

Report No: AUS9779

Islamic Republic of Afghanistan Agricultural Sector Review

Revitalizing Agriculture for Economic Growth, Job Creation and Food Security



June 2014



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Acronyms and Abbreviations

[1 US\$ = Afs55]

A4	Advancing Afghan Agriculture Alliance
AADB	Afghanistan Agricultural Development Bank
AAEP	Afghanistan Agricultural Extension Program
AAIDO	Afghanistan Almond Industry Development Organization
AAIP	Afghanistan Agricultural Inputs Project
ACE	Agriculture Credit Enhancement
ACGF	Afghanistan Credit Guarantee Facility
ACIAR	Australian Center for International Agricultural Research
ADB	Asian Development Bank
ADCUS	Agricultural Data Collection and Utilization System
ADF	Agricultural Development Fund
AFD	Agence Française de Développement
AFIDS	Afghanistan Institutional Development Support Project
AGRED	Afghanistan Agricultural Research and Extension Development
AI	Artificial Insemination
AILMP	Agriculture, Irrigation, and Livestock Master Plan
AISA	Afghanistan Investment Support Agency
AMA	Afghanistan Microfinance Association
ANDMA	Afghanistan National Disaster Risk Management Authority
ANDS	Afghanistan National Development Strategy
ANHDO	Afghanistan National Horticulture Development Organization
ANNGO	Afghanistan National Nursery Growers' Organization
ARAZI	Afghanistan Independent Land Authority
ARDS	Agricultural and Rural Development Strategy
AREDP	Afghanistan Rural Enterprise Development Project
AREU	Afghanistan Research and Evaluation Unit
ARFVPA	Afghan Raisins, Fruits, and Vegetables Promotion Administration
ARIA	Agricultural Research Institute of Afghanistan
ARTF	Afghanistan Reconstruction Trust Fund
ASAP	Accelerating Sustainable Agriculture Program
ASMIS	Agricultural Statistics and Management Information System
ASR	Agricultural Sector Review
AWARD	Afghanistan Water Resources Development
CARDP	Comprehensive Agriculture and Rural Development Program
CBR	Capacity Building for Results
CGIAR	Consultative Group for International Agricultural Research
CHAMP	Commercial Horticulture and Agricultural Marketing Program
CIG	Common Interest Group
CIMMYT	International Maize and Wheat Improvement Center
CMP	Change Management Plan
CPG	Citrus Promotion Group
CSO	Central Statistics Office
DAIL	Department of Agriculture and Livestock
DAP	Di-Ammonium Phosphate
DRM	Disaster Risk Management

EC	European Commission
EIRP	Emergency Irrigation Rehabilitation Project
EPA	Export Promotion Agency
EU	European Union
FAAHM	Food, Agriculture, and Animal Husbandry Information Management and Policy Unit
FAO	Food and Agriculture Organization
FDI	Foreign Direct Investment
FFS	Farmer Field Schools
FMFB	First Microfinance Bank
FSAC	Food Security and Agriculture Cluster
FTE	Full-time Equivalent
GDP	Gross Domestic Product
GIS	Geographic Information System
GoIRA	Government of Islamic Republic of Afghanistan
GPFA	Global Partnership for Afghanistan
GR	Green Revolution
GTZ	Gesellschaft für Technische Zusammenarbeit
ha	hectare
HCDP	Horticulture Cooperatives Development Project
HDU	Herat Dairy Union
HIC	Herat Ice Cream Company
HLP	Horticulture and Livestock Project
IA	Irrigation Association
ICAR	Indian Council of Agricultural Research
ICARDA	International Center for Agricultural Research in Dry Lands
IFAD	International Fund for Agricultural Development
IFC	International Finance Corporation
IPM	Integrated Pest Management
IRDP	Irrigation Restoration and Development Project
ISAF	International Security Assistance Force
IWRM	Integrated Water Resources Management
JICA	Japan International Cooperation Agency
KDC	Kamel Dairy Company
KfW	Kreditanstalt für Wiederaufbau
kg	kilogram
km	kilometer
LF	Lead Farmer
MAIL	Ministry of Agriculture, Irrigation, and Livestock
MCI	Ministry of Commerce and Industries
MEDA	Mennonite Economic Development Associates
MEW	Ministry of Energy and Water
MISFA	Microfinance Investment Support Facility for Afghanistan
MoPH	Ministry of Public Health
MRRD	Ministry of Rural Rehabilitation and Development
mt	metric ton
NADF	National Agriculture Development Framework
NGO	Non-governmental Organization
NHLP	National Horticulture and Livestock Project
NPP	National Priority Program
NRVA	National Risk and Vulnerability Assessment

NSB	National Seed Board
NSP	National Solidarity Program
O&M	Operation and Maintenance
OFWMP	On-farm Water Management Project
PHDP	Perennial Horticulture Development Program
R&D	Research and Development
RADP	Regional Agriculture Development Program
RAMP	Rebuilding Agricultural Marketing Program
RMLSP	Rural Microfinance and Livestock Support Program
SAAF	Strengthening Afghan Agriculture Faculties
SCA	Seed Certification Agency
SEDP	Seed Enterprise Development Project
SME	small and medium enterprise
TFP	total factor productivity
UAE	United Arab Emirates
UHT	Ultra-high Temperature
USAID	United States Agency for International Development
USG	United States Government
VFU	Veterinary Field Units
WFP	World Food Program
WRD	Water Resource Department
WUA	Water User Association

Executive Summary

There is a compelling case for investing in agriculture in Afghanistan. Agriculture (excluding opium poppy) accounts for about one quarter of national GDP and is the second largest sector after services. More than 80 percent of the population and nearly 90 percent of the poor live in rural areas, and agriculture plays an important role in their livelihoods. About half of all households derive at least part of their income from agriculture, which employs about 40 percent of the national workforce. Agriculture and minerals are the two sectors with the greatest potential to drive economic growth in the foreseeable future, and to generate the foreign exchange and government revenue needed to help offset projected reductions in foreign aid. But of the two, agriculture offers significantly greater potential for creating jobs. It also has prospects for raising labor productivity, benefiting women and other disadvantaged groups (the poor, landless, and nomads), and reducing poverty and food insecurity in rural areas.

Given the country's high population growth rate, simulations with an economy-wide model show that agriculture will need to grow by at least six percent per year if rural incomes are to increase. This is nearly twice as fast as the average growth rate over the past decade. Achieving it will be challenging, but possible: fortunately, Afghanistan has many catch-up opportunities—from revamping the rural institutions, infrastructure, and technology destroyed during the years of conflict—that offer the possibility of a period of faster agricultural growth.

The World Bank and the Government recognize that agriculture and rural development are crucial for inclusive growth and are committed to a program of renewal and strategic long-term investments in agriculture. In 2009, the Government with assistance from donors developed the National Agriculture Development Framework (NADF). This comprehensive plan for the sector is structured around four key pillars: agricultural production and productivity, economic regeneration, natural resource management, and change management.

Implementing the NADF is proving to be challenging, however. Although the Ministry of Agriculture, Irrigation, and Livestock (MAIL), the lead executing ministry, has developed a large number of subsector-specific policies, laws, and strategies, many of these have not moved beyond the draft stage. Even once they are adopted, serious concerns will remain about the institutional capacities of the relevant public institutions to implement such a broad range of interventions within any realistic time frame. And serious questions arise about whether the necessary financial resources will be available in an era of fiscal tightening.

To increase the agricultural growth rate quickly, rather than trying to drive the entire agricultural sector forward at the same time, it may be more realistic to focus attention initially on a few “first movers:” priority commodities that are imported, and traditional export crops, and to drive the value chains for these hard for growth and job creation with the expectation that the rest of the sector will follow. Such a strategy is very similar to that underlying the Asian Green Revolution, where an initial thrust on import substitution for wheat and rice in high-potential

irrigated areas led to significant growth in agricultural employment and thence to rural transformation.

In Afghanistan as in the Green Revolution model, the state would need to play a lead role in driving and coordinating the strategy within each of the selected value chains to encourage this growth, and in overcoming cross-cutting constraints including irrigation water and finance. Compared with the Green Revolution model, however, there are greater opportunities today for the state to partner with the private sector and NGOs in market-led solutions, rather than having to rely on state-run marketing and lending institutions—while globalization has opened up new opportunities for exploiting the benefits of international agricultural trade.

This agricultural sector review proposes a “first-mover” strategy to serve as an initial phase in the national agricultural strategy, providing an early boost to productivity growth, employment, and poverty reduction. The promotion of “first-mover” strategy responds both to the adjustment of the anticipated decline in foreign aid and agricultural transformation that is necessary for Afghanistan’s inclusive economic growth, job creation and food security. The review draws heavily on a number of specially commissioned background papers that analyze the available evidence.

A Selective Agricultural Strategy for Quicker Results

First movers

The most promising opportunities for “first movers” lie with irrigated wheat, horticultural crops (defined here as fruits, nuts, and vegetables), and intensive livestock production (milk, eggs, and poultry meat) in peri-urban areas. These three subsectors have several major advantages:

- They have the best catch-up potential in the short term for raising productivity within the constraints of existing institutional capacities and infrastructure. These urgently need to be improved for longer-term gains, but this will take time to achieve.¹
- Cost analysis shows that irrigated wheat and horticultural and livestock products can be produced on a competitive basis with imports (and could be exported in some cases).
- These commodities face strong and growing demand at home or abroad.
- The three subsectors are spatially concentrated in relatively small intensive irrigated and peri-urban areas that are somewhat secure and have good access to markets, and are also well located for leveraging the infrastructure investments that are planned in growth and resource corridors.
- They can leverage significant value addition and employment along value chains, and increase the incomes and employment of large numbers of people.

¹ Experience shows that it takes up to a generation to build effective government institutions in countries emerging from conflict. See World Bank, 2011, World Development Report 2011: Conflict, Security, and Development.

- They are spatially concentrated in the areas where the greatest numbers of poor people live – in the north and northeast regions.
- They can contribute to securing national food supplies for resettling returning refugees and ex-combatants, and in the right combinations they are as profitable as opium poppy production.
- The intensive peri-urban agriculture can serve as a shock absorber and safety valve, when urban employment is contracts due to decline in foreign aid.
- At a time of fiscal tightening, they offer a way to concentrate available public resources so as to achieve the best possible gains.

The three subsectors currently account for two thirds of agricultural GDP and one third of total agricultural employment when measured in full-time-equivalent (FTE) jobs.² Estimates developed for this sector review show that with the right mix of policies and investments, the three subsectors could more than double Afghanistan’s agricultural GDP over the next ten years, driving an average annual agricultural growth rate of about eight percent. This implies an addition of 1.3 million FTE jobs within the next decade (1.05 million in agriculture and 0.26 million in the non-farm economy), a number equivalent to about 30 percent of the estimated net addition to the labor force over the period. The focus on irrigated and peri-urban areas would also bring income and employment growth to the areas where the greatest numbers of poor people live—i.e. the north and north-east regions.

There is a cost to this first-mover strategy, in that it downplays efforts to improve the productivity of the country’s rain-fed farming and nomadic livestock systems. These are important farming systems for the food security and livelihoods of some of the poorest people in Afghanistan. While some households living in rain-fed cropping and pastoral areas would benefit from the first-mover strategy—through technology spillovers, better job and migration opportunities, and less costly food—many are likely to get left behind. Unfortunately, improving their low-productivity farming systems is a challenge, and it would be easy to spend a lot of resources on them without achieving much gain. While carefully prioritized interventions in these farming systems must play a role, they need to be coordinated with other forms of household and community development assistance. Packages of complementary interventions may be more cost-effective ways of helping the poor than direct agricultural interventions alone.

There is also a risk that the first-mover strategy will lead to more rather than less opium poppy production. For example, rehabilitating and expanding the irrigated area and building more rural roads might result in more opium poppy production if farmers find this more profitable than the available alternatives. This risk must be carefully managed.

² A full-time equivalent (FTE) job is defined as 200 work days per year.

Two pillars

Developing a selective agricultural strategy needs to take into account the diversity of Afghan agriculture.

