interrupted due to the lack of funding and unsatisfactory impact. In the aftermath of the recent global economic and financial crisis, Burkina has initiated several social protection programs to increase human capital and vocational training for youth, and to encourage the creation of agribusinesses. Likewise, it is now assessing the opportunity of implementing two food-for-work projects in the construction area. An example is the program “Rural Roads” (2002-2008) financed with donor support. It aims at building roads in the eastern part of the country to increase its accessibility. The program covers nine villages in three secluded provinces (Gnagna, Gourma and Tapoa) and creates paid jobs for the local inhabitants. It also provides training on HIV/AIDS prevention, gender, decentralization, and governance. Nevertheless, only a limited number of persons have benefited from such support, mainly because the administrative costs proved to be significantly higher than the funds transferred to the beneficiary groups. The main challenge is to replicate this program in other regions and to create a legal framework that would encourage construction operators to hire local labor force and, hence, ensure longer-term job sustainability. This would add a dynamic dimension to these social protection programs.

3.103 The food security programs provide support to local communities and help build cereal stocks. The National Food Security Strategy (2003) offers, among others, a platform for monitoring and evaluation of the impact of various sectoral policies on food security and includes a strong social protection component. The food security system evolves around an early alert system meant to identify the vulnerable groups, emergency intervention (for 300,000 persons), food stocks (millet, sorghum and maize) managed by SONAGESS, financial stocks, and an intervention stock for secluded areas. WFP has piloted a food voucher program in 2007, developed a “food-for-assets” program and implemented an emergency “Urban Voucher Program” as a response to the food price increase in 2007. The WFP has also established “cereals banks” meant to be supported by SONAGESS, albeit with little success. Similarly, in January 2009, Bill Gates Foundation launched a “Purchase for Progress” program to strengthen the domestic food producers. Both the Government (through CONASUR) and the WFP programs distribute food allocations to disaster victims, to indigent populations, to children and pregnant women suffering from malnutrition, and to the HIV and tuberculosis patients. Some of the challenges relate to the identification of target groups, financing delays, conflicting activities, the lack of reliable data and the lack of impact on the poorer populations. Moreover, fixing a social price for certain food products (cereals banks) is not appealing for food producers.

3.104 The programs targeting vulnerable populations are numerous and dispersed. Several programs deal with risk and disaster management, relocation of displaced populations,
food distribution in case of hunger, and reintegration of repatriates. Some of the programs support reintegrating youth in difficulty into the education institutions. Others target disabled persons, elderly, street children and orphans. Despite the wide scope of these programs, their implementation is hampered primarily by the fact that demand for aid should be formulated directly by the affected persons. This, combined with the lack of information, makes it difficult for the populations which are far from the decision centers to benefit from timely support. Introducing money transfer instruments through the mobile phone may be a way to address such deficiencies.

**Box 3-2: Public Investments Addressing Households’ Vulnerability in Burkina Faso**

Social sector expenses show that the Government spends large amounts of funds on providing access to basic social services (DATA on expenditures- state budget execution). There are three kinds of programs addressing health risks: (i) the malaria project which targets more than 2.4 million people (20 percent of the total population), (ii) the vaccination program aims to vaccinate almost 75 percent of young children who need vaccines, and (iii) health programs against lymphatic filariasis and guinea worm (which have reached a coverage of more than 80 percent) and a bilharzias program which has benefit to 10 percent of the estimated number of people carrying the disease. Risks to school drop outs are mitigated through programs managed by the Ministry of Basic Education such as (i) the school canteen program which provides hot meals to around 530,000 children, and (ii) the PHS program aimed at providing drinking water for schools. Four main programs address the risks associated with rural poverty and food insecurity: (i) PNGT2 is a land management program designed to improve the use of arable land and to increase crop production, (ii) SONAGESS aims to store 30,000 metric tons of different grains as a food security measure to prevent food shortage during dry season, (iii) PSSA promotes respectively new agricultural production technologies to increase crop production, and (iv) Food Aid is a food-for-work program.

FASI, ONPE and FAPE address different labor market risks by promoting job creation, providing educational courses on entrepreneurship or funds for projects started by young entrepreneurs. The three of them have small numbers of beneficiaries. Several programs attend to address social risks such as child trafficking (LUTRENA), child labour (IPEC), orphans and street children, gender promotion, and repatriates. The basic education sector benefited from numerous initiatives at the national and international level among which (i) testing of bilingual education and satellite schools, (ii) the 25/2015 initiative under UNICEF which aims at achieving school enrolment equality between girls and boys by 2015, (iii) « Fast Track » or accelerated procedure of the Education For All initiative which enabled to additionally mobilize CFAF 23 billion from donors. About 15.6 percent of the government budget (including on external funding) is allocated to basic education in 2006 compared to about 11 percent in 2003. More significant efforts have been done with investment expenses reaching more than 42 percent in 2006 compared to 17 percent only in 2003. Since the 2000s, the Burkinabé Government has been intensifying its efforts to strengthen sanitary infrastructures offer and facilitate the access of the population to public health services. For instance, existing free prevention services for children and pre-natal care improves financial access to health care. Moreover, preventive and curative services coverage improved and vaccination coverage rate increased. Local initiatives and experiences such as the development of mutual health organizations and other risk-sharing mechanisms also aim at achieving a better financial access of the population to the existing health services. Finally, actions and measures of access to health services could benefit from the financial support of both technical and financial partners who support government efforts. The health sector, besides education and rural development ones, is among the ones that benefits the most from public resources.

**Conclusions and Policy Recommendations**

3.105 The risks to households that Burkina Faso faces are varied, ranging from economic, social, health and natural risks, to regional stability, and food security. The Burkinabé farmers and other supply chain intermediaries are vulnerable to exchange rate and commodity price volatility. The appreciation in the Euro exchange rate against the U.S. dollar has reduced profitability of exports. The price of inputs has increased with fertilizer prices strongly affected by high oil prices and reduced margins for the cotton producer. In addition, the international price of cotton has shown a declining trend due to an increased global supply with increased productivity in competing producer countries. Moreover, the poor rural households exposed to
consumption shortfalls stemming from terms-of-trade or weather-induced shocks, may find their ability to recover from their poverty status adversely impacted. Polygamists’ households also tend to be more vulnerable than the monogamous ones. Nevertheless, access to land, means of transport, and literacy tend to reduce vulnerability.

3.106 Transactional efficiency to reduce the impact of exchange rate volatility on the trading costs of cotton ginning companies can result in materializing immediate benefits to the Burkina cotton sector. Both the international cotton markets as well as the fertilizer markets are denominated in US Dollars. The cotton ginning companies should institutionalize a trade finance regimen that offsets US Dollar import payments against US Dollar export proceeds prior to currency conversion into CFA, thereby avoiding sizeable transactions costs in currency conversion to the detriment of the cotton sector’s profitability.

3.107 Hedging the cotton producer price through the use of market instruments for risk management would address the repeated depletion of the Smoothing Fund. Although the existing cotton smoothing fund provides price stabilization, it has not yet hedged its risks exposure to commodity price volatility. Burkina would benefit by accessing the futures markets to announce its producer price. At the end of the cotton season, the Smoothing Fund will only be liable for a producer price which it has hedged in the world cotton markets. By serving as a conduit for the cotton industry to access the futures markets, the Smoothing Fund can be leveraged to sustainably and efficiently address exposure to commodity price volatility.

3.108 Accessing insurance mechanisms against natural risks facing the country. Risk mutualization through the establishment of mutual funds, saving and insurance systems linked to community-based mutualization would provide protection against risks at individual and group levels. However the investments needed to expand the weather observing network for weather-risk management with additional local automatic weather stations to become scalable throughout the countryside could take significant time and investment. Also, while rainfall risk prevails in the northern cotton-producing areas, droughts have a higher impact on staple food production rather than cotton.

3.109 More than being poor, households are vulnerable to different kind of shocks. Also, they evolve in a context of uncertainty which has strongly reduced their temporal horizon. Therefore, they tend to prefer liquidity in order to keep their future as open as possible and they tend to accommodate to their situation, even though precarious, rather than make choices and invest.

3.110 Last, but not least, policy interventions are required to reduce households’ vulnerability and enhance sustainability of the existing safety nets. Food security, irrigation and safety nets need to be at the core of the Burkinabé government strategy. Although Burkina adopted programs to address poverty, food security, health risks, low school attendance, unemployment, and child labor, they seem to have had limited impact because of inadequate financing, lack of appropriate institutional infrastructures, lack of data on beneficiary profiles, and lack of coordination between Ministries and among donors. The Government also needs to address the sustainability of the existing social safety nets because they currently rely on external funding.

3.111 Finally, the report recommends the following actions:
• Incorporate both alleviation and prevention actions as well as ex-ante risk management mechanisms in the new Strategy for Faster Growth and Sustainable Development for 2011-2015 (SCADD).

• Address sustainability, inadequate financing, lack of appropriate institutional infrastructures and lack of coordination between Ministries and among donors to improve the effectiveness of the social safety nets. In particular:
  - Collect systematically detailed data on beneficiary profiles, costs to improve effectiveness and targeting of existing social safety net programs;
  - Ensure that safety nets target the poorest households, reduce extreme forms of destitution and food insecurity and provide minimum resources to support human or physical capital.

• Cotton ginning companies should:
  - Develop trade finance capabilities to negotiate and manage the timing of incoming and outgoing payments via letters of credit related to the import and export needs of the cotton sector;
  - Request an authorization to open USD accounts and net import payments against export proceeds prior to any local currency conversion of proceeds;
  - Request an authorization to execute forward currency contracts to hedge their net USD export proceeds in March/April after import orders have been placed for fertilizers against projected export proceeds based on annual cotton production estimates.

• The trading companies that are also the shareholders of Burkina’s cotton ginning companies should use the futures market more systematically to facilitate annual hedging of the producer price. In the longer term, this capability can be developed at the local ginning company level.

• Local and international banks participating in the cotton financing pool should open a USD credit line against the Euro denominated Smoothing Fund.

• Pilot a commercial index-based excess and deficit rainfall insurance product in the cotton sector.

• Encourage the use of formal micro insurance, building on the recent expansion of microfinance institutions in Burkina.
CLOSING THE INFRASTRUCTURE GAP TO SUSTAIN GROWTH

3.112 Burkina’s Faso’s land-locked position elevates the importance of economic infrastructure for the country’s trade and competitiveness. 78 percent of Burkina Faso’s imports and exports travel through four corridors of 1,000 km, which link the country to the gateway ports in Benin, Côte d’Ivoire, Ghana and Togo. The corridors through Benin, Ghana and Togo are road based while the corridor through Côte d’Ivoire is both road and rail based. As such, the tradable sectors of the Burkinabé economy are highly dependent on the proper functioning of these four north-south interstate corridors. In terms of modal split, the share of airfreight remains marginal (about 2,900 tons of imports and 900 tons of exports in 2005). The country’s limited energy producing capacity, scarcity of surface water and rainfall, its dependence on oil imports and its comparatively low internet penetration rates highlight the importance of harnessing opportunities for interconnections with regional electricity grids and submarine broadband cables.

3.113 Infrastructure is a major drag on doing business. According to the 2006 ICA, 61.8 percent of manufacturing firms and 53.3 percent of the formal firms in all sectors perceive poor access to energy supply and transportation, respectively, as severe constraints to their operations. Burkina falls into the category of many lower-income African countries, for which deficient infrastructure is found to reduce industrial productivity generally by around 40 percent (Escribano et al., 2008). Firm productivity tends to be negatively affected by power outages and poor transport infrastructure conditions which cause production disruptions and losses and delays on export and import activities. The 2006 BBEA Study on factor costs in Burkina also found that firms perceive electricity and transport costs as the most limiting of factors (87 percent and 77.3 percent, respectively), followed by telephone and water costs (59.1 percent and 45.5 percent, respectively) (Table 3-4).

<table>
<thead>
<tr>
<th>Table 3-4: Industrialists’ Opinion on Factor Costs (in %)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Electricity</td>
</tr>
<tr>
<td>-------------------</td>
</tr>
<tr>
<td>High</td>
</tr>
<tr>
<td>Acceptable</td>
</tr>
<tr>
<td>Total</td>
</tr>
</tbody>
</table>


3.114 Burkina’s predominantly agricultural resource base generates high demand for farm-to-market transport infrastructure, services and logistics as well as irrigation. Agriculture employs about 80 percent of the labor force and generates about 30 percent of GDP. Agricultural inputs and produce are transported to production zones and markets around the country, as a result of disparities in the agriculture potential of various parts of the country and to satisfy growing urban demand. Studies have shown that crops like cereals (about 3 million tons per annum), tubers (about 250,000 tons per annum), cotton (about 600,000 tons per annum) and horticulture products (about 120,000 tons per annum) generate substantial traffic demand from
production areas to urban consumption areas. Certain products such as cotton, horticulture products and fresh water fish are exported to regional and international markets. Nevertheless, surface water and rainfalls are scarce to ensure sufficient irrigation for agriculture. The only perennial river is the Mouhoun River. The country has developed dry season production (vegetables and rice) alongside the dams built throughout the country. Dams have been the most common way of storing water for the agricultural activities during the dry season, but better irrigation systems would improve agricultural production.

3.115 **On the supply side, road density plays an important role in boosting income from agriculture, but road investments may not necessarily close agricultural income gap between regions.** An analysis of the 2003 Household Survey data highlights that agriculture yield, high-value crops, selling direct to market and road density are the main determinants of the cash income from agricultural sales in Burkina. Moreover, it points out that there is a downward trend of consumption as people move away from markets. Nevertheless, empirical evidence suggests that the high regional disparities in incomes do not necessarily disappear as economies grow. Therefore, when investing in road construction, it is important to consider the agricultural potential of the region because, otherwise, some opportunities can be missed out. This is the case of Burkina, where the average agricultural sales revenue potential per hectare of main crop ranges from US$204 for cotton in the region of Boucle de Mouhoun, US$637 for millet in Sahel region and US$674 for beans in Centre Nord.

3.116 **Moreover, the emerging mining sector is expected to substantially increase the demand for surface transport, electricity and ICT services.** Significant mining potential exists in Burkina: gold reserves are expected to yield 133.6 tons and projections for zinc and manganese reserves are approximately 6 million tons and 600 thousand tons respectively. Mines require extensive infrastructure, including power for smelting and road or rail access to get inputs in and production out. Businesses operating in the industrial mining sector often invest in supportive infrastructure, including roads, electricity and rail. However, these investments are likely to be of a limited nature and cannot be relied upon as a substitute for more comprehensive national investments in infrastructure. Moreover, the longer-term sustainability of these private infrastructure investments and the resultant externalities are likely to be minimal in the Burkina context (Box 3-3).

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10 The country extends over three climatic zones with an annual rainfall varying from less than 600 mm to slightly over than 900 mm. The rainfall is going down from year to year - since 1976, 10 to 20 percent lower. A substantial share of surface water resources is shared with neighboring countries. For example, the Nakambe River is shared with Ghana under an action plan to coordinate the use of resources.
11 Four main dams are currently exploited and the fifth one is under construction at Samandeni.
12 The 2003 Household Survey was conducted covering 8,500 households.
The mining sector in Burkina Faso faces particular infrastructure constraints. Given the relatively small size of the country, most existing or potential mines are not located in remote places. However, they incur additional costs due to the fact that Burkina Faso is landlocked. This factor is less important for gold mines, where the amounts of ore shipped out are relatively small. Nevertheless, the inputs required to develop and extract gold may generate considerable transport demand. More important than location is the lack or poor state of transport, power, and water infrastructure. Mines incur high costs to connect to power grids and base metal producers, in particular, are confronted with significant transportation costs to move their products by road or rail.

The growth of the mining sector brings with it the potential for private sector (mining company) investments in infrastructure. However, with the exception of the Tambao manganese mine, the positive externalities associated with these investments appear to be limited. Table 3-5 below lists the main infrastructure developments and opportunities linked to the existing and emerging mine sites.

The largest externalities from mining developments often come from opening up of road and railway lines. For example, a mine can make the building of a railway line profitable because of high transport demand. However, as gold mines dominate Burkina Faso’s mining sector and the end product is not bulky, these externalities are limited. Other metals may require greater infrastructure development. Mining companies generally do not seem to be willing or in a position to develop major road links to unconnected areas. The most significant road development that has been funded so far by a mining company (Burkina Manganese) is the 27 kilometer unpaved road from Kiéré to Boni. However, some of the mining companies have improved local road infrastructure to help local communities and facilitate the development of mines.

The mining sector also presents an opportunity for the existing Côte d’Ivoire – Burkina Faso rail concession operator (SITARAIL) to expand its investments and services to capture more of the mining traffic. However, some of the mining companies (including Kiéré manganese and Perkoa zinc mines) have reported that the high prices charged by SITARAIL have prompted their plans to move the ore by road, adding heavy truck traffic on the transport corridors out of Burkina Faso. Due to its remoteness and the large amount of ore to be transported, road transport is not an option for the Tambao mine.

With respect to electricity, the high cost and unreliability of electricity and the limited reach of the power grid suggest that the mining sector is likely to have a limited impact on the expansion of power grid infrastructure in Burkina. Indeed, many companies, even those that are reasonably close to the grid, are building their own generating stations or connecting to more cost-effective alternatives. For example, the Youga gold mine near the Ghanaian border built a 112 kilometer power line (mostly in Ghana) to connect to the Ghanaian grid which offers power at approximately half the price. While some mining company investments in electricity could also provide power to neighboring communities within a five kilometer radius, it is not clear for how long these limited externalities will persist. In the case of Youga, there were plans to extend the power line to the main town in the area, Zabré, 23 kilometers away, but no practical steps have been taken to date.

### Table 3- 5 Infrastructure Provision by Mines in Burkina Faso

<table>
<thead>
<tr>
<th>Mine</th>
<th>Social Infrastructure</th>
<th>Water</th>
<th>Electricity</th>
<th>Transport</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mana</td>
<td>Local Community Fund (not operating yet)</td>
<td>Planned</td>
<td>Own &amp; village</td>
<td>Local roads improvement</td>
<td>Will do community plan</td>
</tr>
<tr>
<td>Youga</td>
<td>Maternity ward, dispensary, classrooms, outdoor market Fund but not running yet</td>
<td>Planned</td>
<td>Link to Ghana power grid (112 km)</td>
<td>Local roads improvement</td>
<td></td>
</tr>
<tr>
<td>Kiéré</td>
<td>Clinic, school, old age home, sports field</td>
<td>Own; no local provision</td>
<td>Repaired 27 km road to main link</td>
<td>Small mine</td>
<td></td>
</tr>
</tbody>
</table>
### Spatial Planning and Infrastructure Development

3.117 **Infrastructure development is not only driven by the types of economic activities, but also by their spatial distribution.** Infrastructure networks simultaneously reflect and underpin the spatial distribution of the economic activities. Transport networks both facilitate domestic and international trade along the main trade corridors and connect urban and rural centers. Energy, water and ICT are equally important to enhance productivity in both urban and rural areas. Understanding the spatial distribution of existing and potential economic activities is key to prioritize infrastructure investments and to identify infrastructure constraints along various trade corridors. Empirical analysis suggests that because of synergy effects, the returns from bundling multiple infrastructure interventions in a particular spatial area (Torero and Escobal, 2005) or along a given spatial corridor (Briceño-Garmendia and Foster, 2009a, 2009b) are higher than those from making the same investments in a spatially uncoordinated manner. Moreover, the urbanization process requires a comprehensive infrastructure development perspective which considers each city and its rural hinterland as an integrated economic unit. At the same time, deficiencies in land policies and planning need to be carefully addressed in order to support infrastructure services. Moreover, the local tax base needs to be exploited to ensure adequate financial resources for infrastructure development at the municipality level (Foster, 2009c).

3.118 **The regional integration process would require rethinking the role of infrastructure development.** The opening of borders and the intensification of trade relations would naturally induce a closer connection of areas inside and outside the Burkinabé borders. Economic integration would also trigger the regional integration of road, electricity and telecommunications networks. Infrastructure development would also need to consider that some of the trade corridors are more active than the others and some may have increasing potential.
For example, the intra-WAEMU borders of Burkina Faso with Mali and Niger register lower transborder activities compared to the ones with Côte d’Ivoire, Togo and Benin. The extra-WAEMU border with Ghana has been also registering increasing transborder activities.

3.119 The population growth in the main Burkinabè cities also calls for better urban planning and infrastructure. The population in the two main cities (Ouagadougou and Bobo-Dioulasso) is expected to grow by 52.3 percent during 2006 – 2025, from around 2 million to 4 million inhabitants, while the population in the other urban areas would grow by 47.7 percent in the same period (from around 1.1 million to 3.1 million inhabitants) (PNAT, 2006). The Government’s Politique Nationale d’Aménagement du Territoire (PNAT) (2006) acknowledges the necessity to have a four-layer urban organization. Small cities (250) would be organized around the main economic activities and markets, and would be connected to the rest of urban areas. Medium cities (around 40) and regional cities (9) would need to be adequately connected through infrastructure, especially the following three main axes: Koudougou – Ouahigouya – Kaya – Tenkodogo (Central region), Banfora – Gaoua – Dedougou (Western region) and Fada – N’Gouma – Dori (Eastern region). These regional cities are deemed to support the main agriculture value chains, to link rural areas to their urban markets and to ensure road connection. Moreover, these cities should be equipped with basic infrastructure (electricity, water, sanitation, sewerage facilities). In the two largest cities, Ouagadougou and Bobo-Dioulasso, dealing with population growth, poverty and job creation would also require adequate urban logistics, public transportation and land management.

3.120 Hence, ensuring proper transport infrastructure networks on the North-South and the Centre-West corridors is essential to connect the main urban and production areas as well as to enhance regional integration. This is one of the PNAT’s main strategic development pillars. The Northern part of the country is mostly characterized by livestock breeding, while the South has the most important agriculture potential and better climatic conditions that facilitate rain-fed crops. Transport infrastructure has been built along the North-South corridor, which facilitates most of the trade relations with the neighboring countries and access to ports. Nevertheless, the Kaya railway connection is not in service yet. To facilitate exports of animal and agriculture products through the ports in the neighboring countries, one of the priorities would be to extend the rail road connection to Dori (in the North). In the context of regional integration and the recent political crisis in Côte d’Ivoire, the functioning of the rail and road infrastructure networks connecting Ouagadougou and Bobo Dioulasso and the existing concession arrangements would also need to be revisited. PNAT draws the attention to another corridor, Bobo – Sikassso – Korgho, which would require infrastructure development, notably railway.

3.121 Moreover, regional integration of the electricity and telecommunication networks is one of the key factors that would improve access to cheaper electricity and ICT services. With regard to the GSM network, the connection Abidjan – Bouaké – Bobo Dioulasso – Ouagadougou – Lomé is desirable, as recognized in the PNAT. This spatial corridor also corresponds to the optic fiber and the high tension electricity networks. Hence, the development of this infrastructure corridor would represent a central factor in the organization of the West African space, between Nigeria and Senegal.

3.122 WAEMU and ECOWAS have already developed a series of initiatives to close infrastructure gaps in the region Regional integration and improved inter-connections to infrastructure in the region will increase the accessibility of the Burkinabè economy. By
participating in the West African Power Pool, Burkina would gain access to regional power supplies, significantly reducing electricity costs and providing opportunities for improved regional ICT connections using the same transmission lines.

3.123 **In the transport sector, Burkina’s participation in regional trade facilitation initiatives helps streamline transport services.** The World Bank’s West Africa Trade and Transit Facilitation Project aims at reducing transport delays, uncertainty and costs along the Tema-Ouagadougou-Bamako corridor to boost intra- and inter-regional trade as well as support Burkina and Mali to have better access to the sea. Other regional transport initiatives target cross-border transport and trade through road rehabilitation, customs reform and improved access to regional ports.

3.124 **In the electricity sector, regional cooperation would facilitate Burkina’s access to additional capacity at a much lower price from neighboring countries.** This involves hydro and gas-based electricity from Côte d’Ivoire and Ghana under the West Africa Power Pool Framework. Burkina Faso has so far managed its electricity sector relatively well in a national context. However, as long as domestic power generation remains the primary source of electricity, its cost will remain high by international standard and unaffordable for a majority of the population. Only by embracing more forcefully regional integration, can Burkina Faso expect to accelerate electrification on a sustainable basis. Therefore, advancing the preparation of the transmission link with Ghana is key as this country has the potential to export significant quantities of electricity thanks to a natural gas infrastructure that is being developed.

3.125 **In the telecommunication sector, the ECOWAS Community is seizing the opportunity to leverage existing and emerging regional infrastructure to address gaps in the regional communications infrastructure.** It aims to create an integrated regional communications market. In this context, an important opportunity in utilizing and commercializing, on a wholesale level, is the excess fiber communications capacity on the high-voltage cross-border power transmission infrastructure of the WAPP. This would provide a unique opportunity to create a seamless regional transmission network and interconnect all ECOWAS countries.\(^\text{14}\)

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\(^{14}\) Earlier studies confirm costs savings in leveraging the WAPP fiber (estimated cost of equipping about 8,000 km of fiber to connect 15 ECOWAS countries would be US$38.5 million-50 million instead of between US$90-200 million for buried cable). The World Bank is working with ECOWAS Commission and WAPP Secretariat to develop more detailed technical, financial and legal feasibility studies which could form the basis for a regional project. The African Development Bank has also expressed keen interest to collaborate with the World Bank.
Box 3-4: Infrastructure Development in the Context of Regional Integration

Building infrastructure that reinforces Burkina’s worldwide and regional integration is essential. The alternative neighborhood approach would involve each country in developing its own monopoly, public or private for the production of key services and then developing in ad hoc fashion the arrangements, most often administrative rather than commercial and competitive, for bilateral cooperation. A strategy of this type is suboptimal. It often leads to excess demand in one place and excess capacity in another, since everyone is trying to do everything on a small scale and at a great cost.

Regionalization supposes an intensification of trade flows with the removal of internal obstacles, a common external tariff and free movement of factors. Infrastructure is a key factor in the regionalization process, as it can be an obstacle if it is not efficient and does not allow free movement of factors. Unlike a customs union, regional integration concerns more than trade. It involves flows of capital and workers, the implementation of a common institutional environment or the political coordination required for economic convergence and an anchoring of economic policies. This requires interconnecting infrastructure, both physical and transactional (networks) and therefore spatial capital. Infrastructure tends to produce spread effects or contagion of growth by reducing the costs of transport, by spurring transfers of technology or by reducing transaction costs. The spread can be through external trade, direct investment or non market coordination.

As infrastructure will not develop without a clear regulatory and legal framework being implemented, and regionalization without infrastructure, integration supposes the implementation of a common system of rules by public authorities in coordination with private actors. Institutions create a stable, secure environment which enhances credibility.

Public Choice Criteria and Infrastructure Projects

3.126 Being a low-income country, Burkina faces the daunting challenge of prioritizing its infrastructure spending needs. Typically, low-income countries need to allocate, on average, about 23 percent of their GDP to build and sustain a basic infrastructure platform, which, in most cases, is difficult to attain in practice. These needs are significantly higher than those in resource-rich countries or middle-income countries, for which around 12 percent of GDP or 10 percent of GDP, respectively, would suffice to meet their infrastructure spending needs (Foster, 2009c). In Burkina, the budget allocation for transport and telecommunication infrastructure attained on average 12 percent during 2007 – 2009, while the one for energy was on average 3 percent during the same period.