First, the sector is spatially diverse, ranging from intensive irrigated crop systems, in which farmers practice multiple cropping, to extensive livestock systems in dryland areas, with many things in between. The rural road and electric power networks are underdeveloped, and communities vary widely in their access to these services and to markets. There is also regional variation in security and continuing conflict, and in the extent to which licit agriculture faces competition from illicit opium poppy production.

This spatial variation means that a first-mover strategy should prioritize regions in terms of their potential for quick agricultural growth. From this perspective, the best first-mover options lie in the intensive irrigated areas that either already have good access to transport, power, and market centers, or that will soon have these features as a result of planned investments in growth corridors. In the latter case, the first-mover strategy would be able to leverage the benefits from these corridor investments.

A second important source of diversity arises at the farm household level. Although most farms are small (two thirds are smaller than 1 ha), the distribution of cropland and water are concentrated among relatively few middle-sized and large farms, which provide most of the marketed surpluses that feed the urban population. Small farm households are much more numerous and mostly subsistence oriented. Net buyers of food, they operate small plots of mostly rain-fed land and/or keep traditional livestock in order to meet their own food needs. The bifurcation between market and subsistence-oriented farming is particularly striking between rain-fed and irrigated areas, and between extensive and intensive livestock farming systems.

Given such farm-level differences, a first-mover strategy needs to have two pillars. Pillar I is the commercial development of selected value chains, targeting commercially oriented farms that can be linked to these chains on a business basis. This will mean targeting many medium-sized and large farms, but opportunities also exist for linking many more small farms on a commercially viable basis (e.g. through farm out-growers and contract farming models) to the priority value chains.

Pillar II caters to the food security and livelihood needs of the rest of the agricultural population. This will require appropriate interventions to improve the productivity of rain-fed farming and extensive livestock systems. But because the prospect for significant productivity gains in these low input–low output farming systems is limited, such interventions need to be coordinated with other forms of household and community assistance, such as drought management, community development programs (e.g. the National Solidarity Program), social protection programs (e.g. the Safety Nets Program), settlement programs for nomadic people, alternative livelihood programs in opium poppy areas, and support for non-farm sources of income (e.g. through the

Afghanistan Rural Enterprise Development Project) as well as for migration. Such coordinated assistance is likely to be much more effective than agricultural investments on their own.

Pillar I: Developing Prioritized Value Chains

There are important constraints along the value chains of the prioritized commodities whose resolution could make a big difference to their productivity and marketed surpluses. Some of these constraints are specific to individual value chains, and are discussed here; others are cross-cutting and discussed in the subsequent section.

Irrigated wheat

Wheat looks particularly promising for increasing incomes and employment in farming. The crop accounts for one quarter of agricultural GDP and 6.3 percent of national GDP (70 percent of its value comes from irrigated areas). Wheat generates between 1.1 and 1.3 million FTE jobs, of which 640,000 - 790,000 arise on-farm and the rest are generated through linkage effects in agro-industries, including milling and baking.

Current production inefficiencies and moderate yields imply a real catch-up growth opportunity in wheat. On average, Afghanistan imports about 20 percent of its wheat consumption, or 1.2 million metric tons (mt) per year. Even at current yields, domestic production can compete with imports on cost, and it is not unrealistic to expect that production could be increased to displace most imports within five to ten years, at least in non-drought years.

With its arid climate and dependence on irrigation, Afghanistan is unlikely to have a comparative advantage in growing irrigated wheat, and in the longer term would find it more economically efficient to expand high-value horticultural production in irrigated areas at the expense of wheat. However, such a shift needs to be tempered by several considerations. First, development of high-value horticultural production and markets will take time, and is likely to be concentrated in areas that have ready access to markets and/or cold storage facilities. This means that irrigated wheat will remain competitive in many areas for a long time. Second, farmers decide what crops to grow, and given the uncertain environment in which they live, most choose to grow wheat for their own food security. Third, the Government needs to balance the need for economic efficiency in the use of the country's agricultural resources against the need to prevent a national food crisis (such as that occurred in 2008), and this requires maintaining an acceptable ratio of domestic production to national consumption. These issues warrant further analysis, but it seems clear that irrigated wheat will remain an important crop for the indefinite future and deserves to be treated as a first-mover commodity.

The best potential for raising wheat production lies with irrigated wheat, and there are two ways to achieve this. One is to expand the irrigated area through rehabilitation and new investment. It needs to be borne in mind that in some rehabilitated or newly developed irrigation schemes there will be a compelling case for promoting horticulture and other high-value farming rather than wheat, or at least for including such crops in rotation with wheat. Indeed, the inclusion of some

high value crops will often be necessary if farmers are to be discouraged from growing opium poppies on the expanded irrigated area. But the final choice of what to grow is a decision that can be left to farmers and markets.

The other way to increase irrigated wheat production is to increase yields. Irrigated wheat farmers are already doing most things right. They are using moderate to high levels of fertilizer, small farms are achieving the same or higher yields as large farms, and post-harvest losses are already relatively low at around 15 percent. The national wheat price and the cost of fertilizer are aligned with border prices, and good farm-level incentives exist without the need for input subsidies. The main opportunities for further raising yields lie with improved on-farm water management, an increased supply of quality seeds and improved varieties, better quality fertilizers, and improvements in agronomic practices. Achieving these improvements will require more effective agricultural research and extension, and better regulation of seed and fertilizer quality.

If the irrigated wheat area can be expanded by 10 percent over ten years through rehabilitation and the yield can be raised to 4.5 mt/ha, then total irrigated wheat production would increase by 2.25 million mt over the decade, giving an additional annual GDP contribution of US\$1.58 billion. This would create 173,800 new FTE jobs in wheat production and 54,700 in agro-industry, including wheat milling and baking. Since irrigated wheat is widely grown on small farms, the benefits to poorer households from raising yields could be widespread. The projected growth in national demand for wheat is more than adequate to absorb such a production increase.

Livestock

Livestock currently contributes about 15 percent of agricultural GDP, or US\$680 million annually, and creates about 1.1 million FTE jobs, 15 percent of which are off the farm. Afghanistan exports some livestock products—mostly skins, wool, and cashmere—but it imports much larger amounts (by value) of live animals, meats, eggs, and dairy products. The demand for these imported products has more than doubled since 2008 and has been almost entirely met from imports.

The livestock subsector has good catch-up potential. It could contribute much to growth and employment, substitute for imports, and exploit more export opportunities. It could also leverage more agro-processing activity at small and medium scales. Livestock constitute perhaps the most inclusive production activity in Afghanistan, being widely held by the poor in all regions, providing a nutritious food staple in everyone's diet, and being cared for largely by women. For small farmers, livestock production also has good potential as an alternative to opium poppy growing.

The livestock subsector is divided mainly into sedentary and nomadic production systems. The nomadic system provides the main source of livelihood for many of the poorest people, especially the nomads, and accounts for most of the red meat, skins, and wool that reach the market. Nomadic livestock husbandry is a low productivity activity that is particularly prone to

losses from drought and severe winters. The sedentary system consists of settled farmers, who hold some sheep and goats and most of the cattle on small agricultural holdings. The intensity of livestock farming on sedentary farms is conditioned mainly by the availability of irrigation for producing fodder, forage, and other feeds (crop by-products, such as wheat- and barley-straw).

Low productivity breeds, diseases, poor feeding, drought, and the difficulties of marketing perishable commodities are the main constraints on the livestock subsector. These constraints are most difficult to overcome in the widely dispersed nomadic and subsistence-oriented sedentary systems. It is the farmers in areas with easy access to irrigated land and urban markets who have the best prospects for producing dairy, poultry meat, and eggs on a commercial basis to compete with imports in supplying the rapidly growing urban market. Most of these better-placed farmers produce at small scales, though some larger-scale units exist for dairy and commercial poultry production (milk, egg layers, and broilers).

Promising interventions for expanding intensive livestock production include: improving animal breeds through importation of breeding stock and artificial insemination; building on successful experiences with privatizing veterinary services; developing medicines and vaccines that are of assured quality for sale by trusted agro-dealers and veterinarians; improving the availability and quality of livestock feeds by assisting small and medium-sized agro-industrial firms to produce feed concentrates of import quality; improving on-farm livestock management through better extension services; strengthening the capacity of MAIL to monitor and control livestock diseases; incentivizing the private sector and producer organizations to build more modern slaughter houses, cold storage, and processing facilities for perishable products (e.g. UHT processing for milk); and in some cases to organize greater coordination along value chains by forming producer cooperatives and trade associations.

Without additional support, intensive livestock production will increase only modestly over the next ten years. But with support there is reasonable potential to double the output of intensive dairy and poultry production within this period, adding US\$270 million annually to GDP and creating 715,300 FTE jobs over the decade.

Horticulture

The horticulture subsector extends to about 360,000 ha, covering almost 14 percent of the country's irrigated land area and involving more than 2 million people. Afghanistan's diverse geographical and climatic conditions allow a wide range of crops to be produced at different times of the year. The most prominent crops are grapes, almonds, and pomegranates, most of which are exported. Some horticultural products, such as pistachios are believed to be native to Afghanistan—which would make them relatively easy to produce. Cumin grows well in rain-fed, semi-arid areas, making it an exception among horticultural products and creating many opportunities for production increases. Saffron production is very labor intensive and is a good source of employment for women. The country has a long history of horticultural production and exports and has considerable potential to regain some of its lost market shares. Afghan

horticulture has grown at 5.5 percent over the past decade, and with a little additional investment it is well positioned to expand even faster. As of 2013, the subsector has recaptured its 1970s levels of production, but is still characterized by low yields, lack of consistency in quality and quantity, poor post-harvest practices, and weak producer and marketing organizations.

Horticulture currently contributes US\$1.4 billion to national GDP and 34 percent of agricultural GDP, and provides some 350,000 FTE jobs, of which some 90,000 are in the non-farm economy. Horticultural exports are worth more than US\$700 million per year and there are good prospects for increasing this amount. The subsector gives high returns to irrigated land, and shows considerable promise for raising farm incomes, generating productive jobs, improving diets in rural and urban areas, opening up agro-processing opportunities, and competing with opium poppy production. Horticulture is open to many of the smallest and poorest farmers, and women can be actively involved in value chains, such as those for saffron, grapes/raisins, and almonds.

The main constraints on the production side are insufficient irrigated land to expand the horticultural area (mainly because of the destruction and lack of maintenance of irrigation schemes during the three decades of conflict and insurgency); inadequate supplies of improved crop varieties and certified seeds and seedlings; old orchards that need replanting; insecure property rights that discourage long-term investment; insufficient access to credit; inadequate extension; and poor on-farm management of water, crops, and pests. On the marketing side, farmers have limited access to the cold storage and refrigerated transport they need for many of these high-value but perishable products.

Needed interventions include: improving farmers' access to improved and certified seeds and planting materials; improving on-farm water management, crop management, and pest control; reducing post-harvest losses; revamping the extension system to focus on selected promising value chains; improving access to credit; and incentivizing the private sector to invest in more cold storage facilities, refrigerated transport and shipping, and processing of horticultural crops.

The potential gains from horticulture are large. Based on recent trends, the subsector is projected to grow to 400,000 hectares (ha) by 2024 and make an annual contribution to GDP of US\$1.6 billion. But additional growth is possible with the right investments and policies. It is reasonable to expect that the irrigated area devoted to horticulture could be increased (through rehabilitation) by 25,000 ha each year, thus adding another 250,000 ha by 2024. Additional yield gains of two percent per year are also feasible, through better extension and better on-farm crop and orchard management. Together these changes could lead to an annual GDP contribution of about US\$3.23 billion per year by 2024. They would add 361,900 FTE jobs by 2024, of which 267,300 would be within horticulture and 94,600 would be in other activities through forward linkages. All these gains are consistent with projected demand in the domestic and export markets.

Countering opium poppy production

Investing in each of the three value chains proposed above presents opportunities for combating illicit opium poppy production, but it also poses some risks of inadvertently increasing poppy production. These risks need to be managed. Developing integrated approaches for Pillar I interventions that offer viable alternatives to poppy production will often require combining farming systems and livelihood perspectives with a regional economy perspective. Priority crops and livestock need to be combined on farm in ways that provide a high annual return per hectare of irrigated land. A lower-value crop like wheat may need to be grown as a secondary crop within a seasonal or multi-year rotation. Horticulture and livestock not only create high on-farm income and employment, but also offer good prospects for local value addition that might be enhanced by appropriate regional economic policies.

Taken together, the total on- and off-farm impact of Pillar I investments on employment could be high in a region, creating significant new opportunities for many small farms and landless workers that are better than those from opium poppy production. So far, experience is limited in taking such an integrated approach with a clear spatial focus. A high priority should be to develop and pilot such an approach within some of the Pillar I target areas.

Agro-industry

Agro-industry already accounts for more than 90 percent of manufacturing in Afghanistan and depends on domestic raw materials. It has considerable capacity to grow with wheat, livestock, and horticultural production, and the projections given for these three subsectors above are consistent with an extra 260,200 FTE jobs in agro-industry within ten years. However, to realize these gains would require an enabling business environment to attract more private investment, including foreign direct investment.

Agro-industry is dominated by small and medium-sized enterprises that face constraints similar to those in the rest of the Afghan manufacturing sector. These include lack of reliable electric power; difficulties in obtaining and securing serviced industrial land; difficulties in obtaining investment and working capital; and delays and difficulties in obtaining licenses and permits. Additionally, since agro-processing depends on materials from rural areas, poorly developed rural road networks and transport systems can be additional constraints, as is the absence of an effective grading system for farmers' produce.

Pillar I: Cross-cutting Constraints

Some of the constraints on individual value chains are common to more than one chain. They include water resources development and management, technology development and transfer, land tenure security, and rural finance. Another cross-cutting challenge is to engage with women farmers—and hence unlock additional growth in productivity as well as contribute to social development.

Water

Expanding the irrigated area available for wheat, horticulture, and livestock fodder is critical for achieving early growth. Currently, the crop area irrigated on an annual basis is about 2 million ha, and the best prospect for increasing this quickly is through further rehabilitation of the infrastructure degraded during the years of conflict. A realistic target is to irrigate an extra 500,000 to 700,000 ha of land within ten years. Experience with rehabilitating irrigation schemes is well established in Afghanistan: about 1.8 million ha of irrigation schemes have been rehabilitated over the past twelve years at a cost of US\$300 - US\$400/ha (US\$600 - US\$800 if tertiary canals are included). As well as rehabilitating water conveyance infrastructure, it is also important to improve water use efficiency in farmers' fields.

Afghanistan has the potential to irrigate an additional 2 million ha, but this would require significant new investment in dams, water conveyance, and irrigation infrastructure, and reaching agreements with downstream riparian countries.³ At around US\$4,500/ha, new investment is about ten times more costly than rehabilitation, and its benefits will take much longer to materialize. Investing in new irrigation is an important production avenue to pursue for the future, but there are serious challenges to achieving this goal quickly given the cost, institutional weaknesses, corruption, and insecurity. These problems will require longer-term interventions, including strengthening the capacities and coordinating the functions of MAIL, the Ministry of Energy and Water, and the Ministry of Rural Rehabilitation and Development.

Research and development

Farmers in Afghanistan are not receiving the technological support they need from the national agricultural research system, as evidenced by low crop and livestock yields compared to those in neighboring countries, and by a trend decline in agricultural total factor productivity.⁴ The agricultural research system functioned well prior to the conflict years, but it has been badly degraded through looting and the loss of scientific staff. In 2010, there were only 21 professionals with a PhD or MSc in the Agricultural Research Institute of Afghanistan (ARIA).

A recent comprehensive assessment of the country's agricultural research system emphasized the imperative of maintaining an adequate network of research stations and on-farm research across a range of agro-ecological zones to bring research, extension, and farmers together. It recommended that in addition to commodity-specific research, cross-cutting research should be undertaken on irrigation, water harvesting, post-harvest technologies, agricultural and livestock product processing and marketing, and economics. Consistent with Pillar I, the assessment

³ The rivers in four of the five Afghan river basins flow across national boundaries, but the Government does not have agreements on sharing these waters with downstream countries, making it difficult to invest in medium-to large multipurpose dams and/or irrigation systems.

⁴ A decline in total factor productivity represents a fall in output growth not explained by a fall in inputs.

emphasized the need for research on crops and livestock of economic importance to the country, to help develop value chains as well as benefiting small farms.

Fulfilling this agenda will require rehabilitating and resourcing on a priority basis at least seven of the existing seventeen research stations under ARIA, including introducing new information technology equipment to enable them to connect globally and serve as knowledge centers, and building up a trained and motivated scientific staff. As an interim measure while ARIA's capacity is being restored, more research could be outsourced to regional centers of excellence, international agricultural research centers belonging to the CGIAR (especially ICARDA), and the national research systems of developed countries with similar agro-climatic zones (e.g. ACIAR in Australia). These kinds of partnerships need to be developed because Afghanistan is too small a country to undertake basic research on its full range of crop, livestock, and natural resource management problems. The intent here is to temporarily outsource more of the adaptation research that ARIA should be doing for itself, and to seek training and capacity building assistance from such partners.

Extension services

The public extension system run by MAIL reaches only a modest fraction of Afghan farmers and is hampered by an unrealistically ambitious mandate, outdated models of extension, and inadequate human and financial resources. The Afghanistan Agricultural Extension Model (AAEM) seeks to provide a strategic framework for extension services, but it is over-ambitious and its lack of clear objectives will make it difficult to implement. The AAEM should be revised to approach the delivery of extension services in a more focused way, concentrating on the first-mover agricultural commodities of Pillar I. MAIL also needs to update its models for service delivery to farmers, and then focus on organizing, regulating, and resourcing these effectively. Consistent with international best practice, MAIL should gradually move away from providing services towards an enabling and regulatory role—devolving some, if not most, of its current services on to private firms and NGOs.

MAIL also needs to strengthen the capabilities of its extension officers. Many extension staff are poorly trained in modern farming techniques and have limited communications skills for reaching groups of farmers. Part of the problem is the quality of new recruits: very few are university agricultural graduates, and MAIL has no effective training system to improve and update their skills. The extension staff are also poorly equipped and trained in using modern mass communication methods to engage with farmers, even though radio and TV programs and mobile phones are now important sources of knowledge for many farmers. About 75 percent of the Afghan population, and 80 percent of women, now has access to mobile phones. Mobile phones offer a powerful new medium for extension, particularly for women farmers, and for linking farmers to market information systems, but MAIL has yet to exploit this potential. The extension service also needs to recruit more women officers, since these are the only ones who can work directly with women farmers.

Regulation of agricultural inputs

Afghan farmers spend significant resources annually on purchased inputs including fertilizers, seeds, pesticides, breeding materials, veterinary medicines, and equipment. Many of these inputs are successfully distributed by the private sector, but a virtual absence of effective regulatory systems means that many are of poor quality. Priority areas for improved regulation and enforcement include the certification of seeds; control of banned pesticides; and certification of veterinary medicines and vaccines, artificial insemination, and day-old chicks and hatching eggs. Regulations need to be set and enforced at the border for imports, as well as among domestic suppliers. Effective quarantine measures are needed, to reduce the risk of importing exotic pests and diseases, and so are national standards for food safety. These measures require strong national institutions that cut across value chains.

Land policy

Land issues are complex in Afghanistan with overlapping legal and customary systems and extensive areas of state-owned land. On cropland, the limited and outdated land registration system (which covers around a third of total cropland), plus the prevalence of competing customary claims and communal land rights, have led to frequent and widespread conflicts and disputes over land. The displacement and erosion of traditional authorities and local courts throughout the long period of conflict has made it harder to prevent and resolve disputes. Land disputes are exacerbating ethnic and religious conflicts, as well as undermining incentives for long-term investments in orchards and agro-industry.

A National Land Policy was approved in 2007 to rationalize land policy for urban and rural areas, but the main land-related laws are neither properly aligned with the National Land Policy nor supported by proper regulatory frameworks. Reforming the full spectrum of land issues will take time, and the Afghan Independent Land Authority will need to be strengthened if it is to fulfill its mandate.

Immediate needs for the first-mover agricultural strategy are to: secure the rights of private owners, especially in irrigated and peri-urban areas; improve land-leasing arrangements, including for agro-industry; and facilitate the development of efficient land markets. It will be necessary to extend and update land titles, creating transparent and easy access to land records, such as is now possible through digitization and the Internet; establish a database on land available to investors; and improve procedures for resolving disputes.

Rural credit

Credit is a constraint on intensive livestock and horticultural production. The nascent financial sector in Afghanistan is fragile. Access to financial services is extremely limited, particularly in agriculture, whether for investment (e.g. for orchards, vineyards, and intensive livestock production) or working capital (e.g. for seeds, pesticides, and fertilizers). Production and market

risks are high and systemic, and this is a major deterrent for commercial bank or microfinance lending for agriculture.

While the Government needs to promote a more stable and mature banking system, this will take time, and in the meantime it should indirectly facilitate the development of agricultural finance.

A promising option is to support the sustainable expansion of the two institutions that dominate the agricultural finance landscape: the First Microfinance Bank and the Agriculture Development Fund. In addition, the Government should *indirectly* support efforts from other financial institutions interested in the agricultural sector.

Women in agriculture

Afghan women are not greatly engaged in wheat production, but are very involved in many horticultural, livestock, and local processing activities, including sometimes in opium poppy cultivation. Women take central roles in the daily tasks of livestock management and in processing animal by-products. They produce milk, yogurt, and other dairy products for household consumption or for sale. Often they also take a role in selling eggs and chickens and in collecting and processing wool and cashmere, including producing carpets and wool products. Despite these extensive involvements, women are widely discriminated against in accessing land, knowledge, finance, inputs, and markets. Discrimination undermines their ability to be as productive as men. Closing the gender gap offers an additional source of agricultural growth as well as contributing to greater equity.

Interventions with women should be designed to: (a) support their traditional roles as entry points to strengthening their productivity; and (b) involve them increasingly in higher levels of value chains, so as to expand their decision-making and livelihood opportunities within those value chains. Particularly when new value chains are being developed—in which gender roles are less established—women’s participation should be a priority. One of the underlying challenges of supporting female farmers is the need to provide extension services and information solely through other women. The public extension system and most projects have struggled to recruit qualified female staff like agronomists, para-veterinarians, and experienced extension workers to reach out to rural women, especially in the more difficult-to-reach or conservative areas. Mobile phones offer a promising new way of reaching more women farmers with extension messages and market information, and could help scale up the efforts of the few existing women extension agents.

Pillar II: Addressing the Needs of the Rural Poor

Implementation of Pillar I investments and policies should yield widespread benefits for the poor. Because Pillar I will be targeted to irrigated and peri-urban areas where most of the poor live, many poor people should gain from greater access to rehabilitated irrigated land; from wider availability of improved crop varieties or livestock breeds; from job growth both on and

off the farm; and from less costly food. Some of these benefits will trickle down to poor people living outside the Pillar I target areas.

The poor who are least likely to gain are those who live in more remote rain-fed farming areas and those who are agro-pastoralists. Interventions to raise the productivity of rain-fed crops and extensive livestock systems (including the nomadic systems) may be a way to help this group of poor. Some interventions, such as disseminating drought-tolerant crop varieties or controlling animal diseases, may offer widespread gains at relatively low cost, as might reforms in property rights and the management of open pastures.

Even so, the prospect for significant productivity gains in rain-fed and extensive farming systems is limited, and without irrigation it will be hard to reduce the existing high volatility in production and incomes. It will also be very hard to raise the returns to the level where they can compete with opium poppy in the livelihood strategies of many poor farm households.

Thus other complementary and non-farm interventions will also be required, especially for people with access to little land or livestock. These interventions include community development programs, relief programs in drought years, education and training, settlement programs for nomadic people, and social protection programs (e.g. targeted cash transfers, and cash and food for work). Except for community development programs, these options are not well developed in Afghanistan at present, and hence will need to be expanded.