3.127 Infrastructure development facilitates economic growth, but should be backed by stable fiscal and monetary policies, stable government institutions, and effective management of the existing infrastructure. Investment in infrastructure should not be seen as a production factor in itself, but rather as a facilitator of economic growth. Several studies highlight the relationship between investment in public sector infrastructure and the performance of the economy. For example, Aschauer (1989) highlights that a 1 percent increase in the stock of public sector capital in the United States could boost GDP by 0.38 to 0.56 percent annually, while Crafts and Leunig (2005) illustrate that highways accounted for approximately 30 percent of all productivity growth in the 1950s in the United States although by the 1980s this figure had fallen to only 4 percent. Nevertheless, other studies suggest that, although the benefits of transport infrastructure to economic growth are generally recognized, a direct casual link is difficult to establish (OECD, 2003). This indicates that, for example, transport policies should not be based exclusively on the assumption that solely investment will bring economic growth.
3.128 **Infrastructure improvements are typically analyzed on four main criteria:** (i) access to the service; (ii) quality of the service, (iii) affordability of the service; and (iv) financial sustainability of the service. Increased access to infrastructure requires the expansion of infrastructure coverage to lower income population, and in those rural areas where infrastructure services are inexistent. Moreover, having in view the rapid urbanization in Burkina, access problems would also arise in the urban areas. This entails a certain number of connections, irrespective to whether the service providers are public or private. Competitive bidding among private providers might lead to lower costs of network expansion, but if increasing access involves a large capital outlay, private investors may diminish or require expensive incentives (World Bank, 2005).

3.129 **Improving infrastructure quality involves technical, reliability, safety and convenience calculations** (World Bank, 2005). In addition, the effect of quality on cost and affordability should be taken into account, since high quality standards would imply high costs for the consumers, weakening investors’ interest. The objective of achieving a specific quality is unlikely to be crucial when choosing between public and private solutions since both public and private utilities may run into quality problems. Public utilities may fail providing quality services as a result of their dependence on uncertain budget transfers leading to poor maintenance or poor upgrading of utilities. Similarly, cost-cutting incentives may jeopardize quality of services provided by the private firms. Nonetheless, adopting quality standards along with inspection and standard enforcement procedures and identifying adequate source of funding (either from end-users, tax-payers or both) remains essential to ensure service quality.

3.130 **The affordability of infrastructure services is directly linked to keeping prices low for both individuals and firms.** Another aspect is the financial sustainability of the service provider, which would imply a cost-covering price scheme. International experience shows that governments tend to keep prices low and ensure financial sustainability simultaneously. Financial sustainability is often achieved through subsidies or, alternatively, by lowering costs and/or through regulation which dictates a low margin between prices and costs. However, subsidies are second-best solutions and should be used parsimoniously for essential energy services, where costs-covering prices are not affordable by poor consumers. With regard to lowering costs, private firms seem to perform better than the public ones. Private participation may be achieved through lease contracts, which gives the private operator the incentives to improve operations and revenue collection, but weak incentives to improve the capital investment program. Conversely, a concession is better suited to improve efficiency. With regard to keeping prices low, private firms have an operating margin to cover their costs and obtain a reasonable return on capital. Nevertheless, when they operate in monopolistic markets, keeping the prices low would also require strong regulatory systems (World Bank, 2005).

3.131 **Financial stability implies having cost-covering tariffs for infrastructure services.** Cost-covering tariffs, when accepted by the government, require that both private and public operators have a stable financial situation. Private firms typically have a stronger incentive to

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15 When designing subsidy strategies, the government needs to ask five questions: (i) Are subsidies well targeted, generally flowing to the poor with little leakage to the relatively wealthy? (ii) Are the costs clear and measurable? (iii) Are the administrative costs as low as possible? (iv) Is the revenue to pay for the subsidy raised from the source that entails the least cost to the economy? and (v) Is there an alternative subsidy mechanism that could perform even better? Moreover, it could opt for performance-based subsidies, which entail providing subsidies only after some desired, specified output has been achieved (World Bank, 2005).
recover costs as they tend to bill and collect more diligently. However, the financial stability of the private operators might be affected when the government has strong political incentives to cut prices. This would ultimately have an impact on the overall infrastructure service provision. In the case cost-recovery is not realistic other solutions involving the participation of the end-consumers could be considered. Such a solution is a road fund, which would dedicate a specified portion of taxes on petrol or vehicle registration to road maintenance.

3.132 When deciding on which of the public or private operators would be better placed to deliver these services, decision-makers would need to look at a set of factors that influence the relative performance of both public and private operators. The most important factor is the degree of competition in the transportation, energy, telecommunications and water sub-sectors. When economically possible, competition is desirable at the centre of sectoral reforms, but it also requires a clear market definition to be able to separate competitive sub-sectors from natural monopoly sub-sectors. Furthermore, policy makers should also look at whether competition among multiple firms exists within the market, which would lower the price, improve service and expand the client base, improving access. Alternatively, they should analyze whether competition for the market can be used especially where multiple firms are not possible and the sub-sector is a natural monopoly. This is the case of distribution networks in electricity, gas and water, where the government can usually auction the right to serve the market.  

3.133 Besides competition, the institutional framework plays an essential role in the public/private choice. Streamlining the business environment, such as the enforcement of property rights, contract observance, fighting corruption, should be combined with a simple and solid regulatory framework in each of the infrastructure sub-sectors (legislation, implementing rules governing service provision and auditing, sectoral regulators). While strengthening governance, management contracts or leases could be used as a first step to introduce private participation. Moreover, to enable public-private initiatives, an adequate regulatory framework is essential to govern transaction design, monitoring and implementation of such initiatives.

3.134 Even if some projects can involve private sector participation, adequate fiscal space is necessary to finance overall infrastructure investment. Typically, taxpayers or consumers (current and future) are the financing sources for all infrastructure investment. The public budget through the contributions of current taxpayers in Burkina as in other low income countries is the main source of investment infrastructure, apart from foreign aid. However, tax revenue is limited in the short term and is subject to competing demands from sectors where there are no alternative financing sources. Moreover, increasing government borrowing is not a viable option since the risk of debt distress is high in many low income countries, including Burkina. This option would entail a higher tax burden on the taxpayers’ future revenues, which would create distortions in the economy and fuel informality and tax evasion. Alternatively, additional funding can be sought from consumers, but prices/tariffs must be set higher then operation and maintenance costs. Diversifying finances means accepting the principle of tariffs that cover operating and

\[16\] Competition for the market does not apply a constant pressure on firms to provide quality services at lower prices. This is mainly because after the time of the auction, the benefits of the initial contest decrease, which means that at the end of a 30 year concession period, there is no guarantee that the incumbent is still the most efficient firm in the industry. In addition, empirical evidence concerning the effects of competition for the market is mixed, while the argument for privatization is weaker in natural monopoly sub-sectors. A possible explanation might be that the benefits of introducing competition in the long-term contracts are muted by the difficulties of running an efficient auction, or because of the complexity and persistence of regulatory problems (World Bank, 2005).
maintenance costs, plus a reasonable return on capital invested. Additionally, if the public infrastructure firms are poorly managed, bringing in new private management could signal that future revenues will be enhanced. Typically, concessions, BOTs and divestitures can bring significant private investment, but they are also difficult to implement as a weak institutional environment would entail for the government guarantees that lessen the private sector risk exposure.

3.135 Nevertheless, some of the infrastructure sub-sectors are more likely to be publicly-owned and operated than others. In Burkina as in many other countries, public investment is the norm for roads and airport infrastructure, while private participation has been present through a concession agreement in the railways (freight) sub-sector. The public utility SONABEL dominates electricity generation and distribution, being a de facto monopoly in the distribution segment. Nevertheless, around 20 cooperatives gathering local inhabitants work with the Fonds de Developpement de l’Electrification (FDE) and supply rural areas which are not covered by SONABEL network. Several private firms and NGOs have also explored alternative niche energy markets, such as using jatropha oil. Mobile telecommunications benefits from private investment, while the fixed line telecommunications remains publicly-owned. Nevertheless, among the more important issues in the telecom sub-sector are the lack of connection to the optical fiber network which limits improved access to ICT services and the limited coverage of fixed line network. Water and sanitation networks are publicly-owned, but lease contracts for management and maintenance of water points were granted to private operators. However, the main issue is the operation and maintenance system which affects service sustainability. Service sustainability is also hampered by the lack of sustainable cost-recovering prices. Table 3-6 shows the extent of public/private participation in each of the four sub-sectors. A detailed analysis of each sub-sector is presented in the following sections.

<table>
<thead>
<tr>
<th>Sub-sector</th>
<th>Typical Monopolistic Activities</th>
<th>Extent of Public/Private Sector Participation</th>
<th>Activities that Can Be Potentially Competitive</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transport</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Road</td>
<td>Major roads</td>
<td>“Tour de role” system in the trucking industry (potential cartel practices) despite the existence of other private operators</td>
<td>Road maintenance, toll roads, safety inspection, truck and bus/car operations</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Public road maintenance fund (2007)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Public transportation in Ouagadougou (11 lines)</td>
<td></td>
</tr>
<tr>
<td><strong>Railway</strong></td>
<td>Rail track, signaling and movement control</td>
<td>SITARAIL-Concession agreement Burkina Faso – Côte d’Ivoire (1995)</td>
<td>Train operations, maintenance (currently low effectiveness of the concession agreement), rolling stock provision, freight consolidation and marshalling</td>
</tr>
<tr>
<td><strong>Airport</strong></td>
<td>Airport premises, runaways, air traffic control and security</td>
<td>2 international airports (Ouagadougou, Bobo - Dioulasso) 13 small domestic airports Planned public investment in an airport next to Donsin</td>
<td>Airline services and operations, maintenance of facilities, airport retail shops, other services (airport parking)17</td>
</tr>
<tr>
<td><strong>Energy</strong></td>
<td>High voltage transmission, and local distribution lines Energy generation</td>
<td>SONABEL (integrated state-owned utility with a de facto monopoly on distribution) Around 20 cooperatives that work with le Fonds de Developpement de l’Electrification (FDE) in the areas that are not supplied by SONABEL Community-based initiatives for wood fuels supply systems/sustainable forest management schemes Some private initiatives to explore the use of alternative energies (jatropha oil)</td>
<td>Generation plants, supply to retail/wholesale customers, development of alternative energy sources</td>
</tr>
<tr>
<td><strong>Telecommunications</strong></td>
<td>Mobile</td>
<td>2 private operators (Zain, Moov)</td>
<td>Long distance calls, internet, VoIP, value added services</td>
</tr>
</tbody>
</table>

17 Private investment would depend on the balance between investment obligations and revenue streams, but market demand is not sufficient to justify either private or public investment.
Framework for Developing Public-Private Partnerships

3.136 The delivery of infrastructure services may be improved in Burkina Faso by considering public–private partnerships (PPP). Stimulating competition, where possible, and encouraging private sector participation would reduce costs and improve the quality of infrastructure service for consumers. Moreover, it would enable determining a sustainable pricing level of services, with or without subsidy to different classes of consumers, attracting new technologies and reducing the regulation scope and costs for the government and private investors. Obviously, through their intrinsic characteristics, some of the sub-sectors are characterized by natural monopolies (electricity distribution, water and sanitation) owned by the state. Nevertheless, private sector can be used even there to enhance the efficiency of service delivery under an appropriate contracting (PPP) or regulatory regime (Box 3-5).

3.137 The role of the PPP arrangements is twofold: (i) to address scarce public capital necessary to build infrastructure and (ii) to compensate for the lack of institutional capacity for the development, the management and the operation of infrastructure. However, if PPPs have been found to overcome the capital constraints of the public sector, their impact on institutional capacity is less clear. This may be partly explained by the fact that the public sector plays a crucial role in ensuring PPP success, notably with regard to the preparation of clear specifications for infrastructure development, the organization of a competitive procurement process and the monitoring of the contractor’s performance (Rhodes, 1996; Savas, 200; Van Slyke, 2003; Estache and Serebrisky, 2004). Conversely, where competition does not exist and there is a potentially monopolistic operator, regulation would ensure the fair treatment of customers who lack protection which is associated with competition as well as fair access to essential network facilities controlled by incumbent operators, that otherwise would deny access to competitors needing to meet consumer demand.

Box 3-5: A New Paradigm for Infrastructure Service Delivery

The historical model of delivering infrastructure services through vertically integrated network monopolies owned by the state has given way to a new framework for the organizational structure of network utilities. The new paradigm has the general characteristics indicated below, and recognizes the reality that a vertically integrated network is not necessarily a natural monopoly in its entirety. Parts of the network will
be a natural monopoly, but significant parts, depending on the particular infrastructure sector, will be potentially competitive.

The new model for delivering infrastructure services has the following characteristics:

- Network utilities should be unbundled both horizontally and vertically, with different owners for potentially competitive components and natural monopoly components;
- For competitive or structurally contestable activities, government interference with market mechanisms and restrictions on ownership should be relaxed, and the scope of introducing competition through horizontal fragmentation should be exploited; and
- Only components involving unavoidable natural monopolies or substantial sunk capital should be placed under regulation and perhaps even operated by the public sector.

*Source: Castalia Strategic Advisors, 2006.*

### 3.138 Opportunities for PPPs exist especially if the government wishes to build, renovate, maintain and/or manage a facility or business that provides a service to the consumers.

There is a large range of contracts commonly agreed between public and private sector entities, depending on the risk and responsibility for the outcomes on the private sector side. Table 3-7 presents a range of such arrangements for greenfield and brownfield investments in infrastructure. Nevertheless, there is no universal definition of the PPP. Typically, a PPP is defined as a contractual arrangement that involves exposure by both public and private parties to customer risk. In some other circumstances, PPPs are defined in terms of sectors for which a PPP unit is responsible.\(^\text{18}\)

<table>
<thead>
<tr>
<th>Greenfield (New Infrastructure Asset)</th>
<th>Higher public sector risk/Lower private sector risk</th>
</tr>
</thead>
<tbody>
<tr>
<td>Design Build (Turnkey)</td>
<td>A private sector contractor is selected to design and build a facility for a fixed fee. The contractor will assume the risk for construction costs</td>
</tr>
<tr>
<td>Design, Build, Operate</td>
<td>A private contractor designs and builds a facility for a fixed fee and then operates the facility. Government (possibly with donor funds) provides financing. The contractor may lease the facilities from the Government. If the tariff is high enough, the lease fee may help to cover the government’s debt service costs. Alternatively, the government may receive the tariff revenue, and pay the contractor an operating fee – the risk of revenues not covering costs lies with the government.</td>
</tr>
<tr>
<td></td>
<td>True PPP Risk sharing by both private and public partners</td>
</tr>
</tbody>
</table>

\(^\text{18}\) In the anglo-saxon system, the PPPs represent concessions granted by the government to build, finance and operate the new infrastructure (BOT, DFBOT). In France, there are two broad types of contracts: (i) the contracts of public service delegation (water distribution, electricity, urban transport, sanitation) or concessions; and (ii) the partnership contracts (the private partner is not paid by the consumers). An appropriate definition of PPP may include the divestures of those government-owned businesses which the government cannot allow to fail. Another important aspect of PPP is when the government makes state property available for commercial use, but retains strong interest in how the property is used (Castalia Strategic Advisors, 2006).
Design, Build Operate, Finance
Private operator is fully responsible for providing the facility and the service. Variants of this approach include: concessions, BOOT contracts, and investor owned utilities.
Lower public sector risk/Higher private sector risk

Brownfield (Existing Infrastructure Asset)

<table>
<thead>
<tr>
<th>Approach</th>
<th>Description</th>
<th>Risk Distribution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Service contract</td>
<td>A private contractor is paid on a fee-for-service basis for operation and maintenance, financial management, or implementation of capital investment programs. The public sector partner retains responsibility for financing and overall management of the enterprise.</td>
<td>Higher public sector risk/Lower private sector risk</td>
</tr>
<tr>
<td>Management contract</td>
<td>A private sector contractor provides a small management team to run an existing utility. The firm receives a fixed fee plus (often) a performance bonus. The public sector partner provides finance, builds the infrastructure and takes operating risk.</td>
<td>True PPP Risk sharing by both private and public partners</td>
</tr>
<tr>
<td>Lease/Affermage</td>
<td>A private sector contractor provides service to customers and in return receives a portion of the tariff, or a fee to cover the operations and maintenance costs. The contractor takes the financial risk and liabilities related to operations. The public partner retains responsibility for making capital investment, though the contractor may manage the capital investment program.</td>
<td></td>
</tr>
<tr>
<td>Concession</td>
<td>A private firm takes full responsibility for operations and investment, and all of the associated risks. The public partner retains ownership of the assets.</td>
<td></td>
</tr>
<tr>
<td>Privatization</td>
<td>A private firm owns a majority share of the company. The public partner takes a minority share, at most, or may not retain any share.</td>
<td>Lower public sector risk/Higher private sector risk</td>
</tr>
</tbody>
</table>

Source: Castalia Strategic Advisors, 2006.

3.139 **PPP arrangements depend on each infrastructure sub-sector.** For example, electricity and telecommunications sectors offer considerable scope for private sector involvement. Nevertheless, the complexity of electricity sector, the size of investment necessary to invest and the long investment recovery cycle make the commercial and financial risks for investors greater in this sub-sector than for telecommunications. In the transport sub-sector, the impact of new technologies and a rethink of the costs of vertically integrated transport monopolies have led to considerable reforms and significant costs saving. Moreover, in certain components of the transport industry traditionally uncompetitive sectors can become competitive as between different transport modes (Castalia Strategic Advisors, 2006). In Burkina, the concession of the railway system (Burkina Faso-Côte d’Ivoire) gave access to private sector participation, although the implementation of the concession agreement faced some difficulties (a detailed discussion is presented in the next section). In the water and sanitation sector, some long distance pipelines, water treatment or sewerage system may also benefit from private participation.

3.140 **Effective PPPs require an adequate PPP regime for infrastructure development, which includes a specific PPP legal framework and a PPP unit.** In Burkina, several PPP projects are at various stages of development. However, the country lacks a fully-fledged PPP
regime, which would include specific PPP legislation and a PPP unit. A law setting up *le Conseil des infrastructure* (2004) provides for that this Council would contribute to the development of a legal framework favorable to the establishment of PPP mainly in the infrastructure. Nevertheless, a specific PPP legal framework should clearly lay down the rules, procedures, roles and attributions for the operators involved. It should establish: (i) the criteria for the selection of PPP projects (eligibility criteria), (ii) the criteria for granting state aids and subsidies, (iii) the procedure for the selection of operators, (iv) the terms for the approval of PPP contracts, and (v) the monitoring and control of the PPP contracts. PPP legal framework would require a careful design in order to avoid conflicts with other pieces of legislation, including the Constitution. A PPP unit would be a specialized entity within the Government which determines and manages the overall PPP strategy on behalf of the Government. Its functions may include: (i) setting the overall PPP strategy based on the Government’s risk profile and the commercial viability of each sector, (ii) deciding on specific PPPs based on the strategy, (iii) managing transactions to implement PPPs, and (iv) monitoring and enforcing contracts governing PPPs.\(^{19}\) PPP units are not always necessary nor do they function efficiently. However, they are most needed where the government or the private sector may have weaknesses and where the market is unable or unwilling to enter the sector as is (Box 3-6, Castalia Strategic Advisors, 2006).\(^{20}\)

\(^{19}\) PPP units may be located within the Ministry of Economy or equivalent. International experience suggests that the attributes of the PPP unit (screening, evaluation, reviewing and ensuring the quality of the PPPs in all stages of implementation) should be separated from the development, promotion and implementation of PPPs. The institutions that design, pilot and implement the PPP programs may be the Ministry of Finance (or equivalent), sectoral ministries (transport, energy, water education, health, defense, etc), sectoral regulators for the monitoring and the oversight of the contract implementation, the Court of Auditors for the auditing of the PPP contracts, and tribunals for conflict resolution. The institutions that help support the market development are the commercial banks/investment (pension) funds/insurance companies, public construction companies, and consulting firms (engineering, finance, economics).

\(^{20}\) Portugal’s PPP unit was created out of a perceived need for better transfer of information to all branches of government on: a) contract design, and b) procurement because of poor PPP efforts in the past. It was also designed to ensure better efficiency in provisions of service and not just swift, off-budget completion of infrastructure projects (Castalia Strategic Advisors, 2006).
Box 3-6: Conditions for Successful PPP

Using private sector to develop infrastructure can be controversial. There are many countries that struggle to achieve success in their PPP programs. The main reasons for these difficulties may be summarized as follows:

- **PPP contracts impose discipline on the infrastructure utilities and require greater discipline from the government involved.** In many countries, governments support infrastructure services, but their support is sporadic and unpredictable. Support for infrastructure is often used as a buffer for budget operations: when budgets are tight, investments and the government’s own bills for infrastructure services can be delayed.

- **Private operators, whether they are purchasing networks outright or managing a water company, have to make a return on their investment.** This requires either that services have to be provided at full cost-recovery tariffs (where costs include adequate return on investment), or the governments have to provide explicit and reliable subsidies to the private sector provider. Full cost recovery may be politically difficult if people have become accustomed to below-cost tariffs, or they may be unaffordable when the population is extremely poor. Many governments also find it difficult to pay subsidies so that private firms can make profits. A subsidy policy should therefore be carefully implemented and be based on a cost-benefit analysis.

- **Private firms will look for the best commercial opportunities, but areas with such opportunities may not be where the national priorities lie.** For example, it is easier to attract private investors to build airport terminals or mobile telephone networks or electricity generation plants, but much harder to attract them to invest in water and electricity distribution networks or in risky transport projects. Governments need to take explicit action to encourage private investment into areas with the greatest social benefit, by reducing the costs associated with the long-term investments and by directing their own resources into appropriate areas.

- **In many cases there is little private sector capability, while projects are too small or the political situation is too risky for foreign investors.** For example, it is often difficult to attract foreign investors into rural electrification projects because of their small scale. This will impose costs and risks on the Government, but the risk is outweighed by the potential to develop indigenous capability because of the need to prevent the country from falling further into aid dependency.

In practice, the PPP regime should contain 12 key principles:

- Duration of the PPP;
- Risk sharing between the public and the private parties;
- Performance indicators for the private sector operator;
- Fee assigned to the private sector operator;
- Obligations of the private sector operator regarding the project implementation and the observance of public service standards;
- Sanctions and penalties in the case of non-observance of the contractual clauses;
- Terms for the modification of the contract in the situation where the public sector needs change, there are new technological solutions or there are changes in the funds obtained.
- Terms for partial or total termination of the PPP contract.
- Clauses that guarantee the continuity of the service provision in the case of failure/bankruptcy of the private sector operator.
- Implications of the contract terminations regarding the infrastructure project.
- Methods for conflict prevention and resolution.

*Source: Castalia Strategic Advisors, 2006; Dooh-Bill, 2009.*
Challenges and Opportunities

a) Transport Infrastructure

3.141 The transport costs of being landlocked are significant. It has been estimated that the direct annual economic costs associated with being land-locked are approximately US$57 million equivalent, which amounts to about 5 percent of Burkina’s export revenue (Savadogo-Tinto, 2008). These costs are mainly linked to high transportation costs which are influenced by long transport distances, as well as by the quality of transport infrastructure, transport services in the port and along the corridors, and the quality of transit operations and customs services. Domestic operators in Burkina are forced to pay a sizeable 28 percent of the price (FOB) for imports compared to a world average of 6 percent and an SSA average of 10 percent. Being a transit country, Burkina’s road network is exposed to a faster rhythm of degradation because of the high number of vehicles in transit and their overloading.

3.142 The supply of transport infrastructure and services cannot keep pace with the growing demand. Transport demand is increasing by about 10 percent a year as the economy is heavily dependent on imports and exports. Emerging sectors, including mining, are boosting transport demand. While mining companies ordinarily finance road connections to the mine sites, financing for wear and tear of major arteries and for the longer-term maintenance of site-connections remains an issue. In addition, the liberalization of the passenger road transport sector has increased the flow of passengers travelling in and out the country and further fuelled transport demand.

3.143 The crisis in Côte D’Ivoire highlighted the vulnerability of Burkina’s reliance on the stability of and transport links with its neighbors for trade. Up until 2002 Burkina’s international trade was heavily dependent on the road and rail transport corridor through Abidjan. The crisis in Côte d’Ivoire between 2003 and 2007 led to a severe disruption of railway operations for several years. It also forced the diversion of freight traffic from Burkina Faso and neighboring countries using the same corridor (Mali and Niger) to the remaining three transit corridors to Ghana, Togo and Benin. Transit traffic on these three corridors increased dramatically leading to deterioration of the road infrastructure. The rehabilitation of the transit road infrastructure, particularly on the corridor to the port of Tema in Ghana, has accordingly emerged as a priority for Burkina Faso, Mali and Niger. With the political situation normalizing

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21 Arvis, Raballand and Marteau (2007) and the World Development Report on Economic Geography (2008) note that being landlocked increases marginal costs. This is because being landlocked increases import prices and reduces export revenues, particularly in small developing country markets due to: (a) uncertainty in shipment delivery time; and (b) low level of demand. Moreover, for a given industry, volumes are lower in a landlocked country than in a gateway country, leading to larger inventory unit costs and unreliable transport. Radelet and Sachs (1998) find the transport costs to be about 50 percent higher for landlocked countries. This results in more expensive intermediate products, making a re-export model (such as a regional service hub) extremely difficult to achieve in landlocked developing countries.

22 Transport prices for most African landlocked countries range from 15 to 20 percent of import costs (MacKellar et al, 2002) – a figure three to four times more than in most developed countries.

23 Burkina Faso is currently producing gold and manganese. It also has prospects to produce zinc. 360 authorizations for mining exploitation have been granted to private sector operators. Six sites are already under exploitation. The significant projected reserves will need to be transported to Ouagadougou and then exported.
in Côte d’Ivoire, some of the transit traffic is expected to shift back to the road and rail mode provided by the Côte d’Ivoire transit corridor.

Railway Transport Infrastructure

3.144 The railway system in Burkina Faso represents the most cost-effective transport option, however the network coverage remains limited and in need of maintenance. Burkina Faso has an operating railway system of about 1,000 km which connects Ouagadougou through Bobo-Dioulasso with Abidjan (Côte d’Ivoire). In 1994 the Burkina Faso – Côte d’Ivoire railway system was concessioned to the private sector company operator SITARAIL. This was the first concession or re-concession of a railway system in Sub-Saharan Africa, and it has now been in operation for about 14 years. The existing rail system yields important transport benefits. In 2008, the railway system transported approximately 850,000 tons (about 23.5 percent of freight carried to/from Burkina Faso) by railroad. Between 2007 and 2008, 800,000 tons were imported by rail, reducing transport costs by half (CFAF 3.5 - 4 billion annually), reducing fuel imports (rail operations consume 3.5 times less than trucks, saving 10 million liters of fuel or CFAF 4 - 5 billion), attenuating CO₂ emissions, reducing road accidents and preserving the road network (World Bank, 2008). The average tariff for railway transport is CFAF 31 per Tkm for SITARAIL, which is 30-40 percent less than the cost of transporting goods by road from Ouagadougou to Abidjan.

3.145 Nevertheless, the crisis in Côte d’Ivoire demonstrated the vulnerability of the rail service to political instability. The crisis led to a severe disruption of railway operations for several years. In 2003, all railway services to Côte d’Ivoire were suspended, and the estimated losses caused by the crisis in Côte d’Ivoire to SITARAIL were estimated at about CFAF7 billion. Railway operations between Burkina Faso and Côte d’Ivoire have resumed, albeit with some increased transit times.