1. Introduction

Economic growth, job creation, and food security are central to the decade of transformation (2015–25) and long-term security for the people of Afghanistan. The Bank and the Government of the Islamic Republic of Afghanistan (GoIRA) recognize that agriculture and rural development are key to inclusive growth, and hence need renewed vigor and strategic long-term investments. Further, the Bank and GoIRA acknowledge that increases in agricultural productivity and market access for smallholders are critical for rural development, job creation, and food security in Afghanistan.

In agrarian economies like Afghanistan's, higher yields in agriculture, access to non-farm rural income-earning activities, migration of family members to cities, and transition to wage employment are milestones on the path to prosperity.⁵ But these options can only be achieved by paying attention to production risk management, by investing in climate-smart agriculture, by promoting agricultural trade, and by integrating smallholders into the value chains of commercial agriculture. In turn, such efforts need to be coupled with an enabling policy environment for private investments into commercial agriculture, and with functioning agricultural sector institutions that generate and diffuse the new technologies necessary for long-term increases in productivity and that ensure the quality and safety of products.

Since manufacturing in Afghanistan is in its infancy and the jobs to be created in the mining sector will be largely for skilled and semi-skilled workers, agriculture will remain the main driver of economic growth and the biggest employer in Afghanistan for the foreseeable future.

As outlined in the National Agriculture Development Framework (NADF) document (2009), the Government's strategic framework in agriculture has four programmatic pillars: production and productivity; economic regeneration through development of value chains; natural resource management; and change management within the Ministry of Agriculture, Irrigation, and Livestock (MAIL). Based on these four pillars, a number of sector-specific policies, strategies, and laws have been developed, and more recently two national priority programs (NPPs).⁶

But implementing the NADF and the NPPs poses challenges. Although MAIL has developed a large number of subsector-specific policies, laws, and strategies, many of these remain non-binding because they have not moved beyond the draft stage.⁷ Even once they are adopted, serious concerns remain about the institutional capacities of the relevant public institutions to implement such a broad range of interventions within any realistic time frame. Serious questions

⁵ World Bank, 2013, World Development Report 2013—Moving Jobs Center Stage.

⁶ NPP1: National Water and Natural Resources Development Program. NPP2: National Comprehensive Agriculture Production and Market Development Program.

⁷ As of September 2013.

arise, too, about whether the necessary financial resources will be available in an era of fiscal tightening.

In view of these challenges, it may be wise to adopt a more selective approach, focusing first on the subsectors and areas where early gains will be easiest to achieve, in the expectation that the rest of the sector will follow. This agricultural sector review has identified such a “first-mover” strategy, consistent with the NADF and NPPs. It is envisaged that this more selective approach is necessary in response to the anticipated decline in foreign aid and could serve as an initial phase in the long-term agricultural transformation program, providing an early boost to productivity growth, employment creation, and food security.

Approach and Methodology of the Review

The review adopted a two-phase approach. Phase I consisted of: (a) technical studies on key subsectors (irrigated wheat, intensive livestock, and horticulture) to understand their structure; performance; constraints; and potential for development, job creation, and food security; and (b) a review of cross-cutting issues in agriculture (water and land resources, extension services, gender, social and land tenure issues, institutional and operational aspects, opium poppy economy, and agricultural finance). Overall, twelve detailed technical background reports were prepared, as listed in the appendix to this report. In addition, the review identified and mapped 34 detailed sub-basin and potential development areas (overlain with information on irrigated land, power, transport, and major urban centers). This was done in collaboration with the Food and Agriculture Organization, using satellite imagery and Geographic Information System data from the United States Department of Agriculture; United States Geographical Society high-resolution aerial photographs (more than 30,000) for the entire area of Afghanistan; and information from the International Security for Afghanistan Forces (ISAF), the Food and Agriculture Organization (FAO), and other agencies.

Phase II of the review used the findings and recommendations from Phase I technical reports and maps to frame the strategic directions for the Afghan agricultural sector that are synthesized in this report.

It should be noted that the evidence base for developing a detailed Afghan agricultural strategy is fragile. Lack of sufficient time-series data on crop and livestock production, domestic consumption, exports, and their respective prices made quantitative evaluation of the sector very difficult. There are serious gaps in the data collected during the years of conflict, and many of the data available are of uncertain quality and contain noteworthy contradictions. The years of conflict saw a dearth of field-based studies on important agricultural issues. Many agricultural projects also failed or were disrupted during the conflicts, leaving few successful models that can be scaled up. Further, the deteriorating security situation greatly limited field trips during the review period.

Therefore, the task team primarily used agricultural data available in the public domain from MAIL, Ministry of Rural Rehabilitation and Development (MRRD), Ministry of Energy and

Water (MEW), Ministry of Counter-narcotics (MCN), Ministry of Commerce and Industries (MCI), other Government agencies (customs, statistics bureau/officers), FAO, the World Bank, donor agencies, academic and research institutions, NGOs/civil society organizations, and other stakeholders. Data collection involved both deskwork and field visits to interview farmers, livestock producers, output and input dealers, and other private-sector players in the crop and livestock subsectors. Open dialogues were held with key informants from the public and private sectors, civil society, and the donor community. The task team also drew on survey data from the NRVA of 2007/08, together with a farm-level crop production survey and an input distribution network survey that were undertaken during the preparation of the Afghanistan Agricultural Inputs Project (AAIP).

Consultations were held with the Government, donors, NGOs, and civil society throughout the review process. These included presentations of the findings and recommendations of the technical report and the resulting ASR synthesis report.

Outline of the Report

Sections 2 and 3 of this report describe the agricultural sector and its current and potential roles in the Afghan economy, and present the rationale for choosing certain areas and subsectors for a selective “first mover” strategy to achieve early gains. Section 4 outlines the constraints and potential in each of the three value chains proposed for the selective strategy: irrigated wheat, intensive livestock production, and horticulture. Section 5 describes cross-cutting constraints and how best to address them, and Section 6 proposes measures to help the rural poor who will not benefit much from the first-mover strategy. Section 7 summarizes the recommendations of the review and their expected results for jobs and incomes.

2. Agriculture in the Afghan Economy

The Macro Setting

Afghanistan's economic growth averaged 9.4 percent per year between 2003 and 2012. Part of this exceptional growth performance can be explained by the high level of aid Afghanistan received in the past decade, which raised aggregate demand for goods, services, and construction. Official development aid and military assistance grew steadily from US\$404 million in 2002 to more than US\$15.7 billion in 2010—equivalent to 98 percent of GDP. About a third of these aid flows went into the development of civilian infrastructure and services, such as education, health, electricity, and roads.

The resulting development outcomes are impressive: between 2002/03 and 2011/12, GDP per capita increased from US\$186 to US\$688; the gross primary school enrolment rate rose from 19 percent to 72.4 percent; the percentage of Afghans with access to improved water sources grew from 22 percent to 45.5 percent; maternal mortality nearly halved; and life expectancy improved from 45 years to 48.7 years.

The challenge will be to sustain these gains during the coming decade. Afghanistan's growth and development progress remain fragile. While progress in producing development outcomes was very encouraging in the immediate post-Taliban era, recent trends point to a stagnant poverty rate and mounting challenges to employment. Poverty levels are stubbornly high, with 36 percent of the population living below the national poverty line in 2007/08, and more than 50 percent vulnerable to becoming poor.

Recent data suggest that overall poverty levels did not decline between 2007/08 and 2011/12, despite the rapid growth in this period. Income inequality as measured by the Gini coefficient appears to have widened significantly. Underemployment is a serious issue. While unemployment is relatively low, at 8.2 percent in 2011/12, more than 16.8 percent of the employed population is working less than 40 hours per week. At the same time, the labor participation rate is low, at 60 percent, mainly because very few women participate in the labor market.

The transition (withdrawal of the International Security Assistance Forces) raises the question of how the projected decline in aid will affect the country's economy. Simulations with an economy-wide model show that the decline in aid that is currently implied by donor commitments is likely to halve Afghanistan's growth prospects.⁸ Even with favorable assumptions, which include gradual improvements in security and good progress in developing extractive industries, Afghanistan is unlikely to achieve growth rates averaging higher than 4.8 percent annually through 2025. At this rate of economic growth and with a projected population

⁸World Bank, 2013, Afghanistan in Transition: Looking Beyond 2014.

growth rate of 2.8 percent per year, it would take Afghanistan more than 20 years to raise its real GDP per capita to the level currently enjoyed by the rest of the South Asia region. Little progress would be made in reducing current high levels of poverty and un- and underemployment. The employment challenge would be greater because of a projected addition to the workforce of 400,000 - 500,000 young people each year, and because cutbacks in foreign aid are likely to have knock-on effects on employment in the services sector.⁹

The transition also poses significant financial risks to the country. Foreign aid accounts for large shares of both Government spending and foreign exchange receipts and both will be at risk during the transition years. While domestic revenues reached an impressive 11.4 percent of GDP in 2011, these revenues financed only some 40 percent of Government expenditures. Moreover, expenditures are expected to increase as the Government assumes more financial responsibilities for domestic security and the expansion, operation, and maintenance of public assets, many of which until now have been funded off-budget through donor-funded development projects. The Government's funding gap is projected to reach 20 percent of GDP by 2025. Reductions in foreign aid will also put Afghanistan's balance of payments at risk. Continued strong donor engagement in Afghanistan will be critical to the country's development, but there is a clear need to pursue economic policies and investments that can expand export earnings, generate Government revenue, and encourage foreign direct investment to help offset the decline in aid flows. All this will need to be achieved at a time when Government funding will be tight.

Role of Agriculture in the Economy

Afghanistan's economy is still largely agrarian and the agriculture sector makes important contributions to economic growth, employment creation, poverty reduction, food security, and the fiscal health of the nation.

Agriculture (excluding the opium poppy economy) accounts for about a quarter of national GDP (table 1). More than 80 percent of the country's population, and nearly 90 percent of the poor, live in rural areas, and agriculture plays an important role in their livelihoods. In 2011/12, for example, agriculture provided income for 49 percent of all households and was the main source of income for 30 percent. Agriculture also employs about 40 percent of the total workforce, though not all these workers are fully employed. The number of full-time equivalent (FTE) jobs in agriculture is estimated at 2.5 - 2.7 million, or 3.2 - 3.4 million when the jobs created through linkages from agriculture to the rest of the economy (e.g. to wheat milling, baking, and other agro-processing) are included.¹⁰

Agriculture and agriculture-related activities will remain the biggest employer of rural people in Afghanistan for the foreseeable future and the best hope for creating additional jobs. Though by

⁹ Ibid.

¹⁰ Estimates are provided in the ASR background paper on jobs (see the appendix, no. 13). A full-time equivalent (FTE) job is defined as 200 work days per year.

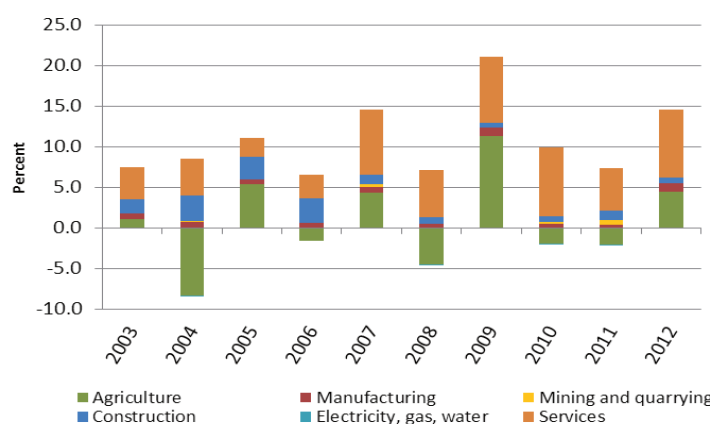
2012/13 the needs of post-conflict reconstruction had swelled the share of the services sector to 53.5 percent of GDP (Table 1), services remain largely unsophisticated, dominated by wholesale and retail services, transport, and government services. The current level of employment in services is at risk, because the sector could see a decline in demand for its output associated with the cutbacks in foreign aid spending during the transition period. Manufacturing is not a vibrant sector; it has a relatively small share of GDP (12.8 percent), and has hardly contributed to real growth over the past decade (Figure 1). The development of mineral resources is unlikely to create many jobs for unskilled or semi-skilled workers.

Table 1: Sector shares of total value added

	2002-2003	2006-2007	2012-2013
Agriculture	38.5	29.2	24.6
Industry	23.7	28.8	21.8
Manufacturing	18.7	16.7	12.8
Mining	0.1	0.4	1.0
Construction	4.8	11.6	8.0
Industry-other	0.1	0.2	0.1
Services	37.8	41.9	53.5

Source: Central Statistics Office.

Figure 1: Sector contributions to real GDP growth (%)

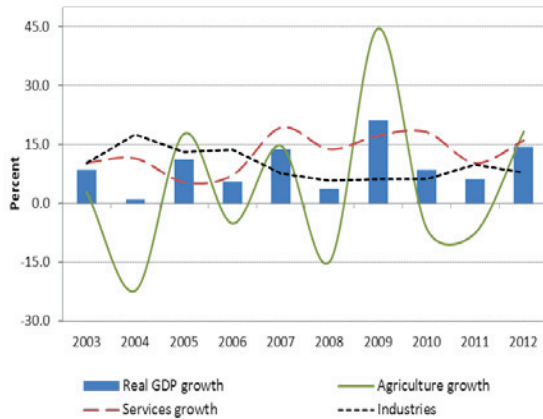


Despite the structural shifts in the economy, agriculture remains one of the largest contributors to economic growth. It contributed more than half of the 8.3 percent growth in GDP in 2012, a year when favorable weather conditions resulted in an exceptionally good harvest. The heavy reliance on agriculture also explains why GDP growth has been highly volatile (Figure 2).¹¹

Most (roughly 90 percent) of Afghanistan’s manufacturing industry and most of its exports depend on agricultural production. Official statistics show that exports—mostly of dried nuts and fruits, other derivatives of agricultural production, and carpets—amounted to 5.5 percent of GDP in 2012/13. Large but unrecorded exports of opium provide an estimated 7-8 percent of GDP if valued at farm-gate prices. But even factoring in illicit exports, Afghanistan’s export performance is below the norm for countries at its income level, whose export-to-GDP ratios are closer to 30 percent.

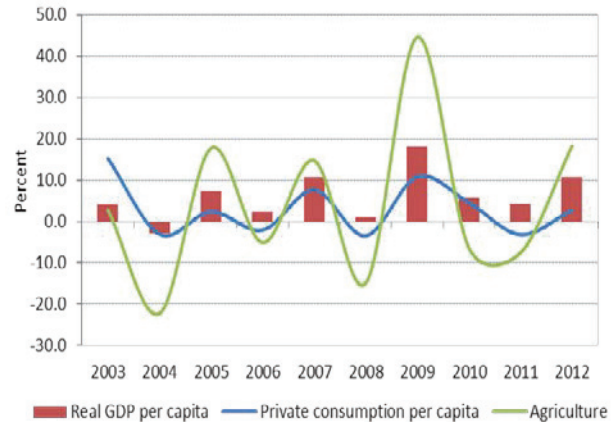
¹¹ Around one-third of Afghanistan’s agriculture is rain-fed, which makes agricultural output and GDP growth heavily dependent on weather. For example, although agriculture grew by 45% in 2009, it contracted in the drought years of 2004, 2008, 2010, and 2011. Inadequate and inefficient irrigation further contributed to output volatility.

Figure 2: Growth of real GDP and sectors



Source: Central Statistics Office.

Figure 3: Real GDP and private consumption per capita



Source: Central Statistics Office.

Prior to the conflict period, Afghanistan was largely self-sufficient in food. Today the country imports significant and growing shares of its food staples (especially wheat), and meat and other livestock products. The growing dependence on imported foods not only drains foreign exchange but also exposes the country to a growing food security risk in an era of high and volatile world food prices. During the food price crisis of 2008, for example, the country needed to import 2.33 million metric tons (mt) of wheat and the domestic price reached US\$609/mo.

Agriculture as a Key Source of Future Growth

Agriculture has good potential for growth and is highly relevant to poverty reduction and job creation both on-farm and off-farm. Afghanistan has a long tradition in horticulture and livestock production, including for export. But the last three decades of conflict have brought massive destruction in production infrastructure and the country’s agricultural productivity is now only half its pre-war level. Household-level data show that a significant portion of arable land remains underutilized, mainly for lack of irrigation water. Only about 63 percent of farmers use fertilizer, a much smaller fraction use pesticides or herbicides, and only a few obtain information or advice on improved crops or livestock production methods.¹²

From a positive point of view, the challenges offer ample catch-up opportunities for productivity enhancement. Maximizing growth in agriculture will require investing more in the expansion of irrigated land; improving the conveyance of irrigation water and the on-farm management of this water; and developing services for generating knowledge and disseminating technology.

Simulations with an economy-wide model show that by raising productivity in agriculture, Afghanistan could raise its GDP growth rate to 5.8 percent annually, on average, over the next

¹² World Bank, 2014, Afghanistan: Pathways to Inclusive Growth.

ten years (compared to the 4.8 percent baseline).¹³ An improved investment climate, predicated on improvements in security that would boost the potential for both mining and agriculture, could raise average GDP growth in this period to 6.7 percent.

Agriculture's Prospects for Job Creation

Future growth dynamics will favor investments in mining and agriculture. But mining is a capital-intensive activity that produces relatively few jobs: perhaps 10,000 - 30,000 by the 2020s. Even in the best-case scenario, mining in Afghanistan could directly generate about 100,000 - 125,000 jobs over the next ten years. This is a rather small number compared to the 400,000-500,000 young people who will enter the national workforce annually, not to mention the extra jobs that may be needed to compensate for losses in employment in the services sector as spending on donor-funded projects declines. And with most of the jobs in mining being for skilled and semi-skilled workers, their direct benefits for the rural poor, landless, nomads, and women are likely to be limited.

The job impact from agricultural growth would be much more substantial. As noted above, agriculture generates 3.2 - 3.4 million FTE jobs (including backward and forward linkage effects). Analysis using farm budgets or a crop/livestock production labor requirement approach suggests that the number of jobs could significantly increase if the irrigated area can be expanded and productivity raised. For example:

- Expanding the irrigated area for cereal production by 100,000 ha could produce an additional 80,000 - 90,000 FTE jobs;
- Irrigating arable land for crop production could create 33 - 60 percent more jobs per hectare than relying on rain-fed farming; and
- Shifting from wheat to production of some horticultural crops could triple, or even quadruple, the labor input (employment) per hectare.
- Job creation can further be fostered by supporting access to credit, land, and markets; promoting high-value horticulture and intensive livestock production; and creating opportunities for female participation through targeted interventions in value chains.

Agricultural Productivity and Value-addition

On average, agricultural value added has grown by 2.9 percent per year since 2002 (Figure 4). But most of the agricultural growth that has been achieved over this period is attributable to greater use of inputs, including rehabilitation of irrigated land, while total factor productivity in agriculture has actually declined (Figure 5).¹⁴

¹³ World Bank, 2014, Afghanistan: Pathways to Inclusive Growth.

¹⁴ A decline in total factor productivity represents a fall in output growth not explained by a fall in inputs.

Figure 4: Growth in agricultural value added, 2002-12 (US\$, constant 2005)

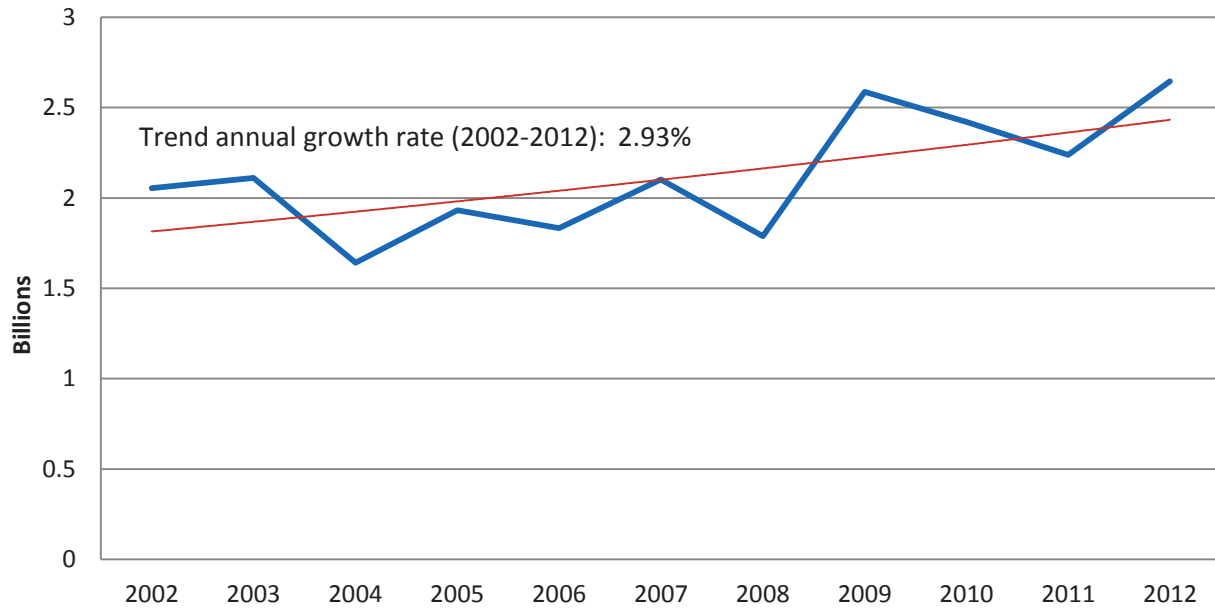
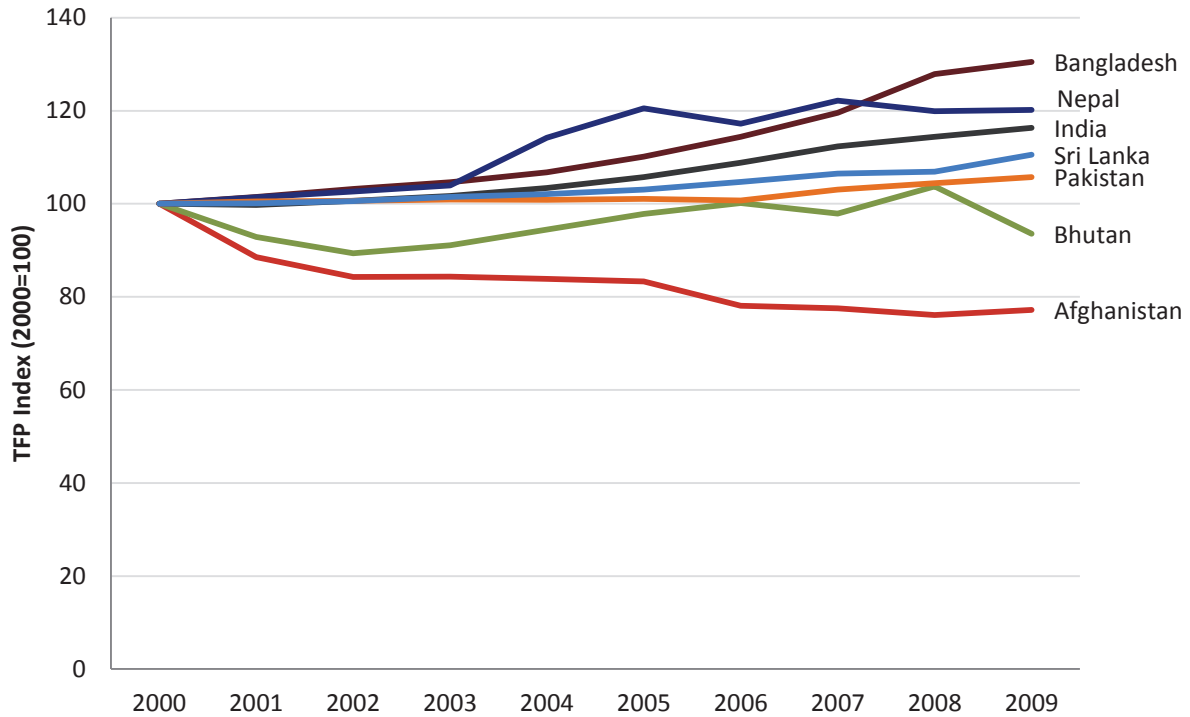


Figure 5: Trends in agricultural total factor productivity: Afghanistan and South Asian comparators, 2000-09 (2000=100)



Source: Database from Fuglie, K.O. 2012, “Productivity Growth in the Global Agricultural Economy and the Role of Technology Capital.” In *Productivity Growth in Agriculture: An International Perspective*, edited by K.O. Fuglie, S.L. Wang, and V.E. Ball. Wallingford, UK: CAB International.