Air Transport Infrastructure

3.146 Air freight infrastructure and service provision is relatively limited in Burkina. Burkina Faso has two international airports (Ouagadougou and Bobo Dioulasso) and 13 domestic airports. With 2,900 tons of freight and about 280,000 passengers in 2007, the airport in Ouagadougou accounted for approximately 98 percent of total cargo freight. In 2008, the passenger traffic accounted for about 320,000 passengers at the Ouagadougou airport and around 30-50,000 at the airport in Bobo Dioulasso. The total passenger traffic (maximum 400,000 passengers) makes the air travel market in Burkina 50 percent smaller than that in Benin and Mali, 60 percent smaller than that in Côte d’Ivoire and 80 percent smaller than that in Senegal. The limited airfreight infrastructure hampers the export development of the horticulture industry in Burkina. To improve air transport infrastructure and service provision, the Government is planning to develop a new airport near the village of Donsin to serve the greater Ouagadougou area. The estimated cost of the new airport is around US$300 million and the time frame for its development will depend on the mobilization of internal and external financial resources. As an interim measure, the Government has commissioned a limited upgrade of the existing passenger terminal at the airport in Ouagadougou.
Road Transport Infrastructure
The Physical Road Network

3.147 **The overall quality of Burkina Faso’s road network remains poor.** The latest Africa Competitiveness Report (2009) shows that the biggest gap between OECD countries, and the best performing countries in Sub Saharan Africa (SSA), relates to the quality of the road infrastructure stock. In the case of Burkina Faso, while the total length of the classified and unclassified road network is about 63,000 Km, only a small fraction of the network is paved. The classified road network in Burkina consists of approximately 15,272 km, of which only 2,976 km is paved. The unclassified road network is approximately 47,728 km and consists primarily of low quality unpaved rural roads and tracks. The classified road network carries about 80 percent of road traffic in the country. According to the AICD data for Burkina Faso, the network asset value for the classified road network is estimated at about US$1.561 billion.

3.148 **However, the state of the primary classified road network has improved in recent years.** Since 2000, considerable government efforts to upgrade the main corridors connecting Burkina with Ghana, Niger, Côte d’Ivoire, Togo, Benin and Mali have enabled Burkina Faso to improve the condition of its classified primary road network and its access to gateway ports in Côte d’Ivoire, Ghana, Benin and Togo. As of June 2008 about 71 percent of the classified paved and unpaved road network was classified in good or acceptable condition. This reflects the significant investments made by the Government with the assistance of development partners rather than the implementation of a long term coherent maintenance policy (World Bank, DTIS 2007). Further, large parts of the secondary and tertiary road networks still need to be upgraded and improved. With the establishment of a road maintenance fund in 2007, funding for the maintenance of the road network should gradually improve. This should lead to asset preservation and improved quality of the road transport network. Since the road fund has been in operation for only one year, it is still too early to judge whether the quality of the road network is in fact improving.

3.149 **Road construction and rehabilitation is hampered by low absorptive capacity in the road construction sector.** Road transport financing acquired under the PST framework considerably increased the resources available for road construction and rehabilitation. While a funding gap remains due to the enormous needs in the sector (both in terms of roads to be built and/or rehabilitated), the Government has been unable to fully absorb allocated budget provisions for road construction sector. The budget allocation for 2008 is CFAF119 billion with a rate of execution of only 37 percent.

3.150 **Road infrastructure investments require careful targeting.** Simulations using the Highway Development and Maintenance Model 4 (HDM-4), the standard model for analyzing road investments indicate that in Central and West Africa, where the traffic is low and the truck fleets are old, as long as international corridor routes are paved and in reasonable condition, further improvement of road conditions do not result in significant reduction of transport costs. Investments to improve the conditions of secondary and tertiary road infrastructure are likely to yield greater poverty reduction effects (Box 3-7). For example, the rural roads investment needed as a percentage of GDP in Burkina varies between 2.8 (pragmatic scenario) and 5.1 (base

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24 The domestic sections of the four road corridors to the sea represent 8 percent of the whole classified road network of the country.
scenario)\textsuperscript{25} compared to an average of 0.7 (base scenario for classified and unclassified road networks) and 0.5 (pragmatic scenario for classified road networks) and 0.2 (pragmatic scenario for unclassified road networks) in 23 countries from Sub-Saharan Africa.\textsuperscript{26}

3.151 **Rural communities have limited access to rural transport infrastructure.** More than 60 percent of the 8,230 villages in Burkina Faso are estimated to be farther than 3 km from an all weather road. At best, these villages are linked to the road network by low quality dirt paths which are largely impassible for long periods of time during the rainy season even for non-motorized modes of transport. This gives Burkina a low Rural Access Index (RAI)\textsuperscript{27} (rating of 25 percent in 2003) similar to other countries, such as Cameroon (22 percent in 2002) and Sierra Leone (22 percent in 2006).\textsuperscript{28} Aware of the need to improve rural connectivity, since 2000 the Government has focused on upgrading the rural road network through the rehabilitation and construction of about 8,400 km of rural roads.

3.152 **The urban road network is poorly planned and inadequate in both length and quality.** The total length of the urban network in six cities is 4,845 km. The rapid growth (+4.8 percent) of the population of Ouagadougou and other major cities places significant pressure on the already limited urban transport infrastructure stock and services. Weak institutional capacity and the unplanned peripheral expansion of major urban areas have complicated efforts to extend the network.

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\textsuperscript{26} For 23 countries from Sub-Saharan Africa, Carruthers et al (2008) find that reaching a Rural Access Index of 50 percent would go beyond the financial resources of many countries (including all post-conflict countries) whereas the average value in other Bank regions is of around 65 percent already.

\textsuperscript{27} Proportion of people who live within two kilometers – typically equivalent to a 20-minute walk – of an all-season road.

Box 3-7: Evidence regarding Investment in Transport Infrastructure

Using country data extracted from HDM-4 trucking surveys, Teravaninthorn and Raballand (2008) demonstrate that the economic viability of high level of service along roads with less than 150 trucks, which include almost all major roads in West and Central Africa, is questionable. Moreover, as demonstrated in the case of Uganda, low level service of secondary/tertiary roads has a greater impact on poverty reduction per dollar spent than high level of service (paved roads) between major economic centers.

Most donors and governments in sub-Saharan Africa have so far relied on several underlying assumptions:

- Greater economic impact is achieved through high level road service (achieved mainly through paving of primary and secondary road networks).
- Primary and secondary road networks cover a large economic hinterland and accordingly, they have a large economic spillover effect.
- There is no limit to the threshold effect for roads in low economic density regions; it was assumed that roads in low economic density regions will ineluctably bring economic development.
- “One size fits all” concept: any remote region should benefit from the same type of investment infrastructure.
- With adequate road infrastructure, road transport services, namely trucking services, will be adequate and available at a reasonable price and quality.

In terms of amount committed, the bulk of donors’ investments in transport in Africa has focused on the rehabilitation of the main transport network.

Hurlin (2008) found a strong threshold effect in infrastructure investments, especially those in the transport sector (based on transport density data). Without any existing network, the impact of road investment on productivity is as low as non-infrastructure investment (such as education and health); on the contrary, when a minimal network is in place, the impact of transport investment is much higher. The upcoming World Development Report (Reshaping Economic Geography) emphasizes the fact that in sparsely located populations with low economic density, investment in infrastructure may not necessarily be the first priority. The WDR advocates the importance of better linking economic density and investments in road infrastructure to poverty reduction, which has been neglected in the past because of the underlying assumption of ineluctable economic development following road rehabilitation of any kind. Level of service is also a key factor which tends to have been neglected despite the fact that it has a potentially major impact on road construction policy because it determines road costs.

Road Transport Services

3.153 **On average, road transport prices**\(^{29}\) **are higher than in other regions and involve significant markups by providers in the trucking industry.** Transport prices expressed in ton-kilometer on the corridor Lomé – Ouagadougou (on average 7 US cents per tkm in 2007) are lower than those on main international corridors from Central Africa, but exceed transport prices in South Asia, Brazil and along the international corridors from Southern Africa (Figure 3-12). Similarly, when expressed in US dollar per kilometer, transport prices on the corridor Tema/Accra – Ouagadougou (on average US$3.53 per km) are higher than those on the corridors from Eastern and Southern Africa (Table 3-8). By contrast, road transport costs\(^{30}\) are lower than

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\(^{29}\) Transport prices are the rates charged by a transport company or a freight forwarder to the shipper or importer. Normally they include transport costs and operator’s overhead and profit margin.

\(^{30}\) Transport costs include vehicle operating costs and other indirect costs, such as licenses, insurance, road toll and roadblock payments. Vehicle operating costs include various direct costs to operate a given vehicle, notably maintenance, tires, fuel, labor and capital costs (Teravaninthorn and Raballand, 2008).
in Europe due to lower wages and lower capital costs associated with the use and maintenance of secondhand obsolete trucks - US$0.66 per km on the corridor Tema/Accra – Ouagadougou (2007) compared to US$0.87 per km in France (2006). Nevertheless, variable costs are more important in Burkina – US$1.54 per km on the corridor Tema/Accra – Ouagadougou compared to US$0.72 per km in France (2007). They reflect: (i) high fuel costs (ranging between around US$1.16 for paraffin and US$1.41 for petrol), (ii) age of truck fleets which induces more fuel consumption and (iii) road conditions that are probably in worse shape than elsewhere (Teravaninthorn and Raballand, 2008). Often, in West Africa, it is difficult to explain how transport prices are not closely correlated with transport costs, which are closely related to road conditions, capital, labor and variable costs (Teravaninthorn and Raballand, 2008). In Burkina, the large gap between road transport prices and costs on the main international corridors is the result of significant markups by providers in the trucking industry. For example, the Tema/Accra-Ouagadougou-Bamako exhibits high profit margins (80 percent) and a ratio of fixed to variable costs of 30/70 percent\(^3\) (Table 3-8).

3.154 The high transport prices resulting from significant profit markups are accompanied by poor transport service quality in Burkina Faso. According to the Logistics Performance Index (LPI) (2007)\(^3\), which measures transport quality, Burkina Faso ranks below the Sub-Saharan Africa or South Asian regional averages (Figure 3-13).

3.155 The highly regulated trucking industry in Burkina raises significant market entry barriers which negatively affect the price and quality of transport services. Access to freight in the ports is done through a system of “tour de role”. This system may ensure access to freight for all operators (most of the time small operators which lack adequate expertise and training), but prevents competition and limits the incentives for the trucking industry to modernize and improve quality. The poor condition of the existing fleets is testimony to this. At the same time, the “tour de role” system encourages cartel practices, which, in turn, creates large gaps between transport costs and prices and maintains low service quality (Teravaninthorn and Raballand, 2008). Additionally market access conditions such as quota allocation between fleets create inefficiencies. The large profit margins should suggest that new operators would have incentives to enter the market, however in practice this does not happen due to cartel practices and other market access rules. Transport prices are set in agreement with the transport trade unions, which also manage the whole system. As long as cartel practices exist in the trucking industry, any intervention to reduce transport costs is unlikely to have any significant impact.\(^3\) While addressing the lack of competition in the sector and dismantling the “tour de role” system will create better service quality and increased efficiency among operators, it could also generate

\(^{31}\)On average, in a developed system such as France, the fixed costs to variable costs ratio is 55/45 (Teravaninthorn and Raballand, 2008).

\(^{32}\)The LPI measures perceptions of the logistics environment of 140 countries on several dimensions: customs, infrastructure, international shipments, logistics competence, tracking and tracing, domestic logistics costs and timeliness. The survey uses anonymous, web-based questionnaire that asks respondents to evaluate their country of residence, as well as eight countries they are dealing with, on the following dimensions: international transportation costs, domestic transportation costs, timeliness of shipments, tractability of shipments, transport and IT infrastructure, customs and other border procedures, and logistic competence.

\(^{33}\)In East Africa the trucking environment is more competitive. Major corridors in Southern Africa are the most advanced in terms of prices and efficiency of services, mainly because of a deregulated transport market (Teravaninthorn and Raballand, 2008).
social costs related to the elimination of inefficient operators by market dynamics. Compensation schemes would need to be implemented in order to mitigate these social costs.

3.156 Furthermore, the regulated trucking industry may foster corruption and overloading. The USAID Improved Road Transport Governance (IRTG) Initiative on Interstate Trade Corridors (October –December 2008) explained the increase in bribery in Burkina and other West African countries as caused by an illegitimate “fee” paid on overweight vehicles. As the Burkinabé trucking market is regulated through the “tour de role” system which caps cargo loads and truckers’ revenues, transport providers seek to maximize their revenues by bribing the freight bureaus, customs and police to allow over-loaded vehicles. The IRTG Initiative found that the highest bribery averages by corridor measured in October-December 2008 in West Africa were on the Ouagadougou-Bamako interstate route, amounting to CFAF 58,243 per trip, most of which was collected on the Mali segment of the route (an average of CFAF 47,447). The Ouagadougou-Lomé corridor registered the lowest bribery average, with CFAF 17,361 collected.

3.157 The weak capacity of trucking service providers has exacerbated the problem of overloading. The operators use an increasingly obsolete vehicle fleet with an average age of above 15 years old. Overloading is a common practice among this type of operator in West Africa (Teravaninthorn and Raballand, 2008). According to EU estimates, the trucks that transport merchandise from ports in West Africa have an overload of on average 20 tons.

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34 The IRTG Initiative surveys cover the following corridors: Tema-Ouagadougou, Ouagadougou-Bamako and Lomé-Ouagadougou.
Table 3-8: International Transport Prices, Costs and Profit Margins  
(from gateway to destination)

<table>
<thead>
<tr>
<th>Route gateway-destination</th>
<th>Price(^b) (US$ per km)</th>
<th>Variable cost (US$ per km)</th>
<th>Fixed cost (US$ per km)</th>
<th>Profit margin(^b,c) (percent)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>West Africa</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tema/Accra— (Ghana)</td>
<td>3.53(^a)</td>
<td>1.54</td>
<td>0.66</td>
<td>80</td>
</tr>
<tr>
<td>Ouagadougou (Burkina and Ghana)</td>
<td>(2.01)</td>
<td>(0.59)</td>
<td>(0.64)</td>
<td></td>
</tr>
<tr>
<td>Tema/Accra— (Ghana)</td>
<td>3.93(^a)</td>
<td>1.67</td>
<td>0.62</td>
<td>80</td>
</tr>
<tr>
<td>Bamako (Mali)</td>
<td>(1.53)</td>
<td>(0.23)</td>
<td>(0.26)</td>
<td></td>
</tr>
<tr>
<td><strong>Central Africa</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Douala—N'Djaména (Chad)</td>
<td>3.19(^a)</td>
<td>1.31</td>
<td>0.57</td>
<td>73</td>
</tr>
<tr>
<td>(Central African Republic)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Douala—Bangui (Chad)</td>
<td>3.78(^a)</td>
<td>1.21</td>
<td>1.08</td>
<td>83</td>
</tr>
<tr>
<td>Ngaoundéré— N'Djaména (Chad)</td>
<td>5.37(^a)</td>
<td>1.83</td>
<td>0.73</td>
<td>118</td>
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<tr>
<td>Moundou (Chad)</td>
<td>(2.58)</td>
<td>(0.64)</td>
<td>(0.43)</td>
<td></td>
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<tr>
<td><strong>East Africa</strong></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Mombasa—Kampala(^b) (Uganda)</td>
<td>2.22(^a)</td>
<td>0.98(^b)</td>
<td>0.35</td>
<td>86</td>
</tr>
<tr>
<td>(Kenya)</td>
<td>(1.08)</td>
<td>(0.47)</td>
<td>(0.14)</td>
<td></td>
</tr>
<tr>
<td>Mombasa—Nairobi(^b) (Kenya)</td>
<td>2.26(^a)</td>
<td>0.83</td>
<td>0.53</td>
<td>66</td>
</tr>
<tr>
<td>(Kenya)</td>
<td>(1.36)</td>
<td>(0.17)</td>
<td>(0.10)</td>
<td></td>
</tr>
<tr>
<td><strong>Southern Africa</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lusaka— Johannesberg(^b) (Zambia)</td>
<td>2.32(^a)</td>
<td>1.54</td>
<td>0.34</td>
<td>18</td>
</tr>
<tr>
<td>(South Africa)</td>
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<td></td>
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<td></td>
</tr>
<tr>
<td>Lusaka—Dar-es-Salaam(^b) (Tanzania)</td>
<td>2.55(^a)</td>
<td>1.34</td>
<td>0.44</td>
<td>62</td>
</tr>
<tr>
<td>(North Africa)</td>
<td></td>
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</tbody>
</table>

Source: Trucking survey data and own calculations. Exchange rates come from International Monetary Fund-International Financial Statistics.

Note: Prices are in US$ per kilometer because most companies have the same truck capacity and similar overloading practices on a corridor. Moreover, because of questions in rescaling overloading prices, in US$ per kilometer are probably much more reliable than prices per ton-kilometer. Prices and costs were obtained from reported truckload (approximately 30 metric tons). Values include trucking services (three or more trucks) and truckers (one or two trucks). Standard deviation is in parentheses.

- a. Destination country is in parentheses.
- b. First segment of the northern corridor.
- c. Second segment of the northern corridor.
- d. First segment of the north-south corridor.
- e. Second segment of the north-south corridor.
- f. Some indicative prices are set by ministries of transportation in Africa, but are not used. Prices set by freight allocation bureaus in Central Africa may be more expected.
- g. Prices from the trucking survey are similar to the ones given by the Conseil Burkina des Chargeurs (see table below). Depending on the tonnage (official or not), prices per ton-kilometers may be more or less higher.
- h. Data should be taken cautiously since some companies may omit some costs or, conversely, double count some costs.

<table>
<thead>
<tr>
<th>Unit</th>
<th>Official data from Burkina Faso shippers' council</th>
<th>Survey</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>KCC</td>
<td>USS</td>
</tr>
<tr>
<td>Ton</td>
<td>26,000-30,000</td>
<td>52-60</td>
</tr>
<tr>
<td>Container</td>
<td>1,300,000-1,400,000</td>
<td>2,600-2,800</td>
</tr>
</tbody>
</table>

Note: Exchange rate US$/FCFA = 0.002.

1. Data are consistent with Oyer (2007), who found US$1.10 per kilometer for Kenyan routes, without including overheads and management costs or border-crossing and bribes costs.
### Figure 3-13: Comparative LPI Scores, 2007

<table>
<thead>
<tr>
<th>Country/Region</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>United States</td>
<td></td>
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<tr>
<td>France</td>
<td></td>
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<tr>
<td>South Africa</td>
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<tr>
<td>Czech Republic</td>
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<tr>
<td>Pakistan</td>
<td></td>
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<tr>
<td>Europe &amp; Central Asia (regional average)</td>
<td></td>
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<tr>
<td>Cameroon</td>
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<tr>
<td>Middle East &amp; North Africa (regional average)</td>
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<tr>
<td>Zambia</td>
<td></td>
</tr>
<tr>
<td>Cote d’Ivoire</td>
<td></td>
</tr>
<tr>
<td>Sub-Saharan Africa (regional average)</td>
<td></td>
</tr>
<tr>
<td>South Asia (regional average)</td>
<td></td>
</tr>
<tr>
<td>Togo</td>
<td></td>
</tr>
<tr>
<td>Burkina Faso</td>
<td></td>
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<tr>
<td>Chad</td>
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</tbody>
</table>


#### 3.158 Overloading represents a primary factor in the degradation of Burkina’s road stock and increases road security risks. According to the EU, the economic cost of overloading in Burkina Faso has been estimated at CFAF 30 billion per year. Overloading is a complex issue that requires concerted actions, such as better management of international transport corridors and road stock at regional level as it has financial implications for transport operators. This is demonstrated by the lack of success of interventions in Africa to control overloading due to vested interests by trucking stakeholders (Teravaninthorn and Raballand, 2008).

#### 3.159 In terms of urban transport services, the limited public transport network has been identified as one of the bottlenecks to the effective development of urban areas. Population growth in Ouagadougou has led to an increase in the use of individual transport, mostly motorized vehicles and especially motorcycles. Buses were recently placed in service by the transport company SOTRACO (Société de Transport en Commun de Ouagadougou). The current public transport network of 11 lines does not serve all parts of the city, and deployment of additional buses to increase service will still face the problem of heavily congested roads. The urban transport network has not been upgraded to meet growing demand, and traffic fluidity has deteriorated as a result. According to the Conseil Exécutif des Transports Urbains de Ouagadougou (CETUO), 62 percent of trips go through the city center, but only 6 percent of

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35 **Programme Quinquennal d’Actions Prioritaires pour l’amélioration de la mobilité Urbaine de Ouagadougou 2004-2008 (CETUO, Octobre 2003).**
all trips are covered by public transport. The increasing mass transport needs, coupled with the inadequate response by the authorities, is causing a rapid increase in congestion, pollution, and accidents on the major transport axes. However, an analysis of the public transport sector in Burkina suggests that the financial viability of public transport companies is low. Moreover, the travel fare – CFAF 150 (around US$ 0.3) - may limit access to public transportation for vulnerable population groups.

Cross-border Transit

3.160 Cross-border transit delays and unpredictability increase the transport costs associated with being landlocked. The average ship arrival-to-clearance time in Ouagadougou of 10 days is better than the average in many developed countries. This is largely due to the heavy competition between the main ports (Abidjan, Tema, Lomé and Cotonou) in West Africa to capture the transit trade from Burkina Faso, Niger and, to a lesser extent, Mali. However, delays in cross-border transit and high transportation costs are associated with the road to port transport which is subject to several nonphysical barriers (see Box 3-8). According to the USAID IRTG Initiative, the density of checkpoints for the surveyed corridors varied from 19 and 37 stops per trip between October and December 2008. The highest density was registered along the Ouagadougou – Bamako interstate corridor - 37 stops per trip, with 29 checkpoints on the Malian and 8 on the BurkinaBé segments. The delays caused by stops at each checkpoint vary from 10 to 24 minutes per 100 km, slowing down the fluidity of the traffic. Due to the unreliability of certain operators, customs administrations have established an escort system for trucks carrying goods at each customs point. The irregular organization of escorts that wait to have a sufficient number of vehicles before departure further impedes the smooth flow of traffic. The lack of traffic fluidity contributes to lengthening the time of freight carriage and introduces additional costs for exporters.

3.161 Custom transit management systems remain deficient. As in many West African countries, the national computerized custom management transit system in Burkina is not fully operational. Interconnecting the information systems of countries in which the transit corridor is located will only be useful after national computerized transit modules are strengthened. Some steps have been taken to consolidate the national information system through the introduction of ASYCUDA++ that allows importers to submit customs declarations online. However, this system seems to be rarely used. Transit procedures could also be simplified to reduce rent-seeking behaviors and streamline border management and customs information systems.

According to a study conducted in 2004, the city of Ouagadougou is responsible for 80 percent of total urban emissions. The overall GHG emission in Ouagadougou is estimated at 18,000 tons/ann. The GHG emissions comprise CO2, CH4 and particles. According to the same study, a large part of this emission is generated by two-wheel motorized vehicles. These emissions are essentially due to the poor quality of oil which is mixed with gasoline in these vehicles. Consequently, incomplete burned gases are released into the atmosphere and generate GHG emissions.

Payments at checkpoints are deemed to raise transport costs by 10-15 percent. On the axis Bamako-Ouagadougou, inside the Malian territory, a “tax” of CFAF 7,500 is encountered every 100 km. On the same axis but inside the BurkinaBé territory a similar “tax” of CFAF 2,700 is charged every 100 km. Similarly, this “tax” is about CFAF 2,900 on the Tema-Ouagadougou corridor, on the Ghana side. The transport operators are responsible for paying these additional costs to the various control agents along the main transport corridors.
Box 3-8: Constraints Related to the Infrastructure Value Chain in Landlocked Countries

According to Arvis, Raballand and Marteau (2008) in many cases, inadequate infrastructure is not the primary cause of delays and logistic costs associated with cross-border transit in a landlocked country. The cost of being landlocked is heightened by transit delays and unpredictability which are critical to international trade. While African shippers contribute to increased and exogenous non essential overheads (from corruption, overregulation and private inefficiencies), much of the transit cost is generated internally in landlocked countries like Burkina due to poor performance of transit logistics including: (i) inadequate implementation of transit regimes; and (ii) the unfavorable political economy of transit, particularly its vulnerability to rent seeking activities.

The authors show that while port delays impact all countries, landlocked countries face an added disadvantage linked to transit economics which is due to the multiple lengthy clearance systems on most corridors. Since most developing countries rely heavily on tariff duties, they tend to develop redundant procedures to avoid fiscal loss. The applied transit regime is therefore conceived as a chain of control rather than the freedom of transit given to compliant operators in exchange of guarantees. For maritime transport, a standard deviation of 20 percent of transport time increases transport costs by nearly 45 percent. Although difficult to quantify, the non-transport costs may be even more for shippers.

In addition to delays, a fragmented transit chain and variance in processing time cause uncertainty and unpredictability. Traders are therefore obliged to hedge in view of the unreliable service delivery – either through increasing inventories or through switching towards alternative but more expensive transport modes – thereby increasing logistic costs.

Transport Regulatory and Administrative Framework

3.162 Burkina Faso has developed a sound regulatory framework in the transport sector. Existing transport regulations allow for private sector involvement and they align with international agreements in the field. Burkina has integrated into the domestic legislation the majority of the WAEMU and ECOWAS transport sector regulations. One of the most important is the law regulating the toll on bituminized roads inside the country, as well as the decree on road controls along the Dakola-Ouagadougou-Bobo-Dioulasso-Kologo-border of Mali corridor. Burkina Faso has also devised a program to sensitize vehicle owners and operators on the consequences of overloading. Road maintenance services were also liberalized in 1998, facilitating the creation of SMEs specialized in road works. Nevertheless, the transport regulatory framework has not adequately addressed the market distortions and cartel-like practices in the trucking industry. Unless liberalization of the trucking industry is achieved, the economic benefits of regional investments aimed at improving the quality of road infrastructure and reducing logistical inefficiencies both at Tema Port and along the corridor will not be fully realized.

3.163 In the railway transport sector, the 1995 concession agreement between Burkina and Côte d’Ivoire was unable to service the track rehabilitation debt and facilitate scheduled concession fee payments during 2003 – 2006. This is mainly the result of the crisis in Côte d’Ivoire. The main amendments that would address these drawbacks relate to (i) the clearing of arrears accumulated by the concessionaire between 2003 and 2006 and, (ii) the reimbursement by the Government of Côte d’Ivoire of the war damages incurred by the

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38 The Concession agreement signed in 1995 assigns to the Government of Burkina and Côte d’Ivoire the responsibility to finance, but not to service, the debt incurred for track rehabilitation. The Concessionaire, on the other hand, must finance rolling stock rehabilitation and maintenance as well as track maintenance.
Concessionaire. In addition, evidence from other rail concessions in Africa suggest that the current concession will not be able to generate enough cash flow, even under the most optimistic assumption, to finance both track and rolling stock rehabilitation and maintenance. However, from an economic standpoint, the concession generates significant returns to Burkina Faso and Côte d’Ivoire, being eligible for direct financial support.

3.164 **Moreover, the institutional and regulatory framework for urban transportation lacks clarity.** This is particularly problematic given the on-going decentralization process in Burkina Faso. Presently, at least four institutions are involved in the planning and regulation of transport in Ouagadougou – each reporting to different levels of government. These are (i) the Ministry of Transport (General Directorate for Land and Maritime Transport); (ii) the Ministry of Infrastructures (General Directorate for Roads); (iii) the Municipality of Ouagadougou; and (iv) SOTRACO. A decree for the creation of an autonomous body under the Ministry of Transport - Conseil Exécutif des Transports Urbains de Ouagadougou (CETUO) - has been prepared, but has not been passed. Nevertheless, CETUO started its operations in 2003 on an informal basis, with only a small permanent secretariat and a very limited budget provided by the Municipality of Ouagadougou. Its role is to ensure that revenues from the recently created SOTRACO are recycled into transport investments without passing through the Ministry of Finance. Although CETUO is also conferred with a mandate to provide policy guidance on transport issues, this role has been so far limited.