Simulations with an economy-wide model show that given Afghanistan's high population growth rate, agriculture will need to grow by at least six percent per year if per capita incomes are to rise. Even faster agricultural growth will be needed to raise living standards appreciably within the next 10-20 years.¹⁵

Fortunately there are many catch-up opportunities in agriculture as a result of the neglect of rural institutions, infrastructure, and technology during the years of conflict. But to reach higher growth rates quickly (essentially doubling the recent agricultural growth rate) will require game-changing policies and investments.¹⁶

¹⁵ Ibid

¹⁶ China, Vietnam, and some other countries achieved and sustained very high agricultural growth rates after they began their transition from state-controlled farming and began catching up to higher levels of efficiency. High agricultural growth rates have also been achieved in some post-conflict situations in Africa, for example in Mozambique, Rwanda, and Uganda.

3. The Agriculture Sector

Agricultural Production

Of Afghanistan's land area of 65 million hectares, only about 8 million (or about 12 percent) is arable; major parts of the country comprise mountains and deserts.¹⁷ Afghanistan has a mainly dry continental climate and most of the cultivable land receives less than 400 mm of rain per year. Irrigation is therefore the lifeblood of agriculture, and it is sourced from snowmelt in the high mountains in the spring and summer months. Given the highly seasonal nature of the water supply and its origin in the high mountain areas, water storage and conveyance infrastructure is critical for irrigation and urban water use. Although the country has the potential to irrigate some 4.4 million ha—and before the conflicts it had the infrastructure in place to irrigate nearly 3 million ha—today only about 2 million ha of arable area is irrigated regularly each year, while the remaining 6 million ha of arable land is either under rain-fed crops or left fallow.¹⁸

Food crops account for more than two-thirds of the cultivated area; they are typically grown for subsistence and mixed with a variety of other crops, such as perennial horticultural crops and vegetables.

The vast majority of the country's farms are small (60 percent are smaller than 1 ha and about 90 percent are smaller than 5 ha),¹⁹ so most farm households can grow only part of their own cereal needs. Nationally, annual cereal production ranged between 3.7 and 5.6 million metric tons (mt) during 2005 and 2011. Wheat is the dominant cereal as measured by planted area, production, and consumption. Afghans consume wheat with every meal, resulting in the world's highest annual per capita wheat consumption (160 kg). Wheat flour supplies 57 percent of the total caloric content of the average bundle of food items of the poor in Afghanistan.

Before the conflicts, Afghanistan was self-sufficient in cereals and in some years was even a small exporter. Today, however, largely as a result of population growth, lagging yields, and shrinkage of the irrigated area, the country imports an average of 1.2 million mt/year (imports fluctuate widely with domestic production).

A key policy issue is to find the right balance between economic efficiency and the risk of a national food crisis. Given its arid climate, Afghanistan most probably lacks a comparative advantage in wheat, and would find it more economically efficient to focus on high-value

¹⁷ Afghanistan has an arid to semi-arid climate and water availability is a key limiting factor on agricultural production. The average annual precipitation (rain and snow) is approximately 250 mm; and varies from 60 mm in the southwestern parts of the country to 1200 mm in the northeastern Hindu Kush Mountains. Evapo-transpiration (a proxy for plant water requirements) ranges between 1200 mm/year in the Hindu Kush to more than 1800 mm/year in the southwest.

¹⁸ See section on water for irrigation below.

¹⁹ Calculated from the 2011/12 NRVA survey.

agricultural products for export while importing wheat. But the Government is concerned about the country's growing dependence on the regional wheat market at a time of high and volatile world prices. High year-to-year fluctuations in domestic cereal production add to the problem: a worst-case scenario would be a large import need at a time when wheat imports are not available or are very expensive.

Apart from wheat, other major cereal crops in Afghanistan are rice, maize, and barley, which together account for about 15 percent of the cereal area. Total production of these three cereals is about 1 million mt/year (about 300,000 - 450,000 mt/year for each crop) and is much more stable than that of wheat.

With regard to export crops, Afghanistan has a long tradition in horticultural production, particularly of fresh and dried fruits, nuts, and vegetables. In the 1970s, it was a world-class producer and exporter of almonds, pomegranates, pistachios, grapes, and apricots, and supplied about 20 percent of the raisins in the world market. But it is no longer so, and its loss of export market shares can be attributed to the declining productivity of aging orchards and vineyards; lack of new planting; and the capture of these shares by new market entrants that are more competitive on cost and quality.

Afghanistan is traditionally known as a livestock country, with an estimated 45 percent of its land area classified as rangelands. In the 1970s, it was self-sufficient in meat and milk, and exported significant amounts of animal fiber (wool) and high-value processed products (carpets and skin garments). Today the country depends on (rapidly growing) imports of frozen chicken, eggs, and dairy products, but it continues to export significant numbers of carpets, which constitute one of its main licit exports. Three decades of war have allowed neighboring countries to capture a large part of the value added in processing many of Afghanistan's traditional animal products. Current average per capita meat consumption in Afghanistan is only ten kilograms per year.

Many Afghans raise livestock while also growing crops. Overall, livestock herds significantly decreased between 1977 and 2004. This was partly because many pastoral nomads took refuge in Pakistan during the conflicts. Other reasons included lack of access to summer grazing areas in Central Afghanistan, years of severe drought, poor animal husbandry, and poor disease control. Livestock numbers have rebounded since 2004, with the return of some owners and their animals to the country. Current livestock numbers are very uncertain, partly because there has never been a livestock census or survey in Afghanistan, but the best estimates suggest that today the country has around 21 million animals: perhaps 3.5 - 4.0 million head of cattle; 13 - 15 million goats and sheep; and about 2 million donkeys.

Opium poppy production is an illicit, but important part of Afghan agriculture, and for many poor and landless households it is the main source of livelihood and income. The area planted fluctuates widely from year to year, but has generally risen since the mid-1990s, and in 2013 it reached an estimated high of 209,000 ha producing 5,500 mt of opium. Opium poppy can be grown almost anywhere in Afghanistan with irrigation (more than half the country's provinces

cultivate at least some), but its production is currently concentrated in the less secure south and the inaccessible northeast of the country (Helmand, Kandahar, Farah, Nangarhar, and Badakhshan provinces). Poppy is very profitable compared to wheat and many traditional land uses when grown by small and marginal farms under sharecropping or leasing arrangements. Poppy growing creates significant employment for farmers and itinerant workers. An overriding challenge in trying to displace this crop is to create sufficient alternative employment and income-generating opportunities.

Major National Agricultural Policies and Strategies

The key strategic document for the Ministry of Agriculture, Irrigation, and Livestock (MAIL) is the National Agriculture Development Framework (NADF) of 2009.²⁰ As outlined by NADF, the Government's strategic framework in agriculture has four programmatic pillars:

- ***Production and productivity:*** increasing production and productivity of crops and livestock, through provision of better research and extension services and enhanced use of inputs. The goals are to move Afghanistan closer to self-sufficiency in field crops, expand production of cash crops to meet domestic and export demands, and improve the supply of animal products for food and handicrafts. The Government's framework therefore focuses on cereals and industrial crops, horticulture, livestock, irrigation, and support for nomadic livestock production. It seeks to get more farmers out of subsistence farming into semi-specialized and/or semi-intensive market-based production systems, while maintaining diversification for risk reduction and food security.
- ***Economic regeneration:*** through development of value chains: (a) support to producer, retailer, and trader organizations; (b) financial services for agricultural development; (c) value addition; (d) quality control and safety of agricultural inputs and products; (e) marketing and market linkages; and (f) agricultural land leasing. Each of these sub-components includes actions that should be taken solely by MAIL, and others that should be taken by MAIL in coordination with external support.
- ***Natural resource management:*** expected to be achieved through: (a) natural resource surveillance, planning, and regulation; (b) protection and conservation; and (c) community management of natural resources.
- ***Change management: intending*** “to create a dynamic, well-functioning, competent, and effective institution through a process of reform and structural adjustment, prepared to meet the challenges of the 21st century and responding to the needs and demands of the agriculture sector.” Potential targets for change may include leadership practices,

²⁰ The NADF is based on: the Agriculture, Irrigation, and Livestock Master Plan of 2005, the Agriculture and Rural Development Sector Strategy (2008-13), the Afghanistan National Development Strategy (ANDS), and the Comprehensive Agriculture and Rural Development Program (CARD). An updated version of the NADF was expected by December 2013, but it has still not been released.

communication practices, organization design, lines of business and activities performed performance management, incentive and compensation strategies, culture change, policies and procedures, and process re-engineering and outsourcing.²¹

Based on the above pillars of NADF, a number of sector-specific policies, strategies, and laws have been developed, and more recently two national priority programs (NPPs).

Implementing the NADF and the NPPs poses challenges, as noted in section 1 above, and thus it may be wise to focus efforts on a few “first movers”—that is, on priority commodities that are imported and on traditional export crops, pushing hard to strengthen the value chains of these products to achieve growth and create jobs, with the expectation that the rest of the agricultural sector will follow.

Such a strategy is very similar to that underlying the Asian Green Revolution (GR), where an initial thrust on import substitution for wheat and rice in high-potential irrigated areas led to significant growth in agricultural employment and thence to rural transformation.

As governments did in the Green Revolution model, the Afghan state would need to play a lead role in driving and coordinating the strategy within each of the selected value chains to encourage growth and to overcome cross-cutting constraints like irrigation water and finance. Compared with the GR model, however, there are greater opportunities today for the state to partner with the private sector and NGOs in market-led solutions for input and output marketing and for credit—while globalization has broadened the opportunities for benefiting from international trade in agriculture.

On the negative side, Afghanistan must contend with opium poppy production, which draws resources away from licit agricultural and allied activities, and whose curtailment poses some additional constraints on a first-mover strategy.

Lessons Learned from World Bank Support to the Sector

The World Bank has had a substantial program of support for the agriculture sector in Afghanistan over the past decade, focusing on the following areas: (a) increasing productivity within existing irrigated wheat areas; (b) producing and marketing more high-value horticultural crops; and (c) improving animal health and production practices, rangeland management, and fodder availability.

The Bank’s agriculture sector investment program has been delivered through a series of eight major projects. Including additional financing, these projects have provided for total IDA grants of around US\$253 million equivalent, ARTF grants of around US\$375 million, and another US\$13 million in other grants (which responded to the crises related to avian influenza and the global food price increases).

²¹ Ministry of Agriculture, Irrigation and Livestock (MAIL), Change Management Program Document, April 2009.

As part of this study, the Bank commissioned an independent review of its past and ongoing agriculture-sector-related projects. Key lessons are:

- The program of projects generally focused on the right subsectoral issues: irrigation, wheat production and food security, community development, horticulture, livestock, all of which are critical for getting sector performance back to pre-war levels.
- However, the design of projects has generally been more complex than necessary, and does not appear to have fully taken into account either the country's weak institutional capacity, which in turn limits absorptive capacity, or the complexities of engaging in a complex and insecure environment. It is telling that all of the bigger projects have needed restructuring, essentially to simplify their design and facilitate implementation.
- The program has not been guided by any sector strategy or medium-term sector assistance strategy—both of which are clearly important for designing and sequencing a program of investments that can achieve the desired levels of aggregate impact, or that can cope with developments that take time to mature and require a flexible response to changing circumstances and institutional capacities.
- While institutional development has been an important component of the investment program, the initiatives have not been guided by a strategic institutional analysis, particularly for MAIL, and there seems to have been at best a very weak engagement in supporting capacity building at the provincial and/or district levels, even though these levels of the administration play a critical role in delivering Government-funded programs.
- The subsectoral investment programs funded by the Bank (e.g. for irrigation and improving technical services delivery for horticulture and livestock), have produced positive outcomes, but the net returns could have been much higher if these programs had been guided by an analysis of the key subsectoral issues, and by a medium-term strategy that outlined a sequenced set of actions for addressing the main problems of the respective subsectors.
- Finally, there appears to have been insufficient engagement with other key donors, leading to fragmented rather than harmonized approaches to water resources management and the delivery of technical services to farmers. , As a result, there are numerous ongoing donor-funded projects, some focusing on the same activities, but uncoordinated. The Bank is well positioned to provide leadership in coordinating donor interventions in the future.

A Selective Strategy for Rapid Agricultural Growth

The most promising opportunities for “first movers” in Afghan agriculture today lie with irrigated wheat, intensive livestock production (milk, eggs, and poultry meat) in peri-urban areas,

and horticulture (defined here as fruits, nuts, and vegetables). These three subsectors have several major advantages:

- They have the best catch-up potential in the short term for raising productivity within the constraints of existing institutional capacities and infrastructure. These urgently need to be improved for longer-term gains, but this will take time to achieve.
- As shown by a cost analysis, they can compete with imports (and supply competitive exports in some cases).
- They face strong and growing demand at home or abroad, including good scope for displacing imports.
- Their production is spatially concentrated in relatively small intensive irrigated and peri-urban areas that are somewhat secure and have good access to markets, and are also well located for leveraging the infrastructure investments that are planned in growth and resource corridors.
- They can leverage significant value addition and employment along value chains, and increase the incomes and employment of large numbers of people.
- They are spatially concentrated in the areas where the largest numbers of poor people live—in the north and northeast regions.
- They can contribute to securing national food supplies for resettling returning refugees and ex-combatants, and in the right combinations they are as profitable as opium poppy production.
- The intensive peri-urban agriculture can serve as a shock absorber and safety valve, when urban employment is contracts due to decline in foreign aid.
- At a time of fiscal tightening, they offer a way to concentrate available public resources so as to achieve the best possible gains.

Today these three subsectors account for some 66 percent of agricultural GDP and 36 percent of agricultural employment in FTE jobs. Estimates developed in section 4 below show that with the right mix of policies and investments, they could raise annual agricultural GDP by 123 percent over the next 10 years (Table 2). That would be equivalent to an average annual agricultural growth rate of about eight percent. Agricultural growth of this type and magnitude could add 1.3 million FTE jobs within 10 years (1.05 million in agriculture and 0.26 million in the non-farm economy along value chains)—a number equivalent to about 30 percent of the estimated net addition to the labor force over the same period.

Where urban and peri-urban households have one foot in the urban wage economy and another in agriculture, contraction of jobs in the urban wage sector shifts family members back to the farming. This was the case throughout the former Soviet Union during the contraction of the

1990s; small scale peri-urban agriculture served as a shock absorber and safety valve. This is most likely to be the case for Afghanistan, and hence it strengthens the “first-mover” strategy.

Table 2: Increments in annual GDP and employment within 10 years

Subsector	Additional agricultural GDP (US\$ millions in 2012 prices)^a	Additional on-farm employment (FTEs)	Additional off-farm employment (FTEs)	Additional total employment (FTEs)
Irrigated wheat	1,575	173,828	54,748	228,576
Intensive livestock	274	604,440	110,880	715,320
Horticulture	1,830	267,268	94,560	361,828
Total	3,679	1,045,536	260,188	1,305,724
% increase over base	123	108	114	109

^{a/} Baseline GDP data are US\$0.9, US\$0.684, and US\$1.4 billion respectively for the values of irrigated wheat, intensive livestock, and horticulture. The corresponding employment data are 0.485, 0.357, and 0.353 million FTE jobs, of which 0.081, 0.055, and 0.092 million are in the nonfarm sector.

A disadvantage of this first-mover strategy is that it downplays efforts to raise the productivity of the rain-fed farming and nomadic livestock systems. These are important for the food security and livelihoods of some of the poorest people in Afghanistan. Unfortunately, they are also low-productivity systems that are inherently difficult to improve and are dispersed over large areas of inaccessible terrain. It would be easy to spend a lot of resources on them without achieving much gain. Carefully prioritized interventions in these farming systems must have a role, but they need to be coordinated with other forms of assistance to households and communities: community development programs, social protection programs, settlement programs for nomadic people, and training and other forms of support for nonfarm sources of income. Some of these complementary interventions may be more cost-effective ways of helping the poor than direct agricultural interventions.

There is also a risk that the first-mover strategy will raise rather than lower opium poppy production. For example, rehabilitating and expanding the irrigated area and building more rural roads might result in more poppy production if farmers find this more profitable than the available alternatives. To manage this risk calls for a coordinated approach, to ensure that new and expanded farm and nonfarm opportunities provide job and income prospects for farmers and rural communities that compete favorably with those from poppy growing. Such an approach is likely to require the promotion of a bigger role, in the medium to longer term, for high-value products, such as those from perennial horticulture and intensive livestock, rather than wheat.

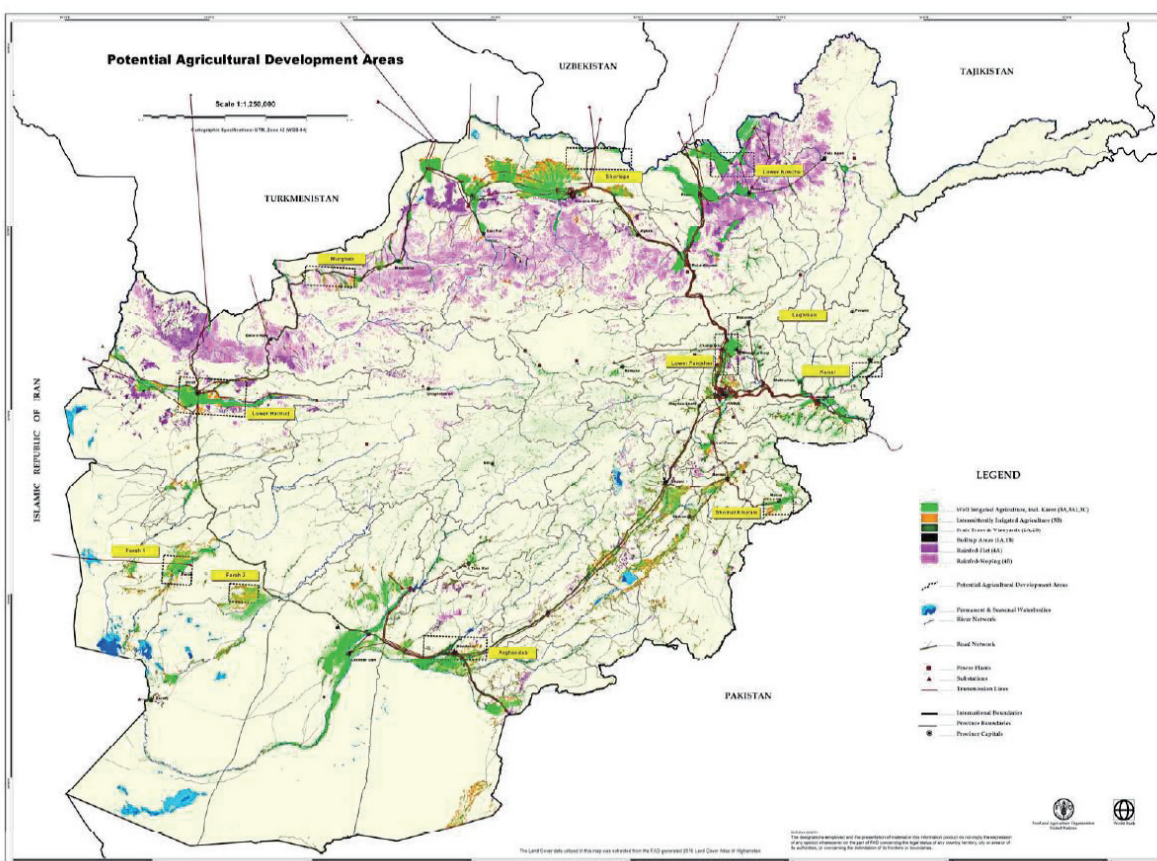
Two Pillars

Two important types of diversity in Afghan agriculture must be taken into account in developing an agricultural strategy.

First, Afghan agriculture is spatially diverse, ranging from intensive irrigated crop systems to extensive livestock systems in arid areas, with many things in between. Rural infrastructure is

also very unevenly distributed spatially. Most of the major road, power, and irrigation infrastructure is concentrated near urban centers and along major transport corridors, while the rest of the country is sparsely served (Map 1). There is also regional variation in security and continuing conflict, and in the extent to which licit agriculture faces competition from illicit poppy production. Hence a first-mover strategy needs to prioritize regions in terms of their potential for quick agricultural growth. From this perspective, the best options lie in the irrigated areas that either already have good access to transport, power, and market centers (Map 1), or soon will have, as a result of planned investments in growth corridors (Map 2). In the latter case, the first-mover strategy would be able to leverage the benefits from these corridor investments.

Map 1: Location of irrigated areas, roads, and markets

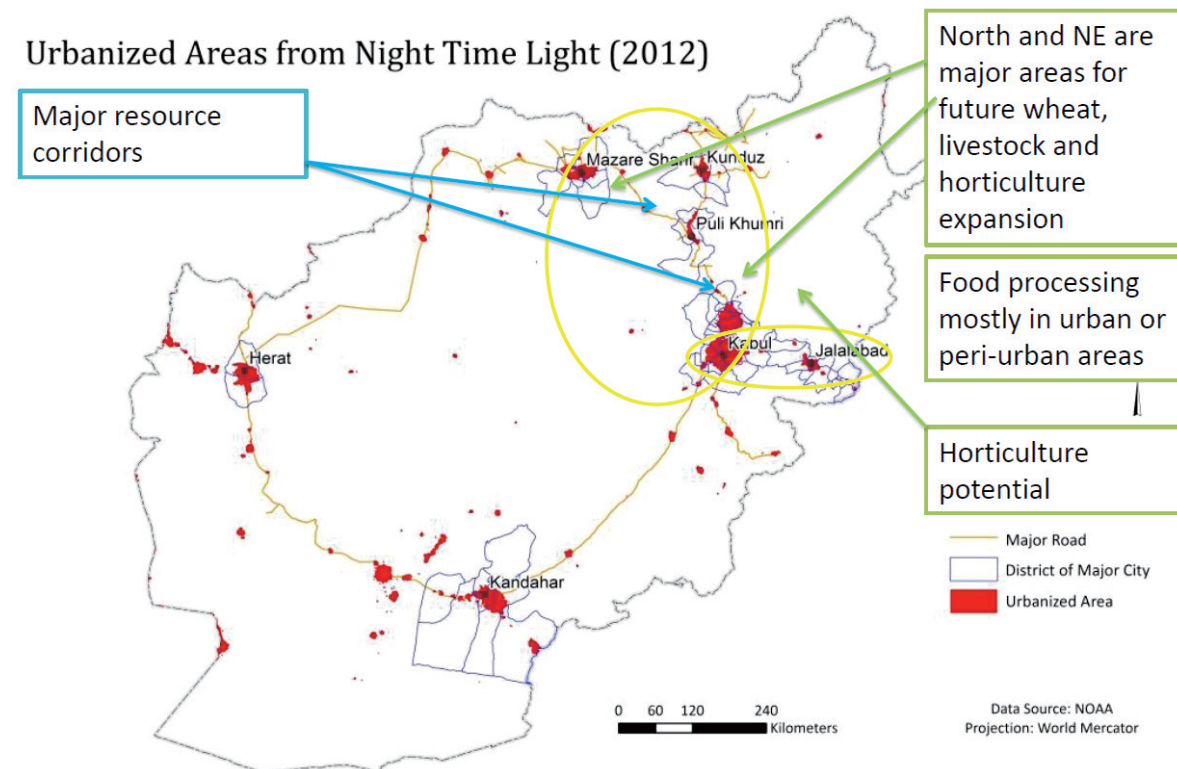


A second important source of diversity is among farm households. Medium and large farms control much of the land and water resources and provide most of the marketed surpluses that feed the urban population. Small farm households are much more numerous, and primarily subsistence oriented. Net buyers of food, they operate small plots of mostly rain-fed land and/or keep traditional livestock in order to meet their own food needs. Calculations undertaken for this review, using 2011/12 NRVA survey data, show that 64 percent of all farm households cultivate holdings smaller than one hectare of land, yet together they farm only 22 percent of the total cultivated area.