3.165 **Implementation of transport regulations is relatively poor.** The implementation of regional agreements on transport and transit facilitation such as the use of Inter-State Road Transit logbook and the axle load control is limited, although the implementation of the latter has recently received more attention. A recent World Bank review of legal instruments on transit trade in Africa confirmed that the main problem is not the inadequacy or lack of agreements and frameworks, but their poor implementation stemming from a lack of capacity or political will.

3.166 **Management capacity in the transport sector is weak** The transport sector administration suffers from a lack of planning and weak management capacity due to the lack of adequate human and financial resources. In addition, the construction standards for rural infrastructures remain unclear and there is no medium term planning for roads construction. The transport sector has been through many institutional changes involving a succession of merging and dismantling of various ministries in charge of infrastructure and transport. These changes have enabled a rationalization of staff and resources and a consolidation of capacity. However, coordination and clear delineation of responsibilities between ministries remain problematic. The low level of control and the lack of reliable statistical data make it difficult to build an effective monitoring and evaluation system.

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39 Financing for CETUO is to come from the Ministry of Finance and the Municipality of Ouagadougou.

40 In the transport sector, corridor management arrangements have been established to facilitate trade on several routes and have achieved some success (Arnold 2007) in solving certain implementation issues and overcoming the natural reluctance of transit countries towards transit trade (Sachs, 2004).
b) **Energy Infrastructure**

3.167 **Access to modern energy in Burkina Faso remains low, especially for the electricity sector whose development is severely constrained by the prohibitive cost of electricity generation.** Only 18 percent of the Burkinabè population has access to electricity (around 40 percent in the urban areas and 3 percent in the rural areas) (World Bank, 2007). The electricity consumption per inhabitant is only 35KWh in Burkina compared to 246kWh in Cameroon, 196kWh in Senegal and 172kWh in Côte d’Ivoire. The majority of the population (90 percent) still relies on wood energy (firewood and charcoal). Poor access to electricity also affects SME development and their operations, including the impact of existing social programs.

3.168 **In particular, rural and peri-urban access to electricity is critically limited.** The low level of access constitutes a severe handicap for the development of small- and medium-size productive enterprises and limits the impact of existing social programs. In the past, Burkina Faso has benefited from support of many donors to improve energy access levels. Unfortunately, efforts were mostly scattered, and successful pilots were not scaled up. Subsidies were granted to private sector contractors to finance equipment and build electricity systems in rural areas. However, the outcomes were mixed due to weak incentives and accountability mechanisms to ensure good performance in the management of the systems and service delivery. Several projects exist to improve access to electricity in the rural, peri-urban and urban areas, to support the use of wood fuel energy, to promote energy saving and the use of alternative energy sources, and to strengthen the existing institutional framework. The National Electrification Master Plan is intended to help expand access to electricity for rural and peri-urban populations (World Bank, 2005).

3.169 **The country’s limited generation capacity cannot meet raising electricity demand.** Burkina Faso has no significant known fossil fuel reserves, making the country completely reliant on imports for petroleum product consumption (400-450,000 tons per year, of which 25 – 30 percent is used for power generation). Electricity demand tends to increase by an average of 7 percent per year in Ouagadougou and Bobo-Dioulasso. This growth has been met mostly by an increase in the domestic thermal generation capacity (liquid fuel engines powered with diesel or Heavy Fuel Oil). Other thermal generation technologies that are potentially less costly like coal or natural gas fired power plants are not feasible in the case of Burkina Faso because of the small size of the power system and its landlocked geographic location. The hydroelectric potential of the country amounts to less than 100MW in five identified sites. Four hydropower plants have been developed with 32 MW of installed capacity and 27 MW of available capacity. However, these plants are vulnerable to erratic rainfall conditions. Moreover, high rates of evaporation affect the management of the reservoirs.

3.170 **Despite SONABEL adequate performance, the high cost of electricity supply in Burkina Faso represents a constraint on the economic activities.** Reforms initiated in the

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41 The Government of Burkina Faso envisages to (i) implement a project to ensure electricity connection in the rural areas (182 villages); (ii) to ensure electricity connection of 180 villages based on a tax of CFAF 2 per KWh collected on the SONABEL bills; and (iii) extend access to electricity in more than 100 villages by SONABEL.

42 Several initiatives supported by IDA and DANIDA helped finance the construction of two thermal power stations with respective production capacities of 14MW and 18MW in 2006 and 2007. SONABEL also financed the installation of a new power plant with a capacity of 14MW in Komsilga which is meant to be operational in 2009.
1990s dismantled SONABEL legal monopoly in the electricity market, and facilitated the creation of alternative providers in rural areas and self-generation. However, within its service area, SONABEL has so far remained an integrated power utility with a de facto distribution monopoly. Thanks to a combination of (i) satisfactory operational performance, (ii) two adjustments in electricity tariffs (2004 and 2006), and (iii) a system of budget support to SONABEL that limits the impact of oil prices volatility on the utility, SONABEL is the only state-owned power utility in the sub-region that has maintained positive operating results, and has not been forced into seeking emergency government financial support to remain financially viable. As a result, the country has so far escaped widespread load-shedding episodes or the need to procure for costly emergency generation.4 Nevertheless, Medium Voltage (MV) electricity costs are significantly higher in Burkina than in Benin, Côte d’Ivoire, Mali or Senegal (Figure 3-14). This is partly due to SONABEL’s dependence on fuel imports for the generation of thermal electricity, the country’s landlocked situation and the small size of the system.

Figure 3-14: Comparative Cost of Electricity in Burkina Faso and Neighboring Countries (in CFAF/KWh)

![Graph showing comparative electricity costs](image)


3.171 Moreover, frequent power outages disrupt various economic activities, but not in the same proportion. Only few firms dispose of diesel generators. Such generators are rare in Ouagadougou and are not as powerful as the SONABEL ones. It should be mentioned that SONABEL’s power outage plans are designed as such to have little impact on the industrial sector. Nevertheless, the service companies are the most affected, mainly because they are

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41 The commercial performance of SONABEL compares favorably with its peers in West-Africa as evidenced by total distribution losses (technical and non-technical) of 14-15 percent compared to 18 to 25 percent in Mali, Senegal or Ghana. More recent efforts to lease the management of the utility to the private sector have been slow and are jeopardized in the present context by the global financial crisis. Therefore, the Government continues to manage the utility. The future role of the private sector participation in the state-owned utility, and more generally in the power sector, still needs to be clarified.

44 Except for the peak load periods in April - May 2008 and 2009 generated by delays in the completion of the Bobo - Ouagadougou transmission line.

45 Typically, the MV energy is used in the manufacturing sector.

46 At SONABEL, electricity distribution losses are among the lowest in the region, but they increased in 2007 compared to 2006 (14.5 percent and 12.7 percent, respectively).
scattered around Ouagadougou and cannot be targeted for electricity supply as a group. The industrial zones receive electricity through specialized networks, which put the remainder of companies at disadvantage.

3.172 **Although the electricity tariff structure is not problematic, the existing subsidy mechanism to SONABEL generates distortions.** The Government decided to subsidize the electricity tariffs after the CFAF devaluation in 1994 to avoid the collapse of the economy. However, it ended up maintaining the tariff at the 1994 level for a decade (World Bank, 2005). In order to pass the cost of rising oil prices on to customers, the Government implemented a first step in the tariff adjustment process in November 2004 with a 10 percent increase in the average electricity tariff, and a second step in September 2006 with a 12.5 percent increase. The adjustments remained however not sufficient to reach full cost recovery. Moreover, the subsidy mechanism by which SONABEL acquires its fuel at administered prices below market price was maintained. In the context of raising oil prices and of the growth in the volume of thermal generation, the budgetary cost of subsidizing SONABEL fuel purchases has increased. Recently, the authorities decided to cap the annual fuel subsidy at a ceiling of US$45 million per year. The Government stated its intention is to phase out the fuel subsidy mechanism after the startup of the transmission line from Bobo-Ouagadougou in 2010. While the fuel subsidy mechanism has insulated SONABEL from the volatility of oil prices, and helped preserve its financial viability, it has artificially reduced the cost of domestic thermal energy generation.

3.173 **Acknowledging the need to eliminate distortions generated by the existing fuel subsidy mechanism, Burkina has initiated a tariff policy assessment.** Maintaining distortions generated by the existing subsidy mechanism would go against the strategy for the sector which is to promote regional integration and substitute domestic thermal generation with cheaper imported electricity. To accompany the phasing out of the fuel subsidy, it will be important to put in place a transparent tariff indexing mechanism ensuring price adjustments in line with costs. One important issue with regard to tariff policy is the existence of a national tariff. While the existence of a uniform tariff for all SONABEL customers regardless of their location is widely seen as equitable, it does not reflect the fact that the cost of supply in isolated areas is much higher. This cross-subsidy makes it financially difficult to expand coverage in isolated areas for SONABEL. In certain rural areas which are not covered by SONABEL, there are around 20 operators organized as cooperatives. Those operators apply prices that are significantly above SONABEL tariffs. This situation is a source of concern for the authorities as the people living in those areas complained about the tariff level. However, it should be recognized however that there is a trade-off between, on the one hand, expanding access to electricity, and on the other, subsidizing electricity prices.

3.174 **Moreover, regional interconnections and other alternative energy sources are being explored to meet the raising demand for energy services and to reduce costs.** Under the regional West African Power Pool (WAPP), Burkina stands to benefit from access to additional capacity at lower price from neighboring countries, including connections with Côte d’Ivoire (the transmission link between Ouagadougou and Bobo-Dioulasso which will allow increased imports from Côte d’Ivoire is due for completion in 2010) and with Ghana (construction expected to commence in 2011). Bobo-Dioulasso has been connected to the Côte d’Ivoire grid

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47 A fee of CFAF2/kWh is leveraged on the SONABEL bills to support rural electrification.
since 2001, through a transmission line that has a transfer capability of 120MW. The government's strategy was to extend the transmission line from Bobo-Dioulasso to Ouagadougou to take full advantage of the transfer capability of the underutilized existing transmission line, and to extend the benefits of low-cost energy to the main load center. This would lead to better management of demand and offer and to considerable cost savings that are expected to eliminate gradually the need for budget subsidies to SONABEL which are currently around US$50 million annually. An interconnection with Ghana would further improve the reliability of electricity supply and avoid reliance on a single supplier.

3.175 **Within the WAPP framework, the construction of new transmission lines will improve the availability and reduce the cost of power generation in the sub-region**, by allowing (i) a better utilization of the energy resource potential existing in the sub-region (hydro, natural gas), (ii) economies of scale in generation, and (iii) a reduction in the requirements for costly peak-load generation capacity. The potential benefits of the WAPP are especially large for a country like Burkina Faso whose options for developing domestic power generation are limited and costly. In 2004, the internal rate of return of the Bobo-Ouagadougou transmission line was estimated at 24 percent compared to the domestic thermal generation costs. This rate of return was obviously based on the base case scenario of oil prices of US$25 per barrel. This suggests that the economic rate of return be considerably higher at the current oil prices. At this point, alternatives to conventional generation technologies have not been developed on a large scale in Burkina. However, going forward, with their costs trending downwards, some renewable technologies, in particular solar power technologies, could increasingly become viable alternatives to diesel-based engines, in particular for locations off the main grid. Also, in the long-term, if the cost of concentrated solar power were to decrease significantly, this technology could become economically viable in Burkina. Regional integration through WAPP would make it easier to develop this technology because back-up generation is needed.

3.176 **Meanwhile, sustainable wood fuel energy and other energy sources need to be explored to ensure connectivity of both households and firms.** As wood fuel and charcoal are the main energy sources for around 90 percent of households in Burkina and account for over 80 percent of total national energy consumption (World Bank, 2005), the environmental issues associated with land clearing require measures to ensure sustainability of this energy type, particularly on the outskirts of the main towns (Box 3-9). Low incomes limit inter-fuel substitution and the sharp increase in oil prices has eroded the modest penetration of LPG and kerosene during the last 20 years. The Government is currently exploring the energy potential of alternative sources such as jatropha curcas, sorgho and sugar cane. Several firms and NGOs have taken steps to explore the use of jatropha oil. Nevertheless, biofuel production in Burkina requires extensive feasibility studies as well as a solid framework for environmental and social protection. To better support the existing efforts, the Government envisages in its national energy strategy addressing the more efficient use of wood fuels and alternative energy sources.

3.177 **Solar energy may also be an option for electricity generation, especially in the remote rural areas, but the market for renewable energy needs to evolve to ensure affordability of such energy sources.** A recent World Bank project (2007) recognized the

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48 The purchase price paid by SONABEL is approximately 7 US cents per kWh.
49 Only one third of the standing 130,000km² forest land is accessible (World Bank, 2005).
importance of solar energy as an alternative source of energy for remote communities. It was envisaged to finance preelectrification in 20 additional remote communities with solar photovoltaic (PV) systems. In particular, about 2,000 solar kits and about 100 institutional systems are to be installed. Nevertheless, it is apparent that a large scale solar PV program through “cash market” by private suppliers is not yet feasible. Moreover, solar energy is not a credible substitution energy source in the major cities. By contrast, solar energy could meet the unsatisfied electricity demand in the rural areas. This is mainly because it is necessary to create a minimum platform to promote renewable energy technologies including solar PV in the narrow Burkinabè market. Affordability of systems is a major issue since the supporting credit mechanisms are nonexistent. Past interventions have failed to create an established market and commercial banks are reluctant to support solar PV business plans. A strategic choice was made instead to support efforts to create a minimum platform for renewable energy technologies and to promote solar PV through fee-for-service delivery model, building on the ongoing experience of energy service cooperatives in Burkina.51

Box 3-9: Initiatives Addressing Overexploitation of Wood Fuels in Burkina

The majority of charcoal production in Burkina is done in small kilns with low conversion efficiencies. Such practices result in an estimated conversion efficiency of less than 11 percent (compared to 18 percent in Senegal and other Sahelian countries) and the need for an additional 40 percent of wood cutting to meet market demand for charcoal. Presently, concentrated urban demand for forest-based products is estimated to be responsible for an annual deforestation of 80,000 ha to 100,000 ha. As population and urbanization continue to grow, it is expected that the situation will worsen. The majority of wood extraction takes place unsustainably in open-access areas outside the control of the Forestry Service. In the aggregate, clearing of forest lands is leading to: (i) loss of agricultural productivity; (ii) gradual impoverishment of the rural areas with the concomitant acceleration of rural exodus; (iii) continued and growing loss of forest cover, carbon sink and carbon sequestration capacity; and (iv) loss of biodiversity, due to the rapid encroachment on wildlife parks and reserves.

With support from the World Bank’s RPTES the Government prepared in 1997 a comprehensive biomass energy sector development strategy and investment program. That program was not implemented, as pledged donor support did not materialize. In 1998, with limited funding support from the Activities Implemented Jointly Program (AIJ) and technical assistance from the World Bank, the Government launched a small pilot project (AIJ/RPTES) to demonstrate the viability of the community-based integrated forestry and NRM sustainable management systems proposed within the RPTES sectoral development strategy and investment plan. While that project had some administrative monitoring problems, its field implementation was extremely successful, especially with regard to promoting sustainable forest management, introducing improved carbonization techniques, setting-up a sustainable wood fuels supply systems, and creating incremental local employment and incomes in the participating villages. Thus, Burkina has today proven operational models for the establishment of community-based sustainable forest management schemes and sustainable wood fuels supply systems, but requires funding resources to scale-up their replication.


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51 Project developed with DANIDA financing.
Energy Regulatory and Administrative Framework

3.178 The Burkinabé Government has recognized the need for strengthening the legal and regulatory framework governing the electricity sector. Such a framework would encourage and facilitate active participation of NGOs, cooperatives, and the private sector in delivering energy services to meet demand by households, education centers, health and recreational facilities, and small and medium enterprises. At the end of the 1990s, a series of reforms were initiated in the electricity sector to address structural weaknesses of the electricity utility, SONABEL. SONABEL legal monopoly over production and distribution was therefore eliminated. Furthermore, in 2007 the Government established a framework regulating licensing and concession contracts. The Government also developed plans to open both the electricity and hydrocarbons markets to private competition. Despite early intentions to privatize SONABEL, the Government opted to maintain ownership and seek a private sector management lease. The partial divestiture of the national petroleum company SONABHY is expected in December 2010.

3.179 The Government adopted an energy sector development strategy in 2000. The strategic priorities include: (i) the creation of an institutional, legal and regulatory framework conducive to attracting additional resources to meet the growing absorptive capacity of the economy; (ii) building capacities in the public and private sectors; (iii) meeting the near-term generation deficit on Ouagadougou System; (iv) lowering the cost and improving reliability of the supply by extending the Ferkessédougou (Côte d’Ivoire) – Bobo Dioulasso transmission line to Ouagadougou; (v) increasing access to electricity services in urban, peri-urban and rural areas; and (vi) ensuring a sustainable supply of wood fuel based energy while promoting substitution and efficient use of wood resources (World Bank, 2005).

3.180 However, the regulatory electricity agency is not yet operational. The Law No. 027-2007/an, which amends the 1998 electricity law provides for the establishment of a regulatory authority - Autorité de Regulazion du Secteur de 1’Electricité (ARSE). Its main responsibilities are to ensure implementation of the relevant laws and regulations, protect consumers’ interests, promote the development of the electricity sector, provide advice on tariff setting, and investigate and sanction any disputes in the electricity sector. Nevertheless, the regulatory authority is not yet operational.

3.181 To improve living conditions in the rural areas, increase productivity and strengthen the capacities of local communities, Burkina is also implementing a progressive rural electrification program. This program ensures a level-playing field for all electricity service providers and simplifies the regulatory mechanisms for small private operators. However, the Fonds du Developpement de l’Electrification (FDE) currently lacks adequate institutional capacity and human resources to fulfill its mission. Given the current low rate of electrification, the authorities should consider carefully the impact of any policy consisting in subsidizing operating costs of suppliers in rural areas in order to reduce the prices for end-users. Such policy options would limit the available funds for financing investments in the electrification of new localities (World Bank, 2007e). With respect to traditional energies, the Government has committed to continue supporting existing programs, including sustainable decentralized and community-based management of the forest resources, the organization and liberalization of the market for biomass products and a balanced distribution of the value-added

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52 Without prejudice to the powers granted to courts and tribunals.
created by these activities. It will also continue supporting the improved cook-stoves and charcoal stoves programs and promote the substitution to LPG and kerosene. In the long-term, regional integration would contribute to accelerating electrification and the sustainable development of the electricity sector. The long term success of rural electrification could also benefit from a methodical and rigorous approach to investment planning.

c) Telecommunication Infrastructure

3.182 Significant improvements in the telecommunications sector have been achieved. Burkina Faso has embarked on far reaching initiatives to deregulate and liberalize its telecommunications sector. These efforts led to increased investments. Currently, the telecommunications sector contributes close to 4 percent of GDP (2.3 percent in 2001) and generates over 35,000 jobs. Telecommunications penetration rates have increased from 5.5 percent in 2005 to 14.5 percent in 2007. Over 85 percent of the country is currently covered by a mobile signal.

3.183 Most of the sector growth is attributed to the expansion of mobile telecommunication. As is the case in most African countries, mobile telecommunication has surpassed growth of the fixed telephone sector. The mobile cellular subscriptions per 100 people increased from 0.2 in 2000 to 10.9 in 2007, but are still below those in Mali (20.5), Benin (21.1) or Senegal (29.3) (WDI, 2009). The ITU reports that there were 1.6 million mobile subscribers at the end of 2007. The 3 mobile companies contributing to this success include Zain with about 53 percent of the market share, Moov with about 15 percent, and Telmob (the mobile network of ONATEL), with about 32 percent.

3.184 By contrast, the fixed-line telephone network remains limited. As in many African countries, Burkina Faso has a very limited fixed-line infrastructure which is owned by ONATEL. ONATEL continues to be the only provider of fixed telephone services even though its monopoly officially ended in December 2005. According to ITU estimates, the number of fixed lines in service in Burkina was 94,800 at the end of 2007. This indicates a low level fixed-line penetration rate - 0.7 telephone lines per 100 people in 2007 (0.4 in 2000) compared to 1.2 in Benin and 2.2 in Senegal (WDI, 2009). Most of the fixed lines are concentrated in urban areas, with less than 10 percent coverage in rural areas. Despite the growth in access to mobile communications networks, many people in Burkina still remain without access either because networks do not cover the areas in which they live or because the cost of communications services is too high for them. The average cost per minute (CFAF29.5) is still slightly higher than in Benin (CFAF23), Senegal (CFAF21) or Mali (CFAF15) (Table 1-9).

3.185 Access to ICT services is uneven and inadequate. The developments in the telecommunication sector mask inadequate and uneven access to basic and advanced ICT services. The incomplete reforms coupled with the lack of a robust national fiber optic network and access to competitively priced international bandwidth impedes the development of high-speed Internet services (broadband services). These also constrain the use of innovative applications to facilitate improved public service and growth of local private industries. Burkina's Internet subscribers (per 100 people) were a mere 0.1 in 2007, below the Sub-Saharan average (1.2) (WDI, 2009). According to the ITU, there were 9,200 internet subscribers and 1,700 broadband subscribers in the country at the end of 2007. The hourly connection to Internet
(CFAF1,180) is higher than in Mali (CFAF500) or Ghana (CFAF500) but still lower than in Benin (CFAF1,320) and Senegal (CFAF1,770) (Table 3-9) As in most African countries, the high cost of Internet services reflects a mix of cost and profit factors. This is mainly the result of over-dependence on satellite technologies and absence of competitive access to the submarine SAT3 cable via Côte d’Ivoire and Senegal. Burkinabe has embarked on an effort to connect its national network by optical fiber to Côte d’Ivoire, Mali and Togo networks. It is also expected to benefit from a regional initiative to improve regional broadband access and interconnection.

Table 3-9: Telecommunication Costs

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<th>Burkina Faso</th>
<th>Benin</th>
<th>Mali</th>
<th>Niger</th>
<th>Senegal</th>
<th>Ghana</th>
<th>Nigeria</th>
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<tr>
<td>Average cost per minute (conventional) (CFAF)</td>
<td>29.5</td>
<td>23</td>
<td>15</td>
<td>25</td>
<td>21</td>
<td>n.a.</td>
<td>16</td>
</tr>
<tr>
<td>Hourly cost of connection to Internet (CFAF)</td>
<td>1,180</td>
<td>1,320</td>
<td>500</td>
<td>3,000</td>
<td>1,770</td>
<td>500</td>
<td>n.a.</td>
</tr>
<tr>
<td>Average cost of international call to France (CFAF)</td>
<td>236</td>
<td>564</td>
<td>450</td>
<td>945</td>
<td>140</td>
<td>n.a.</td>
<td>n.a.</td>
</tr>
</tbody>
</table>


Figure 3-15: ICT Access

3.186 In addition, Burkina suffers from a chronic shortage of ICT skills that risks worsening in the absence of adequate investment in education and training. Issues related to skills development, more conducive legal and regulatory environment for ICT business, lack of strong business incubation capability, and access to finance are also preventing the ICT/ICT-enabled film and tourism industries from realizing their full potential.

53 The SAT-3 cable introduced in 2002 offered a very good alternative to satellite communications and promised to change the communications landscape in the region. The results have been rather limited. Because the SAT-3 was built and is managed by a closed group of incumbent operators, new entrants and ISPs have faced difficulties in using SAT-3 because of lack of access and/or high prices. This in turn has limited the potential development impact of SAT-3. Even when access to a submarine cable is obtained, countries with a monopoly on this international gateway still have tariffs that are substantially higher than those without.
3.187 However, there is evidence that higher rates of ICT penetration are associated with greater levels of exports. Moreover, a 10 percent increase in telephone penetration rate over the long-run is likely to register 0.6 percent higher annual growth in GDP. In Africa, the impact of ICT on trade, productivity, growth, incomes and efficiency are becoming increasingly evident. In recognition of the enormous potential of ICT, many African countries have taken preliminary steps to reform respective ICT markets by introducing competition and improving the legal and regulatory environment. Reforms implemented over the last decade in Africa have unleashed competitive forces in the telecommunications and ICT sectors, fostered private sector participation in the fixed and mobile phone markets, and continue to nurture new innovative industries. The result has been an unprecedented increase in investment in the telecom and ICT sectors – some US$19.5 billion between 2000 and 2007, mostly in the mobile sector.

3.188 Connectivity gaps at international, regional and national levels constrain the efforts of countries in the ECOWAS region to achieve the goal of an integrated ICT market. These also constrain them from reaping the full benefits of regional economic growth and development of member states. Connectivity gaps also prevent the region from capitalizing on innovative applications to improve service delivery in both the public and private sectors. For example, most ECOWAS countries ranked very low in e-government application, according to the UNPAN Web Measure Index. More specifically, Burkina Faso ranked 176 out of 183 countries surveyed.

ICT Regulatory and Administrative Framework

3.189 Burkina has laid the foundations of a regulatory and institutional framework in the telecommunication sector. These efforts began in earnest in 1998 with the issuance of the Telecommunications Sector Reform Act. It defined the legal and institutional framework and established the regulatory body Autorité Nationale de Regulation des Telecommunications (ARTEL).

3.190 The privatization of the national telecom provider is a step towards creating a modern telecommunications market. The recent successful launch of 20 percent of ONATEL shares in Burkina’s first IPO has further entrenched the ICT sector importance in boosting both national and regional capital markets. Despite the financial crisis, about 85 percent of the shares were purchased by individual and institutional Burkinabé investors (74 percent and 11 percent, respectively) while 15 percent was purchased by other investors within the WAEMU region. The IPO for 20 percent shares of ONATEL was the second phase of the Government’s strategic privatization program. The privatization process began in 2006 with a sale of a 51 percent stake to Maroc Telecom. The final phase of this process is expected to include a 6 percent stake that is to be offered to ONATEL employees.

3.191 The ICT regulatory framework is still under development, notwithstanding some progress regarding the legal framework. In particular, a law pertaining to digital signature and a decree describing the process for the certification of digital signature were submitted to the Parliament. These texts will facilitate the development of e-commerce and the launch of e-Government. By establishing clear rules on authenticity and responsibility of digital signatures,

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these texts are expected to facilitate the integration of local markets at the national, regional and
global levels. Consumers should benefit from a wider array of merchandises supplied, and costs
should fall as a result of enhanced competition and reduced intermediaries. These acts will also
facilitate Government’s archiving tasks and digitalization of administrative processes,
simplifying people’s access to the administration, limiting commuting requirements, improving
transparency, traceability and efficiency. Increased access to information will eventually allow
civil society to play a more active role in public policy.

d) Irrigation Infrastructure

3.192 Only a small portion of agricultural land in Burkina Faso benefits of irrigation systems. Currently, the surface water is the main source of irrigation in Burkina Faso, with a potential volume of around 8.79 billion cubic meters. Only 32,258 ha of land are irrigated (out of which only 20,000 ha are cultivated), which represent around 19.5 percent of the potential irrigable land (around 165,000 ha). The current irrigated area is divided into about 8,500 ha of large scale irrigation, 4,500 ha of small scale irrigation and 6,000 ha of equipped lowland (Burkina Faso’s Strategy on Sustainable Development of Irrigated Agriculture, 2004). In the past ten years, Burkina has made efforts to ensure irrigation from surface waters to secure food production and combat poverty. Groundwater use for irrigation is limited by low yields of water abstraction. The main crops that require irrigation are maize, rice\(^{56}\) and horticulture. During 1993-2006, rice was cultivated on more than half of the irrigated land, while the areas for horticulture represented around 40 percent during 1993-2001. Since 2004, maize has been cultivated on 1/10 of the irrigated land, leading to a decrease of the land for horticulture, which attained on average 25 percent of the irrigated land (Ministry of Agriculture, Hydraulics and Fisheries, 2009).

3.193 Sustainable agriculture requires irrigated land. Growth in agriculture reached around 5 percent annually during 2001-2008, exceeding the country’s high population growth of 2.8 percent. Nevertheless, agriculture growth was driven by area expansion rather than productivity gains. Moreover, the sector is mostly characterized by subsistence farming which cannot be sustained in the long-term due to fast-approaching spatial saturation and land degradation. Crop productivity has been stagnant for the last two decades mainly due to the low level use of productivity-enhancing technologies, such as reliable water supply, fertilizers and improved seeds. In addition, as most agriculture products are rain fed and tradable crops, the sector is highly vulnerable to weather risks, to climate change and to the fluctuations in the international commodity (cotton, maize and rice) and fertilizer prices.

3.194 The relatively high costs of developing irrigation may have a negative impact on expanding the irrigated areas. For example, the costs per hectare to irrigate have been estimated at around CFAF7-10 million for medium and large schemes after the 1994 devaluation. Moreover, the average cost for irrigation development per hectare in the lowlands has been estimated between CFAF1.5 million – CFAF4 million. These relatively high costs are primarily due to: (i) the norms and standards for developing irrigation systems, which are not related to the technical level of users nor to the economic viability of the systems; (ii) the lack of economies of scale as a result of small-scale and scattered investment; and (iii) the low

\(^{56}\) Government considers rice as a strategic staple food.
involvement of the beneficiaries in the irrigation development. Moreover, operation and maintenance arrangements tend to be informal, except in areas with large scale irrigation where cost recovery seems to be the main issue. In the past years, the Government has developed new tools to organize operation and maintenance activities by farmers (the Irrigation Committee), but this has translated in little progress on the ground.

3.195 From an economic point of view, the medium to larger areas yield positive returns at relatively high levels of crop intensification. For example, rice crops in the rainy season should be followed by high-value added crops in the dry season. Small areas also yield positive returns for the Government, if crops are diversified and have a high value added (horticulture, cassava, and livestock). By contrast, the returns are negative for the maize or cowpea crops in the dry season.

3.196 Having in view the increasing demand for agriculture products and the exposure of the sector to weather risks, stepping up investment in irrigated agriculture is essential. This effort should complement the promotion of low-external-input or conservation agriculture technologies which improve water retention capacity of soils through improved tillage, cover crop and crop rotation practices. Therefore, it is important for Burkina to tap into the existing unutilized potential for water development. Several actions would envisage: (i) ensuring that farmers are empowered to take full advantage of irrigated production and related market opportunities through water use associations and access to professional service providers; (ii) adopting a watershed management approach, where appropriate, with the aim to secure and manage the water allocation; and (iii) taking a proactive approach towards lowering the costs of investment and system operations and maintenance in order to ensure the long-term sustainability of irrigation infrastructure.

3.197 Nonetheless, the share of irrigation-related expenditure in the total public budget for agriculture is low. The irrigation expenditure typically represents an important share of public expenditure in many countries that are located in semi-arid areas. The numerous market failures in the water management justify public intervention in this sector. Therefore, subsidy policies can be used to support the investment while cost recovery should be sought for recurrent operation and maintenance (O&M) charges. Cost recovery is usually hampered by many constraints, such as the low level of economic operators’ professionalism, the long time span for investment amortization, the lack of adapted financial instruments and, sometime, the resistance of rural communities. In Burkina, irrigation expenditure is the fourth priority in the public expenditure for agriculture. Moreover, the dominance of external financing of investments considerably reduces the government flexibility and sometimes generates a gap between needs and allocated expenditure. In 2007, the public budget covered only 11 percent of the financing of agriculture expenditure, compared to 25 percent in Mali, 51 percent in Senegal and 59 percent in Benin. Nevertheless, there are increasing returns to irrigation expenditure provided that various agriculture operators get involved in the decentralization process and, hence, take advantage of the sector opening to private sector participation.

3.198 Ensuring adequate financing is not only a public matter. The decentralization of the agriculture sector is a challenge that would require matching the public interventions with the local value chain development needs. The current approach to developing growth poles and specific agriculture value chains is a step forward. For example, there are plans to develop new

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57 World Bank, 2009, Burkina Faso- Sustainable Irrigated Agriculture Development Project – Concept Note.
irrigated land for small to medium scale entrepreneurial farmers growing horticulture and cereal crops in Bagré scheme, and similar opportunities were identified in Bam lake, Kanazoe dam, and Kou river basin. The beneficiaries would be selected through a competitive process among groups of irrigating farmers. They would enter into medium to long term land lease agreements and contribute to the cost of investment in addition to the full operation and maintenance charges.\(^{55}\)

3.199 **Moreover, understanding producers’ needs would help better target investment and support services to irrigation.** This would also help move from the existing supply-driven irrigation development to a more market-oriented one. The latter would imply analyzing the farming systems and their irrigation needs (equipment use, water management) to support the overall development of irrigated agriculture.

### Irrigation Regulatory and Administrative Framework

3.200 **Irrigated agriculture is one of the main strategic pillars of the Government rural development agenda.** In 2003, the Government issued a new Rural Development Strategy for advancing the rural development agenda. One of the key pillars was to increase, diversify and intensify crop production. Hence, in 2004, the Government adopted a new strategy for the sustainable development of irrigated agriculture. This document provides an in-depth analysis of the main constraints as well as guidance for the development of the sector. The most important aspects of the strategy are: (i) a detailed implementation strategy stratified by region, scale and purpose for the rehabilitation, improvement, modernization and where justified, extension of irrigated schemes whether large, medium, small-scale or low-land; (ii) an adequate agricultural development program of the developed lands; (iii) the necessary accompanying institutional and regulatory reform measures for the smooth implementation, viable use and sustainable management of the program’s investments; (iv) a detailed costing plan amounting to an overall estimated investment of CFAF 397,300 million (approximately US$899 million) to be implemented in four planning phases, covering the period 2004-2015; and (v) a set of implementation performance, output and outcome indicators.

3.201 **Despite a coherent approach, policy implementation has not always been consistent.** This is mainly because the irrigation policy is implemented in a non-coordinated way through several donor-funded investments. At the same time, Burkina lacks adequate capacity, including a strong institutional framework. MAHRH,\(^{59}\) which is in charge of the irrigation policy, has had difficulties in ensuring coordination and consistency among various programs. The sector Ministry does not have up-to-date data about the actual expenditures undertaken under each of the investment components in support of the sub-sector strategy. The Government decided to undertake a mid-term review in order to evaluate the strategy implementation, areas for improvements and the necessary revisions. The results of this mid-term review are not yet available.

3.202 **Nonetheless, some projects for irrigation development with private sector participation have yielded encouraging results.** This is the case of the Burkina Faso Pilot Private Irrigation Development (PPID) financed by the World Bank. The project idea was that

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\(^{55}\) World Bank, 2009, Burkina Faso- Sustainable Irrigated Agriculture Development Project – Concept Note.

\(^{59}\) Ministère de l’Agriculture, de l’Hydraulique et des Ressources Halieutiques.
services would be provided under various cost recovery arrangements to be tested, either directly to its members by APIPAC, a newly established smallholders’ association, or indirectly through contract agreements with third parties. This was a first attempt to transfer responsibilities of service delivery to the private sector in the context of multiple state agencies and public services that have monopolized agriculture development planning and execution for years. APIPAC was deemed successful in delivering demand-driven support services to private small-scale irrigation, through cost-effective processes, but has stopped its operations. Nevertheless, MAHRH has not always ensured adequate coordination of other projects implemented directly by the Government, which disseminated treadle pumps free of charge. Apart from the fact that those pumps were of poor quality, the lack of coordination affected APIPAC’s efforts to build private dissemination networks and to implement a strict quality control process (World Bank, 2005). APIPAC has eventually stopped its operations.

Conclusions and Policy Recommendations

3.203 Burkina’s landlocked position and the recent crisis in Côte d’Ivoire stress the importance of improving the country’s infrastructure. The country’s trade highly depends on the proper functioning of four north-south interstate corridors. Moreover, its limited energy producing capacity, scarcity of surface water and rainfall, dependence on oil imports and low internet penetration pinpoints the importance of finding solutions for interconnections with regional electricity grids and submarine broadband cable. Lack of adequate infrastructure hampers private sector activity and firm productivity. Firms perceive electricity and transport costs as the most limiting factors to their operations, followed by telecommunications and water costs. Agriculture and other emerging sectors increase demand for transport, electricity and ICT services. Although some of the companies such as those operating in the mining sector are willing to invest in road and energy infrastructure to facilitate their activities, such solutions cannot replace more comprehensive national efforts.

3.204 Infrastructure development reflects and underpins the spatial distribution of the economic activities. The population growth in Burkina calls for better infrastructure and urban planning. For example, consolidating the main transport infrastructure on the North-South and the Centre-West corridors would improve connection between the main urban areas and production areas. Similarly, better regional integration would help improve access to cheaper electricity and ICT services.

3.205 When building new infrastructure, access to service, quality, affordability and financial sustainability of services are key criteria. Moreover, the degree of competition as well as the institutional framework governing each infrastructure sub-sector should guide the choice between the public or private operators that would deliver the infrastructure services. In Burkina, some sub-sectors, such as railway transportation, telecom, small-scale irrigation, have benefited from private sector participation. Nevertheless, Burkina does not have an adequate public-private partnership framework (legal framework and a PPP unit) to enable more systematic private sector participation in the infrastructure development.

3.206 The supply of transport infrastructure and services cannot keep up with the growing demand. Overall, the quality of the road network remains poor despite recent improvements of the primary classified road network. Despite an increase in the road transport
financing, the low absorptive capacity hampers road construction and rehabilitation. Road transport prices are high notwithstanding comparatively low costs, due to lack of competition and high profit margins maintained by transport service providers in the trucking industry. Transport service quality is poor. In addition, the regulated trucking industry fosters corruption, cartel-like practices and overloading, which further exacerbate degradation of the road stock. Moreover, the limited public transportation network is one of the bottlenecks to the effective development of the urban areas. Although the railway system represents the most cost-effective transport means, the network coverage is limited and needs maintenance, especially in the aftermath of the Ivorian crisis. The regulatory framework has improved, but lack of competition in the trucking industry has not been addressed. To rehabilitate railway transportation, the 1995 concession agreement between Burkina Faso and Côte d’Ivoire requires some amendments, mainly because it was unable to service the track rehabilitation debt and to facilitate concession fee payments during 2003 – 2006. Moreover, the implementation of specific regulations remains lacking and management capacity is weak.

3.207 **Burkina’s energy potential is limited and electricity costs are high compared to other African countries.** In the absence of domestic hydroelectric resources, and due to its landlocked location, the country is not in a position to meet the increasing demand for electricity (an average of 7 percent per year in the two main cities) at an affordable cost. Electricity costs are higher than in Benin, Mali or Senegal. However, under the West African Power Pool, the country is expected to benefit from access to additional capacity at a lower price from its neighboring countries. Regional integration through the development of interconnections with neighboring countries seems to be the only viable strategy to increase access to electricity in rural and suburban areas. In addition, alternative energy sources need to be further explored to improve access to electricity for both households and firms. Despite improvements in the regulatory framework, the regulatory electricity agency is not yet operational.

3.208 **In the telecommunication sector, access to ICT services is most problematic.** While important progress has been achieved in liberalizing the telecommunications sector and increasing access to mobile telecommunication, internet penetration rates are low and prices continue to be high. The high cost of internet services reflects the over-dependence on satellite technologies and absence of competitive access to the submarine SAT-3 cable. In addition, the shortage of ICT skills may worsen if adequate investment in education and training is further delayed.

3.209 **Irrigation systems for agriculture are not widely-available.** This is partly due to the relatively high costs of developing irrigation for agriculture. Despite that the share of irrigation-related expenditure in the total public budget for agriculture is small, solutions to reduce irrigation costs may be crafted in collaboration with private sector participation. Furthermore, upgrading MAHRH capacity for better policy implementation and coordination would be essential for the development of the main agriculture value chains and growth poles.

3.210 **To address the main deficiencies related to infrastructure, the following actions are recommended:**

- Improve spatial planning of infrastructure investments by connecting productions zones to consumption centers.
- Adopt a coherent legal framework and set up a PPP unit to enable public-private partnerships for infrastructure investment.
Transport Infrastructure

- Ensure systematic implementation of domestic and international transport regulations: for instance, enforce existing legislation on axle load restriction by more systematically weighing and sanctioning when necessary to protect roads from early degradations.
- Deregulate the trucking industry and address potential cartel practices.
- Improve financial sustainability of the road fund for maintenance and rehabilitation.
- Use ASYCUDA++ for online customs declarations to facilitate transit and reduce delays.
- Upgrade commercial vehicle fleets through PPPs and train transport professionals to improve the quality of road transport services.
- Rehabilitate railway transportation by revising the existing concession agreement between the government (financier of the railway tracks) and the concessionaire (to invest in the rolling stock).

Energy Infrastructure

- Strengthen capacity of the Fonds du Développement de l’Electrification (FDE) to expand electricity access in the rural and peri-urban areas.
- The electricity regulator (Autorité de Régulation du Secteur de l’Electricité or ARSE) should be fully operational (staffing, budget) to meet its purpose.
- Design a tariff indexing mechanisms for SONABEL that is financially sustainable once fuel subsidies have been phased out.
- For other electricity operators in areas not covered by SONABEL, output-based subsidies should be provided to reduce tariffs gap in rural areas.

Telecommunication Infrastructure

- Improve access to the submarine SAT-3 cable to facilitate access to ICT services at reasonable prices.

Irrigation and Water Infrastructure

- Support the development of agriculture value chains through irrigation investments:
Focus first on a few selective growth poles to facilitate market access and maximize productive externalities and cross-sectoral linkages. Improve the coordination among irrigation projects and instruments at the national and local levels.

Extend private sector participation in the development of irrigation systems through demand-driven initiatives, adequate financial instruments (land lease agreements) and support for technological development (asset management, system design).

Focus on maintenance cost recovery and private delivery/operation services to improve long-term sustainability of irrigation infrastructure.
Improving Financial Intermediation

3.211 Sustained and diversified growth cannot be achieved without the support of a developed and effective financial system. Small and medium size enterprises which are often the most dynamic and competitive play a pivotal role in economic growth and employment. But without adequate financial means, small enterprises are unable to finance the productive investments needed in order to develop and reach the optimum average size enabling them to be more productive and competitive. Households and small and medium-size enterprises still find it difficult and costly to obtain bank credit and financial services. As a result, a large part of their investments and working capital is still self financed. In addition, since there is little competition and the financial market is under developed, there are few available products accessible to the mass of potential savers. The interest rate for deposits is still low, while the lending rate remains abnormally high. The risk is high that productive sector ends up being fragmented with informal and sub-optimal structures stagnating at the bottom because of self-financing and at the top modern structures which are larger but not necessarily more competitive and do not generate more jobs, especially in a context of international crisis. The financial system plays a key role in the defragmentation and revitalization of the economy. The low level of bank intermediation and the lack of financial depth, combined with the high cost of bank services, hamper the country’s efforts to become more competitive and hence its economic growth.

3.212 Deepening financial intermediation is key to accelerating growth in Burkina Faso. The development of a sound and competitive financial sector is an essential condition for both private sector development and export-oriented productive activities. Using the Levine estimates on a cross-section of the data, to increase the rate of per capita GDP growth from 2.7 percent (average for 2000–2007) to the 4.0 percent targeted in the PRSP would mean increasing financial intermediation, measured by the ratio of credit to the private sector-to-GDP, from the current 16 percent to 28 percent.

3.213 The Government has strengthened its financial industry. In 2009, the Government adopted a strategy for the financial sector development and an action plan based on the recently completed Financial Sector Review (FSR) and the joint Bank-Fund Financial Sector Assessment Program (FSAP, 2008). The strategy involves strengthening monetary policy, consistent with the fixed exchange rate of the WAEMU, and increasing the efficiency of the banking system by improving financial intermediation and access to finance to support the private sector led growth agenda, particularly in areas such as SME finance, rural finance, housing finance, and long term finance. In addition, the Government continues to promote the sound development of the microfinance industry, in particular by reinforcing the supervisory capacity and strengthening microfinance institutions, diversifying the financial sector, fostering access to credit on a decentralized level through micro credit, and modernizing financial markets. The strategy takes into account weaknesses identified in the financial sector and builds on the national microfinance development strategy adopted by the Government in 2005.

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A Shallow Financial Sector Dominated by Banks

3.214 An overspread sector. Financial intermediation (broad money as a percentage of GDP) is slightly below the WAEMU average (Table 3-10), which is itself below the average for sub-Saharan Africa. The financial system is not very concentrated: seven of the eleven banks have market shares representing about 10 percent of the Burkinabé market. Four banks were licensed in 2005; with only a limited increase in terms of competition, as their contribution to the overall assets of the sector is marginal. A bank (Banque de l’Habitat du Burkina Faso - BHBF) and a guarantee institution (Société Financière des Garanties Interbancaires – SOFIGIB) entered the market. Banks mobilize nearly 85 percent of all financial assets in the country, and the relative weight of the other institutions (insurance, financial, and microfinance) is small (Table 3-11), with a relatively large share of the financial assets held by the Social Security Funds (CNSS and CARFO) or in the postal network (SONAPOST). Microfinance mobilizes a large share of all assets and manages as many accounts as the banks. It is shared between the Réseau des Caisses Populaires du Burkina (RCPB) (56 percent of microcredit) and a large number of small MFIs.

Table 3-10: Structure of the Banking Sector

<table>
<thead>
<tr>
<th>End-2006</th>
<th>Burkina</th>
<th>WAEMU</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of banking groups</td>
<td>4</td>
<td>9</td>
</tr>
<tr>
<td>Number of banks</td>
<td>11</td>
<td>95</td>
</tr>
<tr>
<td>Number of counters</td>
<td>90</td>
<td>796</td>
</tr>
<tr>
<td>Number of accounts (thousands)</td>
<td>864</td>
<td>3,324</td>
</tr>
<tr>
<td>Managed assets (in percent of GDP)</td>
<td>25.5</td>
<td>29.0</td>
</tr>
<tr>
<td>WAEMU market share (in percent)</td>
<td>10.9</td>
<td>100.0</td>
</tr>
<tr>
<td>Public sector share in capital (in percent)</td>
<td>22.8</td>
<td>16.4</td>
</tr>
<tr>
<td>Foreign share in capital (in percent)</td>
<td>54.4</td>
<td>9.6</td>
</tr>
</tbody>
</table>

Sources: The Central Bank of West African States; and the West African Economic and Monetary Union Banking Commission.

Table 3-11: Structure of the Financial Sector (2007)

<table>
<thead>
<tr>
<th>Number of Institutions/Branches</th>
<th>Assets</th>
<th>Deposits</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>In CFAF</td>
<td>In CAF</td>
</tr>
<tr>
<td>Commercial banks</td>
<td>11 / 90</td>
<td>599.3</td>
</tr>
<tr>
<td>Financial institutions</td>
<td>5 / 15</td>
<td>25.9</td>
</tr>
<tr>
<td>Insurance companies</td>
<td>10 / 29</td>
<td>6.6</td>
</tr>
<tr>
<td>Microfinance</td>
<td>323 / 450</td>
<td>100.4</td>
</tr>
<tr>
<td>Postal network</td>
<td>1 / 75</td>
<td>73.6</td>
</tr>
<tr>
<td>Pension Fund</td>
<td>2</td>
<td>80.7</td>
</tr>
<tr>
<td>Total</td>
<td>350 / 659</td>
<td>886.5</td>
</tr>
</tbody>
</table>

Sources: World Bank, Financial Sector Study; and FSAP (2008).
Inadequate Institutional and Regulatory Framework

3.215 Government intervention, particularly through direct state participation in the financial sector has distorted financial markets. The Government’s progressive divestment from the banking system is noteworthy. Progress has been achieved through the restructuring of two banks: The Commercial Bank of Burkina Faso (BCB) and BHBF. In the case of BCB, the board decided to increase its capital to CFAF 18 billion (CFAF 6.5 billion were subscribed) to observe regional regulation and standards. In the second case, the IFC launched discussions regarding its participation in the BHBF capital. The Government has established 12 funds and has allocated CFAF 22 billion either directly from its budget or indirectly through resources provided by donors such as Tapei (China) to lend to specific and targeted population including rural SMEs. These funds have to be periodically re-capitalized with operating and investment subsidies, often because of a lack of professionalism in their management and/or deficiencies in the mechanisms used for to extend and monitor each loan. Recovery rates tend to be very low and unsustainable despite subsidized interest rates. Also, recent government intervention with a view to promoting housing credit (tax breaks to selected institutions) has created market distortions.

3.216 Access to financial services is limited. At present, the financial sector, dominated by commercial banks, is not open to all kinds of economic activities. With regard to financing costs, since the 1990s, Burkina Faso, like all BCEAO member countries, has established usury limits at 18 percent per annum for banks and at 27 percent for microfinance institutions and other credit companies (leasing, hire-purchase, etc). Despite good intentions, the cap on interest rates limits may hurt rather than protect the most vulnerable as they arguably limit their access to financial services. Such ceilings make it difficult for formal and semi-formal micro-lenders, in particular, to recover their costs, thus driving them out of the market. Recent studies in three WAEMU countries have shown that interest rates charged by microfinance institutions (MFIs) are in many cases insufficient to cover costs (including cost of default on the part of borrowers). The poorest clients such as small farmers are therefore often either left with no access to financial services or must revert to informal credit markets such as local moneylenders, which are prohibitively expensive, with interest rates typically running at over 70 percent.

3.217 Moreover, an insufficiently developed regulatory framework represents a major constraint to the diversification of the financial system. Going beyond the banking law, the absence of a specific legal and regulatory framework for financial leasing activities, venture capital and equity investment companies, and the lack of prudential frameworks being established for them61 are obstacles. For example, the development of equity investment companies requires that specific concessions be made to promote participation in commercial enterprises.

3.218 Some aspects of the regional prudential rules are perceived as constraints. Thus, the exclusion of microfinance institutions to provide leasing product limits the development of medium- and long-term loans by MFI. Similarly, provisioning policies defined by BCEAO Instruction 94-05 can hinder the use of guarantees other than real collateral in the granting of credits by banks to SMEs and the rural sector.

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61 For example, obstacles to the development of financial leasing institutions include the lack of provisioning rules specific to them.
3.219 **Weak capacity of the government agency in charge of supervising MFI’s.** The ability of this unit to carry out its mandate is still limited by a growing number of institutions, limited resources and skills. It is important to strengthen this agency to avoid that other MFIs continue to grow without developing the requisite procedural systems and management skills.

3.220 **Legal constraints and weak judiciary.** The legal and regulatory environment of financial sector operations is inadequate and the judicial system is seen to be a deterrent to financial intermediation and access to credit in Burkina Faso. Financial institutions operate according to the banking law that can sometimes hamper loan recovery or the creation and realization of security. To some extent, it fails to guarantee property rights as an instrument that can be used for collateral and does not support property rights enforcement. One structural factor being the unavailability of land titles required by financial institutions for collateral backed loans. Enforcement of legislation is also constrained by slow execution of due process manifested by slow court proceedings and lenders’ inadequate access to timely foreclosure procedures. The execution of court orders, even after considerable delays, is rarely undertaken in a timely manner. This is largely attributable to lack of knowledge of financial sector issues and operations on the part of stakeholders such as judges, legal practitioners and the business community.

**Unsustainable Financial Intermediation**

3.221 **Low efficiency in the banking sector translated into high level of non performing loans, and wide interest rate spreads.** Although interest rates are market determined, spreads between lending and savings rates are high, amounting to 8.4 percent in December 2007. Commercial banks have large non performing loans, representing nearly 20 percent of their total loans portfolio (2007) from a low 16 percent in 2006. The high level of non performing assets is translated into low deposit and saving rates and high lending rates to cover important overhead expenses representing, as of December 2007, 69.8 percent of the banks’ net interest revenue.

3.222 **Underdevelopment of non-bank financial institutions (NBFI) and lack of long term finance.** Contractual savings institutions, especially pension schemes, are typically the main source of long-term funds in Africa today. In addition to its banks, Burkina Faso has a very small contractual saving sector (six life insurance companies and two pension schemes). The insurance sector and the pension schemes represented respectively 0.7 percent and 9.1 percent of the total financial sector assets as of December 2007. Underdevelopment of NBFI’s is an obstacle to developing a meaningful long term saving mobilization. The insurance industry and the pension schemes, to the extent that they would invest in Burkina, are potentially a significant source of long term funds (for project finance, infrastructure finance, etc.) insofar as they are reformed and tape into the existing potential for saving mobilization. At this point, sustainability is at risk for the pension system and one can forecast mounting deficit and, eventually, even bankruptcy. The insurance industry has a very limited portfolio of products and the market potential remains untapped. In addition, companies lack technical skills to expand business to the agriculture sector and trade.

3.223 **Weaknesses in the microfinance sector.** The micro-finance sector has experienced good growth but there are signs of weaknesses. It is highly concentrated with one network

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62 Commission Bancaire /UEMOA report (December 2007).
representing over 60 percent of the sector. Small networks are characterized by weak institutional capacity, as reflected in inadequate accounting and monitoring tools, the lack of viable management and information system, and the absence of strategic planning. In addition, due to poor operational and business processes, the sector is accumulating non performing loans.

Limited Access for SME’s and in Rural Areas

3.224 The supply of financial services is limited and geographically concentrated. Only 6 percent of the population has a bank account (above the average of 4 percent for the WAEMU countries), and an additional 10 percent have access to an account in a microfinance institution or with the postal financial services managed by SONAPOST. Although the number of bank branches per capita is close to the WAEMU average (Table 3-12), most of them are located in the urban areas. The rural and agricultural sectors (about 80 percent of the population) often have access only to microfinance institutions, which manage as many accounts as the banks although they have fewer assets.

<table>
<thead>
<tr>
<th>Loan Accounts/1,000 Inhabitants</th>
<th>Average Loan/GDP Per Capita</th>
<th>Average Deposit/GDP Per Capita</th>
<th>Share of the 50 Largest Borrowers (In Percent)</th>
<th>Agencies Per 1,000 km2</th>
<th>Agencies Per 100,000 ha</th>
</tr>
</thead>
<tbody>
<tr>
<td>Benin</td>
<td>36.26</td>
<td>5.30</td>
<td>6.81</td>
<td>37.9</td>
<td>0.67</td>
</tr>
<tr>
<td>Burkini Faso 1/</td>
<td>61.71</td>
<td>2.90</td>
<td>3.09</td>
<td>58.5</td>
<td>0.51</td>
</tr>
<tr>
<td>Côte d’Ivoire</td>
<td>37.24</td>
<td>4.40</td>
<td>4.87</td>
<td>52.1</td>
<td>0.55</td>
</tr>
<tr>
<td>Guinea Bissau</td>
<td>15.38</td>
<td>3.80</td>
<td>7.57</td>
<td>70.4</td>
<td>0.08</td>
</tr>
<tr>
<td>Mali</td>
<td>47.76</td>
<td>4.20</td>
<td>5.13</td>
<td>60.2</td>
<td>0.15</td>
</tr>
<tr>
<td>Niger</td>
<td>8.43</td>
<td>10.70</td>
<td>12.53</td>
<td>51.0</td>
<td>0.03</td>
</tr>
<tr>
<td>Senegal</td>
<td>47.32</td>
<td>5.40</td>
<td>6.53</td>
<td>37.4</td>
<td>1.01</td>
</tr>
<tr>
<td>Togo</td>
<td>39.75</td>
<td>5.80</td>
<td>7.40</td>
<td>76.7</td>
<td>1.43</td>
</tr>
<tr>
<td>WAEMU</td>
<td>39.29</td>
<td>4.76</td>
<td>5.58</td>
<td>48.9</td>
<td>0.26</td>
</tr>
</tbody>
</table>

Memorandum items

| Cameroon                        | 14.39                       | 11.70                         | 7.54                                          | 0.27                   | 0.08                   |
| Namibia                         | 80.74                       | 5.16                          | 1.27                                          | 0.11                   | 4.47                   |
| Kenya                           | 80.74                       | 5.16                          | 1.27                                          | 0.11                   | 4.47                   |
| Mauritius                       | 200.13                      | 2.75                          | 0.53                                          | 71.92                  | 11.92                  |
| Uganda                          | 5.79                        | 10.41                         | 3.93                                          | 0.67                   | 0.53                   |
| Zimbabwe                        | 3.79                        | 7.98                          | 7.98                                          | 3.27                   | 3.27                   |


3.225 Bank lending is highly concentrated on large enterprises. The banks have tailored their business primarily toward large enterprises, civil servants, salaried workers, and the Government. The risks borne by the largest 50 borrowers reported to the credit registry represent 59 percent of all reported credit, which is above the WAEMU average (49 percent in 2006), whereas in Burkina 99 percent of all enterprises have less than 20 employees, and 73 percent have a turnover of less than CFAF 10 million. Loans not reported to the credit registry because they were below the reporting threshold represented only 30 percent of the total stock compared with 80 percent in Senegal.63

63 This low share of credit of small amount is an indication of the limited loans extended to SMEs.
Most SMEs do not have access to the banking sector given their informal status, and even for SMEs in the formal sector, access remains difficult. Informal SMEs have access to financial services only from MFIs or from the various Financing Funds set up by the Government to extend credit to some targeted sectors/clients. As stated in the 2006 Investment Climate Assessment, nearly 80 percent of all firms in the formal sector consider limited access to financial services as a major obstacle to their development.\(^\text{64}\) Constraints primarily stem from: (i) an often inadequate supply of financial services; (ii) a poor regulatory environment; (iii) weaknesses in the financial information infrastructure; (iv) the weak capacity of SMEs; and (v) distortionary government interventions (see above).

The financial institutions lack expertise in the financing of SMEs. Most financial institutions indicated that SMEs were not treated as a market in its own right or warranting attention by a specific department. Many banks deem it sufficient to use traditional lending methods to finance SMEs, with the same requests for financial statements and property titles as guarantee that are often unavailable to SMEs. Also, for many banks the absence of adequate credit assessment tools has been a contributing factor to their lack of interest in the sector.

Excessive Concentration on the Cotton Sector

The financing of agriculture is concentrated on cotton. Besides cotton, which has access to financing because of its network and the organization of its supply chain through the banking pool (international led by HSBC in the recent years and domestic led by BIB), there is virtually no credit available for agriculture. The principal players in rural areas are the RCPB, which finances mainly nonagricultural business, and the former Agriculture and Commercial Bank of Burkina (Banque agricole et commerciale du Burkina – BACB), which focuses on cotton (98 percent of its rural portfolio).

Risk of instability due to high loan concentration. Loans are concentrated on a small number of borrowers, including SOFITEX. Due to its small size, the banking sector cannot absorb cotton sector financing without assuming considerable risks. In June 2007, loans to the sector were the largest single exposure in all the banks except one. On the other hand, exposures to sectors other than cotton are relatively diversified: they represent around 15 percent of the five largest single exposures. Lending to the cotton sector varies from one season to the next.

The international financial crisis impacted cotton sector financing. With the financial crisis, the relevant impact on Burkina Faso is that of reduced financing for the cotton sector for multinational and large local enterprises involved in the sector (SOFITEX, FASO-COTON and SOCOMA). Due to the low capitalization of local banks, the financing of production and exports is partly assured by foreign banks through a banking consortium (local banks/international banks). With investors’ worldwide low tolerance to risk and deleveraging, the country risk factor plays a greater role in the credit scoring and markets react to a drop in credits below the investment level expected by the enterprises in the cotton sector in Burkina. Also, global default risks impact premiums in Burkina Faso, driving the cost of credit up.

\(^\text{64}\) The number of SMEs in the formal sector in 2003 seems to have reached nearly 12,000. However, according to most of the banks, the number of SMEs eligible for bank financing is very much lower than the number of SMEs existing in the formal sector.
Conclusions and Policy Recommendations

3.231 To strengthen financial intermediation and facilitate access to finance for SMEs, the report recommends the following:

- Extend the range of financial products offered. Banks and microfinance institutions (MFIs) should develop new lending techniques and cover new market segments (move, respectively, downscale and upscale).
- Increase access to a diversified system of guarantees such as endorsements, pledges, stock collateral, and leasing and allow the acceptance of such guarantees by the supervisor as collateral.
- Increase access to information by lowering the thresholds for reporting information on borrowers to the credit registry to allow information on SMEs to be collected and shared with lenders.
- Diversify risks, products, and partnerships to increase access to finance in rural and agricultural areas. There are various strategies in this respect, including actions to:
  - Develop a reliable system of warehouse receipts, which will be based primarily on warehouse infrastructure, a system of product inspection, insurance, verification, and classification, or a disaster-relief fund;
  - Develop new products and partnerships by: (i) facilitating partnerships between banks and MFIs, ranging from the simple line of credit to the syndication of larger loans to serving as an agent for the distribution of various services, including insurance and the transfer of funds; (ii) providing greater access to financing for agricultural equipment, especially through increased access to leasing; and (iii) expanding the pilot program on mobile banking, based on the success achieved in Kenya and in South Africa, in partnership with the institutions present in the rural areas, such as SONAPOST, RCPB, and the mobile telephone companies.
- Review and remove regulatory aspects that constrain financial deepening including (i) the revision of interest rate ceiling; and (ii) the review of fiscal, legal, and prudential constraints on the development of leasing. Establish regulations that facilitate access to financing, in particular by raising or eliminating the ceiling on lending rates to encourage improved credit risk pricing.
- SMEs should improve their financial management, and their access to markets and technology. The banks should set up departments dedicated to SMEs.
- Cotton companies should build-up their risk management functions and, in particular, transfer some of their risk offshore or share it in a wider pool.
3.232 Considering fiscal policy options for promoting growth as well as education and health-related Millennium Development Goals (MDG) in Burkina Faso is key for sustained long-term development. Several fiscal policy options are considered among: (i) creating fiscal space, such as mobilizing resources, and (ii) using fiscal space, namely using these resources to pursue growth and MDG objectives. Specifically, regarding the creation of fiscal space, the following is considered: (i) reprioritizing expenditures towards growth and MDG objectives; (ii) increasing health and education expenditures; (iii) increasing infrastructure expenditures; and (iv) combining increases in health, education and infrastructure expenditure.

3.233 Adequate public infrastructure and health and education levels are particularly important for competitiveness or coping with population growth. Whereas the other chapters often take a microeconomic view, the analysis in this section takes place at the macro and meso levels, with a focus on growth, domestic absorption, income distribution, and MDG effects. Part of the challenge the authorities face in developing a fiscal policy that supports growth and MDG objectives is the relative weight to be assigned to public infrastructure and human development spending. The section on the use of fiscal space compares these two expenditure types. A practical lesson that emerges from the simulations is that increasing health and education services in real terms (as opposed to increasing nominal spending) takes time because training skilled workers required for delivering these services is a lengthy process. Ramping up health and education spending therefore needs to pay close attention to capacity constraints, in particular the ability of training programs to graduate skilled teachers and nurses. Another lesson is that while there are tradeoffs between promoting growth and poverty through public infrastructure spending on the one hand and promoting health and education objectives through human development spending on the other, public infrastructure is fairly effective at improving health and education outcomes, which reduces the size of the trade off.

3.234 Simulations with the Maquette for MDG Simulation (MAMS) are used for analyzing the effects of the fiscal space options. In addition, the model is used to analyze structural changes of the Burkinabé economy. MAMS is a multisectoral growth (real) model that has been expanded to incorporate MDGs through modeling of health, education and water-sanitation sectors and their linkages with the rest of the economy. By explicitly modeling the link between fiscal policy tools and growth, education, and health outcomes, MAMS allows to conduct the analysis of fiscal space within the discipline of a model-based framework. The model using Burkina-specific data has been calibrated, which required a substantial effort given that the database and the model are quite detailed relative to other economy-wide models.

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66 “Meso” is an intermediate case of multi-sector analysis situated between macro (which may be defined as highly aggregated analysis, often only a single sector) and micro (which may be defined as highly disaggregated analysis, referring to individual projects or survey observations). The analysis in this chapter is focused on the macro and meso levels and the links between the two.
A key feature of models of this type and related databases is that they strive to integrate, in a consistent framework, available data on behavior and structure in different sectors of the economy. Unfortunately, for Burkina Faso, data weaknesses are serious in many areas; inter alia, the understanding of key economic linkages (such as the link between education level, labor market performance, and economic productivity/growth) is sparse. Given this, the level of model uncertainty remains high—the analysis should be seen as a rough first approximation of Burkina’s economy as opposed to a close replica.

Analyzing Structural Changes

Even though key macroeconomic ratios remain relatively stable in the MAMS simulation, the model indicates that the period 2008–30 is marked by substantial structural change brought on by the improving education of the workforce. The Burkinabé authorities have succeeded in recent years in boosting education—the net primary school enrollment rate, for example, increased from 36 percent in 2000 to 47 percent in 2007—and the MAMS baseline assumes a continuation of this path, with gross enrollment rates increasing for all school types throughout the simulation period (Appendix 13, Figure A13.3, panel 1). This has a sizable impact on the composition of the labor force: in 2007, the share of labor with some education level—i.e., labor with education beyond primary school—is only 5 percent, while by 2030 its share has risen to about 20 percent of the total labor force (panel 2). The supply of semi-educated labor (i.e., with a lower secondary school degree) increases particularly rapidly, followed by highly educated labor which has completed full secondary or tertiary education (panel 3). This new supply of educated labor needs to be absorbed by the economy, and in MAMS this involves multiple adjustment channels: (i) wage adjustment; (ii) factor substitution; (iii) unemployment; (iv) sector composition; and (iv) external adjustment.

Considering the individual channels in some detail provides a good illustration of the economic transmission mechanism within MAMS. It also foreshadows several of the issues that arise if fiscal space is used to increase education spending and identifies some of the challenges Burkina Faso may face in making productive use of these new skills.

Wage adjustment

In MAMS markets are generally cleared through relative price changes. Hence, wage rates for factors that are becoming more abundant (educated labor) tend to decrease, whereas those becoming more scarce (land, uneducated labor, private capital) increase. The wage rates depicted in Panel 4 conform to this pattern except for semi-educated labor: even though the supply of semi-educated labor increases noticeably, there is only minimal wage restraint relative to uneducated labor. The reason is twofold: first, productivity of semi-educated labor is assumed to increase strongly throughout the simulation period, which promotes the absorption of labor into the labor market without wage restraint, and, second, unemployment of

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For the net primary school enrollment rate, see IMF (2009), Table 9. Figure 3 (Panel 1) in Appendix 13 displays the gross primary school enrollment rate, which is considerably higher than the net enrollment rate because it includes students that are enrolled outside their own primary cohort, i.e., students that did not complete primary school when they were of primary school age but do so at a much older age. The data source for the MAMS calibration is the UNESCO Institute for Statistics (UNESCO, 2009).
semi-educated labor dampens the scope for downward wage adjustment because reservation wages form a wage floor. We will discuss both of these factors below.

Factor substitution

3.239 **The relative wage change leads to a factor substitution process, with production becoming more intensive in factors that have become relatively cheaper.** With the general decline in wage rates for educated labor, production becomes more education-intensive. For instance, the agricultural sector is very intensive in uneducated labor at the start of the simulation in 2007 (Table 3-13). Over time, that intensity declines because semi-educated labor adjusted for productivity becomes substantially cheaper, which leads to a substitution of semi-educated for uneducated labor. As a result, the agricultural sector absorbs most of the new supply of semi-educated labor (Panel 5). The adjustment process for highly educated labor is similar, but here the industrial and nongovernment service sectors increase their education intensity while lowering their capital intensity (i.e., they are substituting highly educated labor for capital). Consequently, most new entrants to this part of the labor force are absorbed by these two sectors (panel 6).

<table>
<thead>
<tr>
<th></th>
<th>uneducated labor</th>
<th>semi-educated labor</th>
<th>highly-educated labor (second. edu.)</th>
<th>highly-educated labor (tert. edu.)</th>
<th>private capital</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2007</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>agriculture</td>
<td>54.4</td>
<td>0.7</td>
<td>...</td>
<td>...</td>
<td>763</td>
</tr>
<tr>
<td>industry</td>
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<td>0.5</td>
<td>0.2</td>
<td>0.0</td>
<td>1,577</td>
</tr>
<tr>
<td>non-government services</td>
<td>5.0</td>
<td>1.0</td>
<td>0.3</td>
<td>0.1</td>
<td>1,654</td>
</tr>
<tr>
<td>government services</td>
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<td>1.6</td>
<td>1.9</td>
<td>...</td>
</tr>
<tr>
<td>all sectors</td>
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<td>0.3</td>
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<td>1,149</td>
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<tr>
<td></td>
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<td></td>
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<td>agriculture</td>
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<td>...</td>
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<tr>
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<td>0.6</td>
<td>1.5</td>
<td>...</td>
</tr>
<tr>
<td>all sectors</td>
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<td>1.6</td>
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<td>0.3</td>
<td>934</td>
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<td>change in percent</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td>agriculture</td>
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<td>418.8</td>
<td>...</td>
<td>...</td>
<td>17.2</td>
</tr>
<tr>
<td>industry</td>
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<td>-8.8</td>
<td>119.2</td>
<td>79.4</td>
<td>-25.0</td>
</tr>
<tr>
<td>non-government services</td>
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<td>0.8</td>
<td>110.6</td>
<td>119.1</td>
<td>-32.5</td>
</tr>
<tr>
<td>government services</td>
<td>-93.7</td>
<td>-86.5</td>
<td>-62.7</td>
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</tr>
<tr>
<td>all sectors</td>
<td>-60.0</td>
<td>116.3</td>
<td>34.1</td>
<td>24.2</td>
<td>-18.7</td>
</tr>
</tbody>
</table>

1 Factor employment per 1000 value-added units.

Sources: INSD and Authors’ simulations.

Sector composition

3.240 **The changes in relative wages also change sector composition: the share of the agricultural sector in real GDP declines while that of the two service sectors expands** (Panel
Agriculture is relatively intensive in uneducated labor and land, the two factor categories showing the strongest wage rate increase (Panel 4). The sector passes part of the higher factor costs through to consumers (Panel 10), which lowers demand and production. As a result, the share of agricultural production in real terms declines. For the two service sectors, the process works in reverse: they are relatively intensive in highly educated labor; the decline in wage rates allows them to lower their producer prices, which increases demand and production.

External adjustment

The change in sector composition also implies a shift of resources from the tradable (agriculture) to the nontradable (services) sector. This tends to create an external imbalance, which in turn triggers a real exchange rate depreciation that keeps the balance of payments in equilibrium (Panel 11). Because of Burkina Faso’s membership in the West African Economic and Monetary Union (WAEMU), real exchange rate appreciation is brought about by lower inflation than in other countries rather than through a nominal depreciation. The real exchange rate deflated by producer prices—which better captures producer competitiveness—depreciates by even more. This enhances the competitiveness of the economy at large and also raises the profitability of the export sector compared to other sectors, because producer prices in the export sector are exogenously given and do not decline, which raises relative producer prices in this sector.

The real depreciation keeps the share of exports and imports in terms of real GDP relatively constant (Panel 12). In nominal terms, however, the export and import shares increase because the depreciation increases their nominal value (Appendix 13, Figure A13.3, Panel 6).

Unemployment

Wage adjustments will not always be sufficient to clear labor markets because the Burkina Faso calibration allows for unemployment by specifying reservation wages that essentially form a wage floor. This can prevent wages from falling enough to clear the labor market. For 2007, elevated levels of unemployment are evident only for semi-educated labor (Panel 7); the unemployment rates for other labor types are at their exogenous minimum levels (i.e., reflecting search unemployment). That is, in 2007 the reservation wage floor is binding only for semi-educated labor. However, as the expanded education system begins to produce a larger supply of highly-educated labor—increasing numbers of graduates with secondary education begin to enter the labor market around 2015 and with tertiary education around 2020—reservation wages for highly-educated labor become binding as well, and unemployment begins to rise. In the long run it is likely that unemployment would revert to its exogenous minimum for educated labor because, first, the reservation wage itself would adjust downward (in MAMS, it is modeled as a negative function of unemployment), and, second, the decline in wages would reduce the number of students seeking high levels of education. However, these adjustment processes require a long period to take effect.

Both sector output and GDP are measured at constant prices.

Another part of higher factor costs is absorbed through factor substitution, i.e., by replacing uneducated labor with relatively cheaper (after adjusting for productivity differences) semi-educated labor.

However, given the scarcity of labor market data, these estimates should be treated with caution.
Another aspect is the ability of the economy to create suitable jobs for new educated labor market entrants. In MAMS the ability to switch employment in a given sector from uneducated to semi-educated labor, for example, is governed by the producer’s first order condition (i.e., the marginal cost of employing a factor has to equal its marginal revenue product). The switch in employment then depends mostly on the factors’ wage rates (which affect the marginal cost) and their productivity (which affect the revenue product).71 Given the assumption of a CES production technology in MAMS, productivity is a function of employment levels, the elasticity of substitution, and a factor-specific productivity term. The last, depicted in Panel 8, shows an assumption of strong productivity growth for educated labor, in particular semi-educated labor.72 This assumption is critical for the relatively smooth process of absorbing additional educated labor that is embedded in the MAMS baseline for Burkina Faso. Without productivity growth, the baseline would depict strongly increasing unemployment rates and falling wage rates for educated labor. That is, the newly educated labor force would end up in part unemployed. In the real world, the type of productivity growth underlying the MAMS baseline simulation could take two forms:

- **Moving up the value chain in agriculture:** The increase in the semi-educated labor force has to be absorbed mostly by the agricultural sector. To realize the productivity gains implied in the MAMS simulations, it is not enough to simply replace an uneducated worker with an educated one—this would yield only marginal productivity gains—but requires moving more-educated labor into high-value areas like fruit production or agro processing where these skills are indispensable. That is, the assumption of high productivity growth for semi-educated labor is shorthand for a fundamental transformation of agriculture. Increasing the education level of the labor force in agriculture will be part of the process, but it will also require entrepreneurship, a supporting environment (e.g., an effective financial sector), and identifying and exploiting business opportunities for higher-value agricultural products.

- **Expanding the industrial and nongovernment services sectors:** The industrial and service sectors will have to provide job opportunities for the highly educated labor force entering the labor market in the medium term, because agriculture is unlikely to require that much highly educated labor. In the MAMS simulations, highly educated labor is absorbed by an expansion of the service sector, as will be discussed below. However, while in MAMS this is a relatively mechanistic process based mainly on the decline in wage rates for this type of labor, in the real world it will be less automatic. Rather, as with agriculture, individual businesses will have to find opportunities to establish new lines of business or expand existing ones. This type of discovery process is inherently uncertain.

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71 If the factor substitution leads to adjustments in goods markets, changes in the sector’s output and price levels also affect the first-order condition.

72 The productivity growth for highly educated labor benefits in particular government, because government health and education services are intensive users of this type of labor. The productivity gains increase the efficiency of government services, i.e., government requires less factor input for a given output, which explains why the government sector becomes less intensive in all factors over time. Simultaneously, the relative share of highly-educated labor in government increases. In the real world, productivity growth could result from productivity-enhancing reforms like reforms of the civil service or public financial management that become more feasible with a more highly-educated workforce.
A final aspect of the evolution of unemployment is the fragmentation of the labor market in Burkina Faso: for a similar type of labor, agriculture typically pays significantly lower wages than industry or services. Besides a sectoral dichotomy, this likely reflects also a rural/urban divide. The significance of this is twofold:

- **It implies that the present factor allocation is inefficient**, i.e., if labor were able to migrate from low wage/low productivity jobs in the agricultural sector to high wage/high productivity jobs in the industrial or service sectors, the overall productivity (and income) of the economy would improve. Also, the abundance of uneducated labor provides Burkina Faso with a comparative advantage that could give rise to the development of light manufacturing employing uneducated labor (e.g., assembly or textile production)—but with a large part of this labor “locked up” in agriculture, the country does not effectively use this advantage.

- **The barriers that prevent the equalization of wages and productivity over sectors**—examples could include unions that raise wages in formal sectors above market-clearing levels or cultural barriers that prevent migration from rural to urban areas—could interfere with the structural change that is necessary to absorb an influx of educated labor. If sectors that could generate skilled employment are segmented from the rest of the economy—if wages in these sectors are kept high and employment limited through barriers like high unionization—increasing the supply of educated labor may mostly yield higher unemployment because wage rigidity would prevent employment generation. For individual workers it might still be worthwhile to invest into education and face the prospect of unemployment if this opens up a chance to eventually land a high-paying job in the segmented sectors, but education then serves primarily as an opportunity for securing a share of the rents in these sectors, so it becomes a means of rent seeking. Labor market segmentation is captured in the Burkina Faso calibration through exogenous wage distortion parameters, but these cannot fully capture the structural impediments that give rise to these distortions or their impact on structural change.

**Sector composition**

The changes in relative wages also change sector composition: the share of the agricultural sector in real GDP declines while that of the two service sectors expands (Panel 9). Agriculture is relatively intensive in uneducated labor and land, the two factor categories showing the strongest wage rate increase (Panel 4). The sector passes part of the higher factor costs through to consumers (Panel 10), which lowers demand and production. As a result, the share of agricultural production in real terms declines. For the two service sectors, the process works in reverse: they are relatively intensive in highly educated labor; the decline in wage rates allows them to lower their producer prices, which increases demand and production.

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73. Both sector output and GDP are measured at constant prices.
74. Another part of higher factor costs is absorbed through factor substitution, i.e., by replacing uneducated labor with relatively cheaper (after adjusting for productivity differences) semi-educated labor.
External adjustment

3.247 The change in sector composition also implies a shift of resources from the tradable (agriculture) to the nontradable (services) sector. This tends to create an external imbalance, which in turn triggers a real exchange rate depreciation that keeps the balance of payments in equilibrium (Panel 11). Because of Burkina Faso’s membership in the West African Economic and Monetary Union (WAEMU), real exchange rate appreciation is brought about by lower inflation than in other countries rather than through a nominal depreciation. The real exchange rate deflated by producer prices—which better captures producer competitiveness—depreciates by even more. This enhances the competitiveness of the economy at large and also raises the profitability of the export sector compared to other sectors, because producer prices in the export sector are exogenously given and do not decline, which raises relative producer prices in this sector.

3.248 The real depreciation keeps the share of exports and imports in terms of real GDP relatively constant (Panel 12). In nominal terms, however, the export and import shares increase because the depreciation increases their nominal value (Appendix 13, Figure A13.3, Panel 6).

Rural to urban workforce migration

3.249 In the context of simulations with MAMS, a more rapid migration from rural to urban areas would be supported by a decline in the relative size of the agricultural sector, with workers released from agriculture being integrated into more urban service and industrial sectors. After having explored the roles of different factors, a scenario that combines different mechanisms was constructed, that both individually and when occurring together, bring about a relative decline in agricultural production and employment. Compared to the baseline simulation in the next section, the alternative scenario introduces the following assumptions:

- Higher total-factor productivity (TFP) growth in the agricultural sector: higher TFP growth could result, for example, from the introduction of improved seeds that raise output for a given labor and land input. In the simulation, this is implemented by raising the TFP growth rate path for agricultural sectors while simultaneously lowering it for others, keeping economy-wide TFP growth identical to the baseline in the fiscal space chapter. That is, in the simulation here the sources of TFP growth in the economy reside mostly in agriculture, whereas the fiscal space baseline assumes a more even distribution of TFP growth sources. While higher TFP growth tends to boost agricultural output, demand is unlikely to keep pace with the new production potential, leading to a reduction in its labor use. In the simulations, the change in TFP growth is by far the most important factor for shifting labor from agriculture to other sectors.

- Lower expenditure elasticity of market demand for agricultural products: this tends to reduce demand for agricultural products as the economy grows, amplifying the effect of higher TFP growth in agriculture on employment by lowering production levels and thereby leading to a further reduction in employment.

- Lower expansion rate of land supply for agriculture: the baseline in the fiscal space chapter assumes significant irrigation efforts that increase the available land supply through the simulation period; in contrast, the simulations here set this rate to zero.
Combined with a lowering of substitution elasticities in the production process, this lowers the overall production potential of the agricultural sector and employment.

- Taken together, these changes in specification reduce the share of labor employed in agriculture from close to 90 percent in 2004 to approximately 70 percent in 2030.

3.250 The starting point for shifting employment from agriculture to other sectors is the increase in the TFP growth rate. The underlying TFP-trend is depicted in panel 1 in Figure A13.2 in Appendix 13. Overall, this leads to an increase in overall agricultural production relative to the fiscal space baseline (panel 2), but there is considerable variation among different agricultural products. For those that have a significant export share (panel 3), in particular cotton and non-cereal and non-livestock products, production increases significantly, because higher exports provide a ready outlet on the demand side for higher production. For cereal and livestock production, in contrast, production does not increase. This reflects the specification of low expenditure elasticities for market demand, which means demand shifts away from these products as the economy grows and prevents an increase in production despite the higher production potential. The real (CPI-indexed) price of agricultural products declines significantly (panel 4), reflecting that the supply potential now significantly exceeds demand for agricultural products. With the increase in exports, the real exchange rate appreciates (panel 5) to restore current account balance through higher non-agricultural imports relative to GDP (panel 6) and lower non-agricultural exports also relative to GDP.

3.251 Higher TFP growth in the agricultural sector raises household incomes quick evenly across different types of households (Appendix 13, Figure A13.3, panel 1). Agricultural households tend to benefit from much higher income from their land owing to the productivity gains (panel 2). Urban households, on the other hand, benefit from the increase in wage rates on educated labor, which is an important source of their income.

3.252 A critical part of the transmission mechanism is the adjustment in relative wages. The largest challenge in the migration of labor from agriculture to more urban sectors lies in the different skill mix in rural and urban sectors: agriculture is very intensive in uneducated labor whereas service and industrial sectors in urban areas require educated labor to expand. The resulting mismatch in factor supply and demand as the agriculture sector sheds uneducated labor and service and industrial sectors seeks educated labor to expand leads to falling wages for uneducated labor and strong increases for educated labor (Appendix 13, Figure A13.4, panel 1). In response, the agricultural sector releases relatively more educated labor and capital than uneducated labor (panel 2), which implies that production in this sector becomes more intensive in uneducated labor. This may be surprising, because intuitively one might have expected that higher productivity in agriculture would attract more educated labor and capital into the sector, whereas in the simulations the opposite happens. The reason is that the increase in productivity makes the overall economy more wealthy, which creates additional demand for non-agricultural goods that can only be met by drawing educated labor and capital out of the agricultural sector. High demand for these factors bids up their relative price until it becomes more effective for agriculture to substitute them through uneducated labor that is now relatively abundant.

3.253 The key to this result is that in the simulations it is easier for agricultural production to become more intensive in uneducated labor than it is for the other sectors. If this simulation result were to be confirmed in reality, it may be difficult to absorb uneducated labor released from agriculture into other sectors, and that, in fact, the best employment hope for
uneducated laborers lies with agriculture itself, but only if their wages decline. This would have a number of implications:

- The potential for rural-urban migration is limited (as evidenced by the relatively modest reduction in the agricultural employment share over the simulation horizon) even if productivity increases in agriculture, because uneducated labor would find it difficult to find employment opportunities in urban sectors and could be forced to accept lower wages to remain in agriculture.

- Landowners would clearly benefit from higher agricultural productivity, but landless uneducated laborers may actually suffer.

- Increasing education levels in rural areas would facilitate the migration mechanism by making agricultural laborers more employable in urban sectors.

3.254 Turning to non-agricultural sectors, production in industrial and trade-related sectors increases but falls substantially in other services (Appendix 13, Figure A13.5, panel 1). This reflects that production in industrial and trade-related sectors can switch to some extent to uneducated labor and capital to expand their production, whereas this process is hampered in other services due to their particular strong reliance on highly-educated labor that is in scarce supply. Moreover, other services also have to compete for highly-educated labor with education sectors that also are in high demand; ultimately, other services lose out in this competition and the resulting shrinkage releases highly-educated labor that is instrumental in expanding education services. Overall, industrial and service sectors are in high demand, whereas the supply response is constrained by the availability of suitable factors. Consequently, their relative price increases (panel 2). This is less pronounced for industrial sectors, because these sectors can more easily expand production by employing uneducated labor and capital released from agriculture. For other services, the relative price increase is large enough to significantly reduce demand, whereas demand for trade-related services is less price sensitive.

3.255 Regarding GDP impact of higher TFP growth in agriculture, real GDP growth remains unaffected by construction, but the GDP deflator for private investment increases strongly due to the price increase for industrial and service sectors that are important inputs into the production for investment goods (Appendix 13, Figure A13.6, panel 1). Consumption, in contrast, consists to a significant extent of agricultural goods, whose relative price decline; as a result, the increase in the consumption deflator is much less pronounced. The strong increase in the investment deflator reduces the real value of investment, shifting real expenditures towards consumption (panel 2).

Creating Fiscal Space

3.256 Creating fiscal space will become an important task over the long run if the current high level of donor support subsides to levels common in other countries: the average aid-to-GDP ratio (WDI definition) over 2001-06 was more than twice as high in Burkina Faso (about 13 percent) than in Sub-Saharan Africa (5 percent) or low-income countries (about 6 percent). In the wake of the current global financial crisis, a decline in aid inflows could become an urgent issue. To compensate, the authorities would need either to significantly raise their revenue effort or prioritize expenditures. Then again, donors have committed themselves at the Gleneagles’
summit to a significant scaling up of aid. This commitment implies an average aid target of US$85 per capita. If this target were to be realized, this would represent a significant scaling up of aid for Burkina Faso. This section will simulate an increase in the revenue effort, a prioritization of expenditures, and a scaling up of aid in line with Gleneagles’ commitments. The latter also provides insights on the effects of a scaling down in aid, triggered for example by the current global financial crisis, by simply reversing the sign of the simulation results.

Prioritizing Expenditures

3.257 This scenario creates fiscal space by shifting resources from other government activities to those that help promote growth and MDG objectives (i.e. health, education, and infrastructure spending), thereby prioritizing expenditures. Specifically, the current and capital expenditures are explicitly modeled, both of which are split into (i) health, (ii) education (with sub-groupings for primary, secondary I and II, and tertiary education); (iii) maintenance and operations of infrastructure, and (iv) other government activities. Collectively, i-ii are referred to as human development.

3.258 Under the baseline, current spending on other government activities grows at an annual rate of 6 percent; in the prioritized scenario, this growth rate is gradually reduced until it reaches 1.5 percent in the period 2012 to 2015; the growth path returns gradually to the baseline afterwards (Figure 3-16, panel 1). As a result, other government spending declines over time, with a reduction of about 2.5 percent of GDP in 2015 (panel 2). This gain in fiscal space is relatively persistent, because the expenditure base for other government activities is permanently reduced through the temporary spending restraint. The precise amount of fiscal space gained depends on what the fiscal space is used for; this will be explored in more detail in the following section, whereas in this section, a simultaneous increase in expenditures on human development (education and health), and infrastructure (the combined scenario) is assumed.

Figure 3-16: Fiscal Space in the Prioritized Scenario

Sources: Authors’ simulations.

All growth rates are in real terms.
3.259 **Prioritization is a difficult option for creating fiscal space, because it involves deciding which expenditures to give lower priority.** In Burkina Faso’s 2007 budget (which is broadly mirrored in the MAMS composition of government expenditures) other government expenditures — those not dedicated to health, education, or public infrastructure - account for approximately 50 percent of current and capital expenditures respectively. It includes expenditure items like support for agriculture (including irrigation), internal security and justice, as well as decentralization. Many of these expenditures are highly desirable and potentially economically productive, which makes it genuinely difficult to decide which of these tasks are not priorities. Moreover, the prioritized scenarios assume that the growth rate for this aggregate sector can be reduced significantly without a negative impact on productivity. This would require strongly reduced growth in the subsectors of other government with no or a negative impact on productivity—the ‘classic’ example is a cutback in defense spending—or efficiency gains in the production of government services. Finally, in the MAMS application, other government expenditures are not directly linked to factor productivity in any economic activity—unlike infrastructure, education or health expenditures, where this link is modeled—which could understate the economic impact of cutting other government activities back.

Increasing Aid Inflows

3.260 **In this scenario, aid inflows are increased from about US$43 per capita in 2007 to approximately US$85 per capita in 2015** (Figure 3-17, panel 1), in line with the Gleneagles’ commitment of developed countries for increasing aid. This corresponds to an increase in aid inflows from 9.5 percent of GDP in 2007 to about 14 percent in 2015 (panel 2). The percent increase in GDP-terms is much smaller than in per-capita terms, because Burkina Faso’s real GDP per capita expands strongly in this period, which reduces the aid-to-GDP share for a given US dollar amount. After 2015, aid inflows are maintained at a level of US$85 per capita, with the aid-to-GDP share gradually declining as real GDP per capita increases.

**Figure 3-17: Fiscal Space in the Aid Scenario**

Sources: Authors’ simulations.
Raising Domestic Revenue

3.261 In this scenario, the revenue (tax collection) effort is raised to the WAEMU target of 17 percent of GDP in 2015, starting from about 12.5 percent of GDP in 2007 (Figure 3-18). This revenue ratio is maintained over the long term, thereby making the gain in fiscal space permanent. In practice, achieving this type of revenue increase will require reforms regarding both revenue administration and tax policy.

![Figure 3-18: Fiscal Space in the Revenue Scenario, 2007-2030 (revenue in percent of GDP)](image)

Sources: Authors’ simulations.

Comparing Gains in Fiscal Space

3.262 The two domestic scenarios—prioritizing expenditures and raising revenue—are programmed to create fiscal space permanently (Figure 3-19, panel 1), whereas the increase in aid is temporary in GDP terms. While this pattern is primarily a programming choice, it also reflects that a one-time increase in revenue or a one-time decrease in non-prioritized expenditures can be maintained relatively easily over time, thereby creating permanent fiscal space. Likewise, Burkina Faso will eventually graduate from its low-income and aid-recipient status, which makes any scaling up of aid inherently temporary in nature. Considering the cumulative effect of these options for creating fiscal space, the cumulative impact is relatively similar until 2014 (panel 2), with the scenarios diverging afterwards. The following discussion on the macroeconomic effects of these options will consequently focus on the period up to 2014, but charts will display the full sample period to show the longer term effects of these options.
Most, but not all, of the created fiscal space can be used for increasing target expenditures, such as infrastructure, education and health. This is illustrated in Figure 3-20 for the revenue scenario. The source of leakage differs among the scenarios. In the revenue scenario, for example, spending on other government activities grows at the baseline rate, but this implies that the share of other government spending in GDP increases because GDP growth declines in the revenue scenario. As a result, the increase in targeted expenditures is somewhat less than the fiscal space created through the revenue effort. In real terms, the increase in expenditures can be even less because of rapid cost increases when education and health expenditures are ramped up. The latter will be explored in more detail in the section on the use of fiscal space.
Macroeconomic Impact

3.264 In the period up to 2014, when the cumulative fiscal space created in the three scenarios is comparable, the GDP impact is positive and large for the aid scenario, slightly positive for the prioritization scenario, and slightly negative for the tax scenario (Figure 3-21). The negative GDP impact in the revenue scenario is the result of the crowding out of the private sector due to higher taxation, which reduces private investment and private capital accumulation. This effect dominates the positive growth effect of higher public infrastructure spending. At the other end of the spectrum, the large positive GDP impact in the aid scenarios results from the availability of external financing that allows a reduction in the share of cotton in total exports (leaving cotton production almost unchanged over the period while other sectors grow) and a relative shift of production factors out of the cotton sector to other sectors in high demand, mainly construction and health and education services due to higher government spending on these sectors. Given that labor productivity in the cotton sector is generally low whereas it is high in the construction and service sectors, this reallocation of factors (in relative terms) might lead to an overall improvement in labor productivity, provided that productivity in the cotton sector does not improve. For the prioritized scenario, this effect is much smaller, because prioritization frees up factors in sectors related to ‘other government’ activities spending, which generally have much higher productivity than those in the cotton sector. The shift in factors from ‘other government’ activities to construction and health and education services consequently does not raise overall labor productivity significantly.

Figure 3-21: Cumulative Change in Real GDP, 2007–2030 (difference to baseline in percent)

Sources: Authors’ simulations.

3.265 The aid scenario leads to a substantial widening in the trade deficit, whereas changes in the two domestic scenarios are comparatively small (Figure 3-22, panel 1). By definition, the mirror image to the change in the trade balance is the change in domestic absorption, particularly domestic consumption and investment (panel 2). The defining

77 In this scenario, cotton output and employment from cotton continue at their current level, but as growth is generated from other sectors, the relative weight of cotton in the Burkinabè economy diminishes over time.
characteristic of the aid scenario is that external resources are available to finance the increase in government expenditures, thereby allowing an increase in domestic absorption (panel 3). In contrast, in the domestic scenarios the increase in government spending needs to be financed by reducing other domestic activities, thereby leaving overall domestic absorption unchanged. In the prioritized scenario, increased government absorption of education, health, and infrastructure activities comes at the expense of other government activities, which leaves overall government and private absorption practically unchanged (panel 4). In the revenue scenario, higher government absorption takes place through crowding out private absorption (panel 5). This illustrates that making effective use of aid resources requires fully spending and absorbing them, because aid resources that are only spent but not absorbed—if an increase in the trade balance is resisted—are akin to a domestically-financed increase in government spending.

3.266 The widening in the trade deficit in the aid scenario is mostly a result of a reduction in exports, especially to a sharp decline in cotton sector production (Figure 3-22, panel 6). The aid inflows essentially replace the foreign exchange earned by the cotton sector. This frees up resources in the cotton sector for reallocation to other sectors that are in high demand. Without this reallocation, the supply response to government demand for education, health, and infrastructure services would be muted, making the expenditure increase ineffective.

3.267 A real appreciation is an integral part of the transmission mechanism to bring about the reduction in the export sector (Figure 3-23). The combination of a real appreciation with a decline in the export sector is often associated with ‘Dutch disease’ concerns where the economy is permanently damaged as a result of the shrinkage of the tradable sector. This can be the case if the tradable sector is a special source of productivity growth. MAMS allows for this channel by linking productivity growth to the size of exports and imports. Despite this link, the overall GDP effect in the simulation is still positive - the productivity gains from a more educated and healthier workforce as well as better infrastructure outweigh the productivity loss from the shrinkage in exports. Nevertheless, outside the model context, a reduction in the size of the cotton sector can be a cause for concern because this sector has some special attributes like an effective vertical integration that provides farmers with inputs.
Figure 3-22: Trade Balance and Absorption

Panel 1: Trade Balance, 2007-2030 (difference to baseline in percent of GDP)

Panel 2: Absorption, 2007-2030 (difference to baseline in percent of GDP)

Panel 3: Absorption—Aid Scenario, 2007-2030 (difference to baseline in percent of GDP)

Panel 4: Absorption—Prioritized Scenario, 2007-2030 (difference to baseline in percent of GDP)

Panel 5: Absorption—Revenue Scenario, 2007-2030 (difference to baseline in percent of GDP)

Panel 6: Trade Balance (Exports and Imports)—Aid Scenario, 2007-2030 (difference to baseline in percent of GDP)

Sources: Authors’ simulations.
Impact on MGDs

3.268  **The poverty impact essentially mirrors that of the real GDP impact:** the aid scenario is most effective in poverty reduction whereas the revenue scenario actually leads to an increase in poverty relative to the baseline because real GDP declines in this scenario (Figure 3-24, panel 1). The differences for the education and health MDG indicators are much smaller (Figure 3-24, panel 2 and Figure 3-25) because these depend in large part on the increase in government spending on these services, where the three scenarios are almost identical up to 2014.
Impact on Income Distribution

3.269 Six different representative household groups in MAMS are modeled: two wage-earning households, three agricultural households, and one ‘other’ for pensioners, independent businesses, etc. The 2004 household survey shows that the wage-earning households are the least poor—with an average (unweighted) poverty rate of about 10 percent—while the agricultural households are the most poor with an average poverty rate of approximately 55 percent. The impact on income distribution is measured by the change in household consumption relative to the baseline by household type (Figure 3-26).

3.270 Mostly, the distribution impact depends on the use of fiscal space, with spending on education and health services benefiting in particular the wage-earning households (this will be discussed in more detail in the following section). However, the revenue scenario shows that tax policy can have a powerful impact on income distribution, because in this scenario a higher tax burden on the wage-earning households in the formal sector equalizes the income distribution (Figure 3-26). The formal sector wage-earning households are among the main beneficiaries of higher education and health spending, but they are also the largest payers of direct income taxes; increasing education and health spending while simultaneously increasing direct income taxation leaves the relative income position of this group broadly unchanged compared to other household groups. Wage earners in the informal sector, on the other hand, escape from higher taxation, leaving their benefits from higher education and health spending intact. Cotton agricultural households, in contrast, get caught in the tax net because this sector is relatively well organized, making it part of the formal economy, and higher income taxation leaves the cotton agricultural households overall worse off because they reap only few benefits from higher education and health spending. The deterioration of their relative income position is an unwanted side effect, given the high degree of poverty in the cotton agricultural households at the outset.
Using Fiscal Space

Human Development Spending Versus Infrastructure Spending

3.271 In the Burkina Faso MAMS application, fiscal space can be used for (i) promoting human development through higher education and health spending; (ii) promoting growth through higher infrastructure spending; and (iii) a combination of both types of spending. In the previous section, different sources of fiscal space were compared while considering the same use for this expenditure as a combination of human development and growth spending. In this section, human development is compared to infrastructure spending while considering only one source of fiscal space, namely increased aid inflows.

3.272 A key difference between increasing human development and infrastructure spending is that it is much more difficult to increase the former in real terms than the latter. Figure 3-27 shows that for human development spending the real expenditure increase relative to the baseline is much smaller than the nominal, whereas for infrastructure spending there is practically no difference. The reason for the discrepancy between nominal and real spending is that the skill

Footnote: Figure 3-27 also shows that the nominal expenditure increase for infrastructure spending is somewhat larger than for human development spending, which mainly reflects a stronger GDP effect for infrastructure spending discussed below. Note that the consumer price index (CPI) is the model numéraire - these nominal changes occur in a setting where aggregate CPI inflation is zero.
set needed to increase human development spending is very different from that of most other economic activities in Burkina Faso. Increasing the provision of education and health services requires high-skilled labor, which is scarce outside the government sector in Burkina Faso. Increased demand for high-skilled labor leads to higher wages for this type of labor, but the supply response is limited because the private sector employs only few high-skilled laborers that could migrate to the public education and health sectors to meet government demand. Likewise, creating a new pool of high-skilled laborers takes many years because of the education that is required. Consequently, in the short to medium term, a sizeable part of increased nominal spending ends up increasing the wages of existing teachers and health workers without adding much to supply; the resulting price increase for education and health services accounts for the difference between nominal and real human development spending. In the longer term, though, the supply of high-skilled laborers increases because higher wages for high-skilled labor make higher education more attractive and eventually a large pool of graduates with secondary and tertiary degrees enters the labor market. At this point, high-skilled wage rates begin to fall and real spending catches up with nominal spending. In comparison, the changes in wage rates for infrastructure spending are much more muted; the largest change is for the wage rate of private capital, reflecting the increased productivity due to the higher stock of public infrastructure.

Figure 3-27: Spending Increases in Nominal and Real Terms

Panel 1: Increasing Human Development Spending, 2007–2030 (aid scenario; difference to baseline in percent)
Panel 2: Increasing Infrastructure Spending, 2007–2030 (aid scenario; difference to baseline in percent)
Panel 3: Wage Rates, 2007–2030 (aid scenario–human development spending; diff. to baseline in percent)
Panel 4: Wage Rates, 2007–2030 (aid scenario–infrastructure spending; difference to baseline in percent)

Sources: Authors’ simulations.
Growth Impact

3.273 In the MAMS simulations, spending on human development and infrastructure spending both raise factor productivity:

- Higher education spending raises the educational attainments of workers, raising labor and total factor productivity.
- Similarly, higher health spending improves health indicators with a positive impact on labor and total factor productivity.
- An increase in the infrastructure capital stock raises total factor productivity.

3.274 Comparing the growth effect of human development and infrastructure spending in the MAMS simulations, the latter has a much larger impact on growth. However, this is in part due to the fact that in real terms, the increase in human development spending is much smaller than real infrastructure spending (Figure 3-28), because the first relies significantly on specialized labor, such as teachers or nurses, that need to be attracted into the sector via higher wages that then reduce the real value of human development spending, at least until the newly trained workers enter the labor market. For example, the growth effect of human development spending in 2015 is about 65 percent smaller than that of infrastructure spending, but cumulative human development spending in real terms is also about 70 percent smaller. In the longer term, this gap narrows as capacity in the health and education sectors is built up and real spending on human development services catches up with real infrastructure spending as newly trained human development workers become available.

![Figure 3-28: Real GDP Impact, 2007–2030 aid scenario; difference to baseline in percent)](image)

Sources: Authors’ simulations.
Balance-of-payment Impact

3.275 The impact on the trade balance and absorption in the human development and infrastructure scenarios is broadly similar (Figure 3-29, panels 1 and 3). There are sizeable differences, though, in the impact on the trade balance composition. In the infrastructure-spending scenario, the negative impact on exports is smaller, which leaves more room for an expansion in imports to achieve the same increase in the trade deficit (panel 2). The extent in the real exchange rate appreciation is correspondingly also smaller in the infrastructure-spending scenario (panel 4). At a more general level, the main function of the real appreciation is to shift resources from tradable sectors (cotton in particular) to those sectors that are in high demand to meet increased government expenditures. With infrastructure spending, the supply response is larger (as was seen in the growth response) which reduces the necessary factor reallocation and thereby the extent of the real appreciation and decline in the export sector. After 2015, aid inflows in GDP terms become smaller, which leads to a reversal in the appreciation and eventually a depreciation that is necessary to rebuild the export sectors.

Figure 3-29: Balance-of-Payment Impact

Sources: Authors’ simulations.
Impact on MDGs

3.276 Infrastructure spending is most effective in reducing poverty, in particular in the long run, which owes to its strong income effect (Figure 3-30). For the MDG education indicator, human development spending achieves better outcomes, but the improvement as a result of infrastructure spending is also substantial. The reason for the latter is that the decision to seek education is not only a function of education quality—and thereby of education spending—but depends inter alia also on per-capita household consumption (better off households tend to demand more education) and on the level of infrastructure (which lowers the cost of getting to schools). Infrastructure spending affects the last two factors positively, which accounts for the substantial gain for the MDG education indicator in this scenario. A similar explanation applies to the MDG health indicator, where infrastructure spending also yields strong results. In addition, the real increase in infrastructure spending is larger than that of education and health spending because it is more costly and time consuming to scale up the last than the first.

**Figure 3-30: MDG Impact**

**Sources:** Authors’ simulations.
Impact on Income Distribution

3.277 Human development spending benefits strongly the relative income position of wage-earning households as a result of the large increase in the wage rate for skilled labor. Since these households account for a major part of skilled labor, and skilled-labor wages are an important source of their income, the increase in wage rates raises their income considerably. In the longer term, this effect recedes somewhat as wage rates for skilled labor decline. By comparison, the income distribution remains broadly unchanged when infrastructure spending is increased, i.e. this type of expenditure is relatively neutral with respect to income distribution.

Figure 3-31: Impact on Income Distribution by Household Type

![Image of Figure 3-31: Impact on Income Distribution by Household Type]

Sources: Authors’ simulations.

Conclusions and Policy Recommendations

3.278 Regarding the sources of fiscal space, scaling up of aid has the largest growth impact—and by extension the largest potential for poverty reduction—but it may also trigger a decline in Burkina Faso’s export sector. The hallmark of the aid scenario is that it allows an increase in domestic absorption. The counterpart is an increase in the trade deficit, which in itself does not pose a threat to external sustainability because it is financed through the aid inflows. In the MAMS simulation, the trade deficit arises because production factors are moved out of the export sector (cotton) to non-tradable sectors that are in high demand because of increased government spending. Again, in itself this reallocation of factors is desirable because it would be difficult otherwise to mobilize the factors that are needed to build additional infrastructure and increase the output of health and education services. The drawback, however, is that the cotton sector was a growth engine in the past ten years and its vertical integration—which is otherwise unmatched in Burkina’s agriculture—is an important mechanism for providing farmers with access to fertilizers, including for non-cotton purposes. Reducing the cotton sector’s size could reduce these externalities and thereby have negative consequences.

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79 This could pose a risk to debt sustainability, though, if the aid inflows take mostly the form of external loans. In the case of Burkina Faso, this is a concern because the risk of debt distress is already assessed as high.

80 An alternative is that the trade deficit arises because of a switch from non-tradables to imports, which could be triggered by the real appreciation that makes imports relatively cheaper. This effect is small, though, in the MAMS simulation, because imports and non-tradables are quite different in Burkina Faso, which implies a low elasticity of substitution.
beyond those foreseen in the MAMS simulation. Another aspect is that the appreciation of the euro against the US dollar in recent years has caused significant financial losses in the cotton sector that ultimately were absorbed by the Government. This raises the specter of increased aid inflows leading to a real appreciation—mostly through higher prices and wages—which causes losses in the cotton sector that, in turn, lead to increased government expenditures to support the cotton sector. In this scenario, a large part of the aid resources eventually end up subsidizing the cotton sector, which is an inefficient use of scarce donor resources. Against this scenario, creating fiscal space through a higher revenue effort or prioritization of expenditures has attractions. At a minimum, the effects on external competitiveness of a scaling up of aid should be taken into account and reconciled with the authorities’ growth strategy that places a large weight on the cotton sector.

3.279 The aid simulations suggest also that a scaling down of aid triggered by the current global financial crisis would initially be disruptive and lead to a loss in growth, but it ultimately may also give a boost to the cotton sector via a real depreciation. An important aspect would be the fiscal policy response, namely whether the loss of aid resources would be compensated by a stronger revenue effort or a prioritization of expenditures. In either case, human development and infrastructure outlays may be protected. If, on the other hand, these expenditures are cut back in response to a reduction in aid, this would amplify the negative growth impact.

3.280 Increasing education and health services in real terms requires time. Burkina Faso has made in past years substantial progress in these areas, and the baseline projects very large gains in education and health MDG indicators over the coming years. Given this, expanding these services substantially over baseline levels can prove challenging, because it requires a skill set that is not readily available and takes time to build up. Consequently, expanding this type of expenditure requires careful preparation that aligns the pace of expenditure increases with the capacity of the health and education sectors to make effective use of these resources. For example, the demand for education and health workers should remain in line with the ability of education and training programs to deliver a supply of skilled workers. There may also be a need to monitor wage pressures in order to avoid large increases in the wage bill that could crowd out other expenditures.

3.281 Infrastructure spending does not promote only growth, but also other MDG objectives. In MAMS, infrastructure has a direct positive impact on education and health MDG indicators, because it facilitates the delivery of these services. In addition, there is an indirect effect through higher growth, with higher per-capita income increasing the demand for these services. In the simulations, infrastructure spending yields very substantial improvements in the education and health MDG indicators through these two channels. However, they take a number of years to become effective and improve education and health indicators.

3.282 Burkina needs to have a long term approach to increasing fiscal space. There are different ways to increase fiscal space among which generating additional revenue through changes in tax policy, reallocating from lower to higher priorities, and setting up public-private partnerships. But in all cases, it is necessary to consider the long term impact of additional expenditure, not only whether space is available in the annual budget.

3.283 Expanding fiscal space through good governance. Expanding fiscal space per se is not easy, but there are many ways to increase fiscal space. Reducing corruption can help reduce
unproductive spending, as well as moving toward a results-oriented budget to help strengthen accountability and the effectiveness of programs and/or strengthening public financial management systems to ensure that resources reach intended users. Sound PFM ensures accountability and efficiency in the management of public resources, which are critical to the achievement of public policy objectives, including achievement of the MDGs. It supports aggregate control, prioritization, accountability and efficiency in the management of public resources and delivery of services, which are critical to the achievement of public policy objectives. An effective PFM system is crucial for a country in making progress in reducing poverty and enhancing long-term growth. Poverty reduction is not merely a question of spending more, but also using existing resources more effectively. Fiscal space can be created by achieving efficiency gains in how expenditure programs are implemented. Therefore, reducing unproductive expenditures, particularly those of a recurrent nature, should be the first option for a Government seeking an expansion of effective programs. Efficiency, appropriate composition of expenditures, strong fiscal institutions and good governance are critical for achieving positive effects of public spending on growth.

3.284 The role of the private sector should not be neglected. Government policies that foster significant improvements in the efficiency through which the private sector allocate enhance its resources may have the impact of facilitating higher and more effective spending.

3.285 None of the scenarios dominates others, which makes it necessary to consider trade-offs. For example, the strongest poverty reduction by 2015 is likely to be achieved through an aid-financed increase in infrastructure spending. However, focusing the aid resources on human development spending would yield a better outcome for the education and health MDG indicators, leading to a trade-off between different MDGs. There are also tradeoffs regarding the sources of fiscal space. For example, mobilizing additional aid will allow an increase in domestic absorption and avoids the political resistance that may emerge as domestic sources of fiscal space are generated—e.g., large taxpayer lobbying against higher taxes—but it is potentially less reliable (and permanent) than domestic sources of fiscal space and it does make the Government more dependent on donors. Ultimately, it is the responsibility of the Burkinabé authorities to resolve these tradeoffs. The model-based analysis of fiscal space, though, can help to identify and quantify likely tradeoffs.

3.286 In summary, the report recommends the following actions:

- Consider a long term approach to increasing fiscal space. There are different ways to increase fiscal space among which generating additional revenue through changes in tax policy, reallocating from lower to higher priorities, and setting up public-private partnerships. It is necessary to consider the long term impact of additional expenditure, not only whether space is available in the annual budget.

- Expand fiscal space through good governance. Reducing corruption can help reduce unproductive spending, as well as moving toward a results-oriented budget to help strengthen accountability and the effectiveness of programs and/or strengthening public financial management systems to ensure that resources reach intended users.

- Encourage government policies that foster significant improvements in the efficiency through which the private sector enhance its resources. Such policies may have the impact of facilitating higher and more effective spending.
Appendix 9: Data and Key Demographic Indicators

1. In order to construct the basic demographic profile, this chapter draws on the latest data available in Burkina Faso. However, it uses the United Nations Population Division projections to estimate the future population (new population projections have been issued in Burkina Faso since the demographic section of this report was completed). The latest and fourth Burkinabé Population and Housing Census took place in 2006 (Republic of Burkina Faso, 2008d; the previous three censuses were conducted in 1975, 1985, and 1996). The Demographic and Health Surveys (DHS) form the basis for estimating the effect of different determinants of child mortality and fertility (they provide also information on nutrition). Three DHS surveys were conducted in 1992/93, 1998/99, and 2003 (Republic of Burkina Faso, 1994, 2000a & 2004). Another DHS survey is planned for 2009. A Multiple Indicator Cluster Survey (MICS3), that gathered also information on child mortality, fertility, and nutrition, was conducted in 2006 (Republic of Burkina Faso, 2008b). Household demographic surveys were conducted in 1960/61, 1974/75, 1984, 1991, 1993, and 2000 (Tabutin & Schoumaker 2004: 588). Finally, data from civil registration, especially those pertaining to mortality, are of poor quality. Despite the latter shortcoming, the Burkina Faso demographic data appear to be of good quality overall. An understanding of the specifics surrounding the implementation of the population policy and the provision of family planning services was obtained through a desk review of key policy and strategic documents as well as interviews of several policy makers in Burkina Faso.

2. With respect to its direct sub-Saharan neighbours, Burkina Faso has the largest population after Côte d’Ivoire (see Table A9.1).

Table A9.1: Population, Population Density, and Gross National Income per Capita in Burkina Faso, Countries of the sub-Region, and Large sub-Saharan Countries, 2009

<table>
<thead>
<tr>
<th></th>
<th>Population mid-2009 (millions)</th>
<th>Population per Sq. Kilometer</th>
<th>GNI PPP per Capita 2008 (US$)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Burkina Faso and neighbouring countries:</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Burkina Faso</td>
<td>15.8</td>
<td>58</td>
<td>1,160</td>
</tr>
<tr>
<td>Mali</td>
<td>13.0</td>
<td>10</td>
<td>1,090</td>
</tr>
<tr>
<td>Niger</td>
<td>15.3</td>
<td>12</td>
<td>680</td>
</tr>
<tr>
<td>Guinea</td>
<td>10.1</td>
<td>41</td>
<td>1,190</td>
</tr>
<tr>
<td>Senegal</td>
<td>12.5</td>
<td>64</td>
<td>1,760</td>
</tr>
<tr>
<td>Côte d’Ivoire</td>
<td>21.4</td>
<td>66</td>
<td>1,580</td>
</tr>
<tr>
<td>Mauritania</td>
<td>3.3</td>
<td>3</td>
<td>2,000</td>
</tr>
<tr>
<td><strong>Large Sub-Saharan countries:</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nigeria</td>
<td>152.6</td>
<td>165</td>
<td>1,940</td>
</tr>
<tr>
<td>Ethiopia</td>
<td>82.8</td>
<td>75</td>
<td>870</td>
</tr>
<tr>
<td>Dem. Rep. of Congo</td>
<td>68.7</td>
<td>29</td>
<td>290</td>
</tr>
<tr>
<td><strong>Sub-Saharan Africa</strong></td>
<td>836.0</td>
<td>34</td>
<td>1,950</td>
</tr>
</tbody>
</table>

*Source: Population Reference Bureau, 2009.*

3. The mortality and fertility indicators for Burkina Faso do not always compare favourably with either those of neighbouring countries or those of the sub-Saharan Africa region as a whole. According to international data, life expectancy at birth is low in Burkina Faso and is estimated at 57 years for both sexes combined, better than the average for sub-Saharan Africa (51 years).
The Burkinabè total fertility rate is estimated at 6.0 children per woman, which is lower than the fertility level in Niger but much higher than the average for the region as a whole, which is estimated at 5.3 children per woman. The use of modern contraceptive methods is also low in Burkina Faso, as the contraceptive prevalence rate (CPR) for modern methods is estimated at 13 percent among women between the ages of 15 and 49. The CPR for sub-Saharan Africa is estimated at 17 percent for modern methods (see Table A9.2).

Table A9.2: Mortality and Fertility in Burkina Faso, Countries of the sub-Region, and Large Sub-Saharan Countries, 2009

<table>
<thead>
<tr>
<th>Life expectancy (M/F) (years)</th>
<th>Infant Mortality Rate (per 1,000 live births)</th>
<th>Total Fertility Rate (births per woman)</th>
<th>Contraceptive prevalence rate (modern methods) (% of women 15-49)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Burkina Faso and neighbouring countries:</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Burkina Faso</td>
<td>57</td>
<td>89</td>
<td>6.0</td>
</tr>
<tr>
<td>Mali</td>
<td>48</td>
<td>110</td>
<td>6.0</td>
</tr>
<tr>
<td>Niger</td>
<td>53</td>
<td>88</td>
<td>7.4</td>
</tr>
<tr>
<td>Guinea</td>
<td>56</td>
<td>104</td>
<td>5.7</td>
</tr>
<tr>
<td>Senegal</td>
<td>55</td>
<td>61</td>
<td>5.0</td>
</tr>
<tr>
<td>Côte d’Ivoire</td>
<td>52</td>
<td>100</td>
<td>4.9</td>
</tr>
<tr>
<td>Mauritania</td>
<td>57</td>
<td>73</td>
<td>5.1</td>
</tr>
<tr>
<td><strong>Large sub-Saharan African countries:</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nigeria</td>
<td>47</td>
<td>75</td>
<td>5.7</td>
</tr>
<tr>
<td>Ethiopia</td>
<td>53</td>
<td>77</td>
<td>5.3</td>
</tr>
<tr>
<td>Dem. Rep. of Congo</td>
<td>53</td>
<td>92</td>
<td>6.5</td>
</tr>
<tr>
<td><strong>Sub-Saharan Africa</strong></td>
<td>51</td>
<td>80</td>
<td>5.3</td>
</tr>
</tbody>
</table>

Source: Population Reference Bureau, 2009
Appendix 10: Population Projection Assumptions

1. New population projections have been prepared by the Government of Burkina Faso after the completion of this chapter on demography. These projections are based on the data of the 2006 General Census of Population and Housing (*Recensement général de la population et de l'habitation de 2006*) that were released in September 2008.

2. The population projections used in this chapter are those calculated by the United Nations Population Division in 2006, according to various scenarios differentiated by the levels of fertility. The United Nations calculate three projections scenarios, namely a Low, a Medium, and a High variant. These variants are differentiated only by the future course of fertility, which is assumed to experience a fast decline (Low variant), a moderate decline (Medium variant), or a slow decline (High variant). The UN Population Division presents also a constant-fertility variant. Accordingly, the total fertility rate (TFR), which is estimated at 6.36 children per woman in 2000-05, is assumed to decrease by 2045-50 to 2.23, 2.73, and 3.23 children per woman, respectively. In the constant-fertility variant, the TFR is maintained at its initial level, i.e. 6.36 children per woman, throughout the entire projection period.

3. Mortality is assumed to be identical across all projection variants. The expectancy of life at birth for both sexes combined is assumed to improve gradually from 50.7 years in 2000-05 to 65.2 years in 2045-50. This situation reflects progress achieved in the areas of immunization, nutrition, sanitation, and general hygiene. Moreover, the effect of HIV/AIDS among the 15-49 year olds is accounted for in the population projections (this effect is taken into account in the life-table). Therefore, improvements in mortality levels imply also that the HIV/AIDS control program will be successful.

4. International migration levels are also assumed to remain constant across all projection variants. However, changes in the levels of migration are projected over time, following a linear pattern. Accordingly, the net migration, both sexes combined, is estimated to decrease from 20,000 emigrants per year in 2000-05 to 13,000 emigrants per year in 2045-50. Finally, the sex ratio at birth, i.e. the number of male births per 100 female births, is always assumed to be 105 boys per 100 girls across all projection variants.
Appendix 11: Simulating the Long-Run Effects of Increased Spending on Family Planning

1. This Appendix examines the likely long-run effects of an increase in spending on family planning that is sufficient to change the demographic scenario of Burkina Faso for the period 2006-2050 from the High to the Low variant of the United Nations 2006 population projections. The analysis uses MAMS (Maquette for MDG Simulations), a model developed at the World Bank for long-run analysis of alternative development strategies. Compared to the MAMS application used elsewhere in this CEM report, the application developed for this chapter has a longer time frame (up to 2050) and a slightly less detailed representation of the private sphere of the economy – it has a single representative household (instead of six) and, outside the human development area, the non-government production sectors are aggregated to agriculture, industry, and (other private) services (i.e., three sectors instead of twelve). The key features common to both versions of the model include a detailed representation of the Government and endogenous determination of MDG indicators, the educational composition of the labor force, and GDP growth, with a positive growth impact from government investments in infrastructure and education.

2. In the model, demographic evolutions matter by influencing the per capita endowment of labor (commonly measured by the dependency ratio, i.e. population outside labor force age per person in labor force age), as well as the population share that demands schooling (starting at the primary level). Other things being equal, the fact that the lower population scenario has a higher per capita labor endowment raises per capita output. Similarly, per capita land endowments are larger and, unless investment and capital stock growth slows down in proportion to the decline in population growth, per capita capital endowments would also be larger for the lower population variant. The implication of a lower population share in school age for the low population variant is that the economy may devote a smaller output share to the production of educational services while maintaining equally strong educational outcomes.\textsuperscript{81}

3. Two alternative scenarios are simulated. First, BASE, a scenario with the High UN population variant, calibrated to an annual growth rate of 6 percent for real GDP at factor cost and designed to be sustainable in terms of foreign and domestic debt accumulation. Second, LOW-POP, a Low UN variant population scenario with the following distinguishing characteristics: (a) the Low UN population variant instead of the High; (b) additional government spending on family planning; (c) government spending on education and health adjusted to generate the same outcomes as the BASE scenario in terms of MDGs 2, 4, and 5 (primary school completion, under-five mortality rate, and maternal mortality rate) and in terms of educational quality (amount of real services

\textsuperscript{81} An additional real-world link, not considered in these simulations, is that a larger production of health services per capita may be required to generate identical health outcomes in a setting with a high dependency ratio (high population shares at relatively young or old ages). For this reason, our results may underestimate the gains in real per capita private consumption and poverty reduction from expanded family planning.
provided per student) at the secondary and tertiary levels; and (d) endogenous growth in real GDP at factor cost; it will deviate from the BASE scenario primarily due to different growth rates for the different labor types and private capital stocks.

4. Table A11.1 summarizes the key assumptions for the two scenarios. The assumed additional costs of family planning (required to switch from the High to the Low population projection variant) are based on an assessment, which draws on available data for Burkina Faso and similar countries. In this analysis, the contraceptive prevalence rate, for modern methods, is assumed to increase by 1.5 percentage point per year; the contraceptive method mix is taken from the 2006 MICSS Survey (Republic of Burkina Faso, 2008b); and the cost of the provision of family planning services is estimated with standard costs from the family planning literature (World Bank, 2007c).

Table A.11.1. Key scenario assumptions for MAMS population analysis.

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Population growth</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>total</td>
<td>2.5</td>
<td>1.9</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7-12 years</td>
<td>1.9</td>
<td>0.9</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>13-64 years</td>
<td>2.9</td>
<td>2.5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Population (millions)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>total</td>
<td>13.9</td>
<td>42.5</td>
<td>32.8</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7-12 years</td>
<td>2.3</td>
<td>5.5</td>
<td>3.5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>13-64 years</td>
<td>7.8</td>
<td>28.1</td>
<td>23.4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dependency ratio*</td>
<td>0.789</td>
<td>0.515</td>
<td>0.404</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Additional cost of family planning</td>
<td>0.34</td>
<td>0</td>
<td>2.27</td>
<td></td>
<td></td>
</tr>
<tr>
<td>US$2004 per capita**</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Million US$2004**</td>
<td>4.81</td>
<td>0</td>
<td>74.65</td>
<td></td>
<td></td>
</tr>
<tr>
<td>% of GDP***</td>
<td>0.085</td>
<td>0</td>
<td>0.102</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note:  
* [population not aged 13-64]/[population aged 13-64]  
**The annual growth rate in the per-capita cost is 4.3%  
***The annual growth rate in the total cost is 6.3%  
****Assuming a real GDP growth rate of 6% (same as for BASE)

Sources: ISND and Authors' calculations.

5. Table A11.2 and Figures A11.1 and A11.2 summarize the simulation results. Under the BASE scenario, the growth rates for the different domestic final demand categories (consumption and investment for the private sector and the Government) is between 5 and 7 percent, i.e. quite close to the annual rate of growth for GDP at factor cost (6 percent), which, for this scenario, is imposed (growth in GDP at factor cost is endogenous for the other scenarios). In per capita terms, private consumption grows at
an annual rate of 3.1 percent yielding an increase of almost 290 percent in 2050 relative to the 2005 level. The real exchange rate is roughly unchanged. The total labor force grows at an annual rate of 2.5 percent, i.e., at the same rate as the total population but more slowly than the 13-64 year population segment due to a growing student population. The simulation results indicate considerable progress for all MDG indicators (although 2050 is far beyond the original target date of 2015). The headcount poverty rate falls drastically corresponding to a decline in the number of poor from 6.6 million to 2.7 million.\footnote{The low rate suggests, not surprisingly, that the current national poverty line may have become less relevant by 2050 if growth remains strong.} Close to every child completes primary education on time (as indicated by the “net” primary completion rate). The under-five mortality rate declines from a simulated value of 187 per 1,000 in 2005 to 44 in 2050 (MDG 4); and the maternal mortality rate falls from 493 to 85 (MDG 5) (given the 1990 figures, the 2015 targets were 62 and 142, respectively).

### Table A 11.2. Selected results from MAMS population analysis.

<table>
<thead>
<tr>
<th>REAL MACRO INDICATORS</th>
<th>2005</th>
<th>base</th>
<th>pop-low</th>
</tr>
</thead>
<tbody>
<tr>
<td>% growth/yr 2005-2050</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Consumption - private</td>
<td>2374.6</td>
<td>5.6</td>
<td>5.5</td>
</tr>
<tr>
<td>Consumption - private - per capita</td>
<td>17044.8</td>
<td>3.1</td>
<td>3.5</td>
</tr>
<tr>
<td>Consumption - government</td>
<td>200.7</td>
<td>7.0</td>
<td>6.3</td>
</tr>
<tr>
<td>Fixed investment - private</td>
<td>255.3</td>
<td>6.1</td>
<td>6.1</td>
</tr>
<tr>
<td>Fixed investment - government</td>
<td>262.0</td>
<td>6.5</td>
<td>6.3</td>
</tr>
<tr>
<td>Exports</td>
<td>372.3</td>
<td>6.9</td>
<td>6.8</td>
</tr>
<tr>
<td>Imports</td>
<td>646.5</td>
<td>6.1</td>
<td>6.0</td>
</tr>
<tr>
<td>GDP at factor cost</td>
<td>2537.7</td>
<td>6.0</td>
<td>5.8</td>
</tr>
<tr>
<td>Real exchange rate (index)</td>
<td>-0.1</td>
<td>-0.2</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>FACTOR ENDOWMENTS</th>
<th>% growth/yr 2005-2050</th>
</tr>
</thead>
<tbody>
<tr>
<td>Labor -- total (millions)</td>
<td>6.4</td>
</tr>
<tr>
<td>-- less than completed 1st secondary</td>
<td>6.1</td>
</tr>
<tr>
<td>-- completed 1st secondary</td>
<td>0.2</td>
</tr>
<tr>
<td>-- completed 2nd secondary</td>
<td>0.1</td>
</tr>
<tr>
<td>-- completed tertiary</td>
<td>0.1</td>
</tr>
<tr>
<td>Land</td>
<td>111.8</td>
</tr>
<tr>
<td>Private capital</td>
<td>3149.9</td>
</tr>
<tr>
<td>Government capital</td>
<td>3112.1</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>MDG INDICATORS</th>
<th>values in 2050</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Headcount poverty (%)</td>
<td>47.1</td>
</tr>
<tr>
<td>2. Primary school (net) completion rate (%)</td>
<td>9.8</td>
</tr>
<tr>
<td>4. Under-five mortality rate (per 1000)</td>
<td>183.0</td>
</tr>
<tr>
<td>5. Maternal mortality rate (per 100,000)</td>
<td>481.4</td>
</tr>
</tbody>
</table>

Sources: INSD and Authors’ simulations.

\footnote{The poverty calculation is based on a log-normal distribution, assuming a fixed log standard error for the per capita consumption.}
6. Relative to the BASE scenario, under the POP-LOW scenario, growth in GDP at factor cost and private consumption and investment all slow down very marginally or are virtually unchanged while the growth reduction for government consumption and investment are more marked. For GDP at factor cost, the decline is primarily due to a decline in labor force growth (by 0.3 percentage points); the growth rate for land is unchanged (and exogenous) whereas growth in the private capital stock increases marginally due to a slight decline in the need to finance government investment. Given the stronger decline in total population growth, by 0.6 percentage points, all of these macro indicators grow more rapidly in per capita terms. For private consumption per capita, this translates into an additional 0.5 percentage point growth and a level in 2050 that is close to 380 percent above the 2005 level. As a result of the gain in private per capita consumption, the headcount poverty rate declines even further, to 3.9 percent in 2050, 2.4 percentage points below the BASE rate. In terms of the number of poor in 2050, this is equivalent to a decline from 2.7 million to 1.3 million, reflecting the combined impact of a lower rate and a smaller population. These are considerable gains considering the minimal additional cost of the family planning program.83

7. By construction, the outcomes for MDGs 2, 4, and 5 are identical to the BASE scenario. However, these MDG outcomes can be achieved with fewer government resources (cf. the above-mentioned declines in government consumption and investment growth) given: (a) the demographic change (a smaller student population); (b) the fact that higher real per capita incomes generate more growth in private health and education services, which substitute for government services; and (c) a positive contribution from higher living standards to the ability of the students to benefit from any given amount of services that are offered.

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83 In addition, a scenario that is identical to LOW-POP is simulated except for that the Government receives additional grant aid sufficient to cover the additional costs of the family planning program. Given the low cost of the program relative to the size of the overall economy, the simulated results were extremely similar to those of the LOW-POP scenario.
**Figure A11.2. Headcount poverty rate (%)**

![Graph showing headcount poverty rate over time.](image)

*Sources:* INSD and Authors’ simulations.
Appendix 12: The MAMS Methodology

1. This paper considers fiscal policy options for promoting growth as well as education and health-related Millennium Development Goals (MDG) in Burkina Faso. The analysis takes place at a macroeconomic level, with a focus on growth, domestic absorption, income distribution, and MDG effects. Several fiscal policy options are considered: (i) creating fiscal space, i.e. mobilizing resources, and (ii) using fiscal space, i.e. using these resources to pursue growth and MDG objectives. Specifically, the creation of fiscal space is used to: (i) reprioritize expenditures towards growth and MDG objectives; (ii) increase aid inflows (grants); and (iii) raise domestic revenue. The use of fiscal space is simulated in scenarios showing: (i) an increase in health and education expenditures; (ii) an increase in infrastructure expenditures; and (iii) a combination of the two options.

2. The Maquette for MDG Simulation (MAMS) is used to analyze the effects of these policy options. MAMS is a multisectoral growth (real) model that has been expanded to incorporate MDGs through modeling of health, education and water-sanitation sectors and their linkages with the rest of the economy. By explicitly modeling the link between fiscal policy tools and growth, education, and health outcomes, MAMS allows us to conduct the analysis of fiscal space within the discipline of a model-based framework. The model using Burkina-specific data is calibrated, which required a substantial effort given that the database and the model are quite detailed relative to other economy-wide models.

3. A key feature of models of this type and related databases is that they strive to integrate, in a consistent framework, available data on behavior and structure in different sectors of the economy. Unfortunately, for Burkina Faso, data weaknesses are serious in many areas; e.g. inter alia, our understanding of key economic linkages (such as the link between education level, labor market performance, and economic productivity/growth) is sparse. Given this the level of model uncertainty remains high – our analysis should be seen as a rough first approximation of Burkina’s economy as opposed to a close replica.

4. Finally, the link between different fiscal space options and the final objective of fiscal policy is considered. The latter is approximated with the Millennium Development Goals (MDGs) for Burkina Faso and included in the fiscal space simulations MDG indicators for poverty, education, and health. In sum, our analysis assesses the macroeconomic impact of different types of spending; evaluates their impact on different MDG indicators; and considers various options for creating the needed fiscal space, including their impact on macroeconomic variables and MDG indicators.

Key Features of the MAMS

5. MAMS includes sets for households; goods and services (used for investment, consumption, and trade); and production factors. For the Burkina Faso application, these sets are defined as follows:
6. **Households:** six different household types are modeled, in particular (i) a wage-earning household in the formal sector and (ii) another one in the informal sector; three different types of agricultural households representing (iii) cotton producers, (iv) food crop producers, and (v) livestock keepers; and (vi) one ‘other’ for pensioners, independent businesses, etc. The 2004 household survey shows that the wage-earning households are the least poor—with an average (unweighted) poverty rate of about 10 percent—while the agricultural households are the most poor with an average poverty rate of approximately 55 percent.

7. **Goods and services:** outside the government and health and education sectors, which are discussed below, 14 different types of goods and services are included that cover different agricultural products (e.g., cereals, cotton, etc.); processed goods (e.g., cotton fiber for exports; manufactured goods for domestic use); utilities (e.g., water and sanitation); petroleum (imported); and services (e.g., construction).

8. **Production factors:** the model considers labor differentiated by four different skill levels—i.e., (i) unskilled labor with completed primary education or less; (ii) semi-skilled labor with completed secondary I education; and high-skilled labor with (iii) secondary II education; and (iv) tertiary education. In addition, private capital and land are included as production factors. This is complemented by public infrastructure, which enhances total factor productivity.

9. **Economic modeling in MAMS** is based on micro-foundations. Beginning with producers, they maximize profits in a perfectly competitive setting, i.e. they take prices (for both output and input) as given. Producers can adjust their factor inputs, thereby changing overall output level as well as the relative factor intensity of production, with the latter subject to the constraint of a CES production function. Profit maximization yields a first-order condition where for each production factor the marginal cost of employing this factor has to equal the marginal revenue it generates in production.

10. On the demand side, domestically-produced goods can either be exported or sold to the domestic market. Exports and goods for the domestic market are modeled as imperfect substitutes, which allows for price differences. The relative price of goods for exports and domestic sales determines the share of domestic production that goes into exports and domestic sales. A similar mechanism applies to determining the share of imports in domestic sales. Changes in the exchange rate affect both exports and imports via their relative price to domestic sales or production; the exchange rate adjusts to keep the current account in balance. Consumer demand is determined via a linear expenditure system; the demand for a given commodity depends (i) positively on household income via a fixed marginal income share; (ii) negatively on its own price; and (iii) on minimum demand determined through subsistence needs.

84 Production technology is defined by a nested, two-level structure. At the bottom, a CES production function aggregates the primary production factors discussed above into value-added output. In addition, a Leontief production function aggregates the intermediate inputs. At the top level, value-added and the intermediate inputs are aggregated into final output via a Leontief production function. For details, see Lofgren and Diaz-Bonilla (2007).

85 This system is derived from utility maximization.
11. Regarding factor markets, households do not maximize utility on an intertemporal basis; this implies (i) that overall labor supply depends only on exogenous population growth and not on wages, and (ii) savings (and by extension investment) is not a function of interest rates (and return on investment) but is determined as the residual between household income and consumption. Households, though, make a decision on their education, which in turn determines the supply of different labor skills in the market. The education decision depends on the wage premium for skill; education quality (determined by government spending on education); student health; level of infrastructure; and per-capita household consumption. In principle, changes in wage rates clear all factor market; however, the model allows for reservation wages for skilled labor, which implies increasing unemployment rates for this factor once wages hit the reservation wage floor and cannot fall further to clear the market.

12. Government collects different types of revenue—direct income taxes, indirect sales taxes (the largest revenue source), and import duty—and spends it on the expenditure categories listed above. Both revenue sources and expenditures categories are broadly calibrated to match Burkina Faso’s budget composition. The required capital stock to support current government activities—i.e., the capital stock needed for education, health, and ‘other government’ activities—is endogenous, depending on the level of current government activities. Capital investment in public infrastructure, in contrast, is exogenous, but current government spending to maintain and operate the public infrastructure is endogenized, depending on the level of the public infrastructure capital stock.

13. In general, goods and factor markets clear through changes in prices. For example, if demand for a given commodity increases—this could result from increased government spending on an activity that needs this commodity as input—the relative price of this commodity will increase; on the demand side, this reduces household demand for this commodity, and on the supply side, production of this commodity becomes more profitable. The latter leads to an increase in factor demand in this sector and higher factor wage rates of factors that are intensively used in this sector. Higher factor wage rates, in turn, reduce factor demand in other sectors where the relative output price has declined. Unlike a dynamic stochastic general equilibrium (DSGE)-type macroeconomic model, MAMS does not model nominal rigidities that lead to a gradual price adjustment; rather, prices adjust instantly in MAMS. Consequently, MAMS simulation results should not be seen as depicting a short-term forecast, but rather the medium-term outcome after all price adjustments have taken place. In this sense, MAMS is a medium-term growth model and not a short-term macroeconomic model. Consistent with this medium-term orientation, MAMS does not model monetary policy or inflation, because monetary policy has real effects only in the short term but is neutral in the longer term, which is MAMS’ modeling horizon. Instead, MAMS keeps the consumer price (CPI) index fixed and uses it as a numéraire; that is, all prices in MAMS are ‘real’ prices, deflated by the CPI index.
Appendix 13: Simulations with MAMS to Analyze Structural Changes and the Determinants of Workers Migration from Rural to Urban Areas

Figure A13.1: Structural Change in the MAMS Baseline Simulation

Panel 1: Gross Enrollment Rates by School Type, 2007–2030 (in percent)

Panel 2: Labor Force Composition by Education Level (in percent)

Panel 3: Labor and Capital Accumulation—Change in Percent Since 2007

Panel 4: Wage Rates, 2007–2030 (Index 2007 = 100)

Panel 5: Change in Employment Relative to 2007—Semi-Educated Labor 2007–2030 (in millions)

Panel 6: Change in Employment Relative to 2007—Highly-educated labor (secondary education), 2007–2030 (in millions)

Source: Authors' calculations.
Figure A 13.1.: continued. Structural Change in the MAMS Baseline Simulation

Panel 7: Unemployment Rates, 2007–2030

Panel 8: Factor-specific Productivity Trends, 2007–2030

Panel 9: Sector Shares in Real GDP, 2007–30

Panel 10: Producer Prices, 2007–2030

Panel 11: Exchange Rate Indices, 2007–2030

Panel 12: Export-to-GDP Shares, 2007–2030

Source: Authors' calculations.
Figure A13.2: Higher TFP Growth in Agriculture—Impact on Agriculture and Current Account

Panel 1: Exogenous Productivity Trends, 2007–2030
(Difference to baseline in percent)

Panel 2: Production Levels in Agriculture, 2007–2030
(Difference to baseline in percent)

Panel 2: Export Shares in Agriculture, 2007–2030

Panel 4: Price Levels in Agriculture, 2007–2030
(Difference to baseline in percent)

Panel 5: Real Exchange Rate, 2007–2030
(Difference to baseline in percent; + Depreciation)

Panel 6: Economy-wide Import Share, 2007–2030
(Difference to baseline in percent)

Sources: Authors’ simulations.
Figure A13.3: Higher TFP Growth in Agriculture—Impact on Household Incomes

![Graph showing income levels by household and production factor, 2007-2030.](image)

**Sources:** Authors’ simulations.

Figure A13.4: Higher TFP Growth in Agriculture—Impact on Factor Wages and Employment

![Graph showing wage levels and agricultural employment, 2007-2030.](image)

**Sources:** Authors’ simulations.
Figure A13.5: Higher TFP Growth in Agriculture—Production and Prices in Non-Agriculture

Sources: Authors’ simulations.

Figure A13.6: Higher TFP Growth in Agriculture—GDP Deflators and Expenditure Shares

Sources: Authors’ simulations.
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