The distribution of owned land is even less equitable: 60 percent of households own holdings smaller than 1 hectare and together own 13 percent of the total land area.²² Part of the difference in the distribution of owned and cultivated land is explained by sharecropping, but it is also widely thought that some large farm owners hold land as an asset rather than for farming.

The bifurcation between market- and subsistence-oriented farming is particularly striking between rain-fed and irrigated areas, and between extensive and intensive livestock farming systems.

Map 2: Strategic growth corridors (Kabul-Poli Kumbri-Kunduz-Mazar/Kabul-Jalalabad)



Given such differences at the farm level, a first-mover strategy needs to have two pillars. Pillar I is the commercial development of the selected value chains, targeting commercially oriented farms that can be linked to these chains on a business basis. This will mean targeting many medium-sized and large farms, but opportunities also abound for linking many more small farms on a commercially viable basis to the priority value chains. For many other small farmers and landless workers, substantial new job opportunities will be created. Support for the selected value chains needs to be regionally targeted and coordinated, so that they provide better income and employment options than opium poppy production.

²² National data on rural land ownership are incomplete, and regional differences in land distribution are significant. Surveys suggest that ownership is skewed, with an estimated 2.2% of people owning 19% of total land (Afghanistan Research and Evaluation Unit, 2002).

Pillar II of the strategy needs to cater to the food security and livelihood needs of the groups of rural households who will benefit little from Pillar I. It will require appropriate interventions to improve the productivity of rain-fed farming and extensive livestock systems, in coordination with other forms of household and community assistance, such as drought management, social protection programs, settlement programs for nomadic people, support for non-farm sources of income, and assistance for migration.

4. Pillar I: Developing the Prioritized Value Chains

Along the value chains of the prioritized commodities, the resolution of some important constraints could make a big difference to productivity and marketed surpluses. These constraints are summarized by commodity group in Table 3. They were identified through analysis of all segments along each value chain from on-farm production to retail. Some constraints are specific to value chains, while others are cross-cutting and affect all three chains.

Table 3: Key constraints along value chains for priority commodities

Segment of value chain	Wheat	Horticulture	Intensive livestock
Water and land	<ul style="list-style-type: none"> Total irrigated area is limiting 	<ul style="list-style-type: none"> Total irrigated area is limiting Insecure land rights for perennial investments 	<ul style="list-style-type: none"> Irrigable area for fodder crops is limiting
On-farm inputs and services	<ul style="list-style-type: none"> Poor on-farm water management and wasteful use of water Inadequate supplies of seed of improved wheat varieties that already exist Shortage of improved varieties adapted to local conditions Poor agronomic practices 	<ul style="list-style-type: none"> Poor on-farm water management and wasteful use of water Insufficient improved crop varieties or certified quality seeds Old orchards Poor crop management practices and pest control Few farmers have access to extension 	<ul style="list-style-type: none"> Significant livestock diseases are not effectively controlled or treated because of weak public capacity to monitor and control diseases No certification scheme for animal medicines and vaccines Limited availability of fodder crops and quality livestock feeds and concentrates for intensive feeding Limited access to improved animal breeds through importation and cross-breeding Unreliable AI services Few farmers have

Segment of value chain	Wheat	Horticulture	Intensive livestock
			access to extension
Credit		<ul style="list-style-type: none"> • Insufficient access to credit for investment (orchards) and working capital 	<ul style="list-style-type: none"> • Limited access to credit for investment and working capital
Post-harvest storage and local processing		<ul style="list-style-type: none"> • Lack of refrigerated trucks and cold storage to reduce losses 	<ul style="list-style-type: none"> • Insufficient modern slaughter house, cold storage, and processing facilities
Marketing		<ul style="list-style-type: none"> • Poor quality control with limited grading. Farmers do not receive prices that reflect the quality of their produce • High transport costs 	<ul style="list-style-type: none"> • Poor collection and distribution systems for milk and other perishable commodities
Processing		<ul style="list-style-type: none"> • Insufficient capacity for agro-processing e.g. oil pressing, canning, freezing, drying and juicing 	
Retail and export		<ul style="list-style-type: none"> • Limited air-freight capacity • Poor standards and quality and phytosanitary control for the export market 	

Irrigated Wheat

In the short term, wheat looks particularly promising for increasing agricultural incomes and employment while also improving food security at the national and farm levels. The crop accounts for one quarter of agricultural GDP and 6.3 percent of national GDP. Wheat currently generates between 1.1 and 1.3 million FTE jobs, of which 639,000 - 787,000 are on-farm and the rest are in the non-farm economy, including in milling and baking.²³ Current production inefficiencies and moderate yields imply a real catch-up opportunity. Even at current yields,

²³ ASR background paper on wheat (see appendix, no.1).

domestic production can compete with imports on cost, and it is not unrealistic to expect that production could be increased to displace most imports within five ten years, at least in non-drought years.²⁴

The best potential for raising wheat production lies with irrigated wheat. According to MAIL, there are 1,167,000 ha of irrigated wheat with an average yield of about 3.0 mt/ha and 1,345,000 ha of rain-fed wheat with yields averaging 1.2 mt/ha. Since the productivity of irrigated wheat is nearly three times higher than that of rain-fed wheat, irrigated wheat accounts for roughly 70 - 75 percent of domestic production. Its output is much less vulnerable to poor rainfall.

With its arid climate and dependence on irrigation, Afghanistan is unlikely to have a comparative advantage in irrigated wheat, and in the longer term would find it more efficient to expand high-value horticultural production in irrigated areas at the expense of wheat. However, such a shift needs to be tempered by several considerations. First, development of high-value horticultural production and markets will take time, and is likely to be concentrated in areas that have ready access to markets and/or cold storage facilities. This means that irrigated wheat will remain competitive in many areas for a long time. Second, farmers decide what crops to grow, and given the uncertain environment in which they live, most choose to grow wheat for their own food security. Third, the Government needs to balance the need for economic efficiency in the use of the country's agricultural resources against the need to prevent a national food crisis (such as occurred in 2008), and this requires maintaining an acceptable ratio of domestic production to national consumption. These issues warrant further analysis, but it seems clear that irrigated wheat will remain an important crop for the indefinite future and deserves to be treated as a first-mover commodity.

There are two ways to increase irrigated wheat production. One is to expand the irrigated area through rehabilitation and new investment. Since this expansion is a cross-cutting issue for other subsectors, it is discussed later in this report under water policy (see Water for irrigation). The other way to increase production is to raise irrigated wheat yields. Some of the constraints on raising yields are listed in Table 3 above.

Producers of irrigated wheat are already doing many things right. They are using moderate to high levels of fertilizer; small farms are achieving the same or higher yields as large farms; and post-harvest losses are already relatively low at about 15 percent. The national wheat price and the cost of fertilizer are aligned with border prices, so there are few policy distortions, and the

²⁴ To achieve food self-sufficiency on the total current estimated demand level of 6 million mt, productivity and planted area would each have to expand by 21%. A 21 % increase in planted area would require bringing an additional 243,000 ha of irrigated land into production. However, with a 2.7% annual population growth rate, increases in yield and planted area would have to increase still further. Over a five-year period, planted area and productivity would each have to increase by 32% if increases are split evenly between the two. A 32% increase in planted area would require an additional 360,000 ha of land being brought into production. These calculations suggest that to achieve food self-sufficiency over the near and medium term is likely to be challenging.

profitability of wheat production has risen in recent years. Returns to wheat production were US\$350 - 400/ha in 2013, versus only US\$150 - 200/ha in 2007; while input prices have increased substantially, wheat output prices have increased more, so that wheat production is now more profitable than before the 2008 price spike.

Though irrigated wheat yields have been rising at a healthy 4.5 percent per year since 2002, they are still low by regional standards. The main constraints on higher yields are the slow uptake of improved wheat varieties, and poor on-farm water and agronomic management practices (Table 3 above).

Farmers have difficulty obtaining reliable seed for existing improved varieties because of problems with seed multiplication and certification. While about 45 percent of wheat farmers obtain their seed from other farmers, nearly all of it comes from informal seed markets rather than being purchased from certified seed dealers. Until recently, Government and donor policy has been to distribute seed more or less free of charge, while paying seed producers roughly double the prevailing grain prices. This policy has created significant distortions in the seed market. While it has helped to develop the domestic seed industry and has paid dividends by raising productivity, it has not helped to develop a vibrant, market-oriented seed sector.

In 2012, the Government began to reform its seed procurement policies, reducing its annual procurements from 30,000 to 15,000 mt of seed and moving to purchase through competitive tenders. The procured seed will still be distributed at a significant subsidy.²⁵ While policy is moving in the right direction, there is likely to be a shakeout in the distribution system as private seed enterprises and certified seed contract growers adjust, and this may disrupt the seed multiplication industry.

Afghanistan's research and development system has been slow to develop additional improved varieties, even when all that is required is adaptive breeding of improved germplasm already widely available within the region. Recommendations for R&D are discussed as a cross-cutting issue in section on research and development below.

Fertilizer use is profitable on irrigated wheat and the private distribution system seems to be working well. Currently, farmers are using 68 percent and 83 percent of the recommended fertilizer application rates (of 250 kg/ha for urea and 125 kg/ha for DAP); available evidence suggests that increasing their usage would be profitable.²⁶ Fertilizers are mostly unsubsidized and supplied almost entirely by the private sector. In past years, MAIL has subsidized the provision of 20,000 mt of fertilizer to facilitate wheat production. This is a relatively small amount (10 percent) compared to the estimated 170,000 - 200,000 mt of urea and 100,000 -

²⁵ A package of 50 kg of seed, 50kg of DAP, and 100kg of urea fertilizers that holds an estimated market value of US\$125 - 130 will be provided to producers at the Government price of Afs2,100 (US\$38 - 40). As such, there is still a significant unsustainable subsidy component of nearly 70% to the program at the producer level.

²⁶ According to the AAIP Baseline Survey, average use rates are 170 kg/ha of urea and 104 kg/ha of DAP.

120,000 mt of DAP that are used on irrigated wheat, with a total market value (at current prices) of US\$200 – US\$240 million. It is not clear that any subsidy is still needed.

A bigger issue is problems with the quality of the fertilizers available. Currently, MAIL has neither the legal and regulatory frameworks nor the infrastructure and human resources that would be needed to control the quality of fertilizers and other agro-chemicals. The World Bank-financed Afghanistan Agricultural Inputs Project (AAIP) will help to build the required infrastructure and technical capacity.

Production costs for wheat are low in Afghanistan and farm credit is typically not needed, nor is it widely available for wheat. The AAIP Baseline Survey found that wheat farmers ranked access to credit as sixth out of seven possible problems or constraints affecting their farming operations.

Wheat farmers' access to agricultural information appears to be relatively good, but only about one third of them use public extension services as their main source of information; mostly they look instead to TV, radio, and private input sellers.²⁷

What needs to be done?

- Expand the irrigated wheat area, through rehabilitation of existing irrigation infrastructure, while allowing farmers to choose whether to grow more wheat or to diversify into higher value crops.
- Ensure that the phasing out of the Government's procurement system for seed does not unduly disrupt the supply and distribution of seed as the private sector adjusts, while continuing the drive towards full privatization of the seed system.
- Invest in developing additional wheat varieties, particularly through adaptive research of internationally available germplasm from neighboring countries and the research institutes of the Consultative Group for International Agricultural Research (CGIAR).
- Improve on-farm water management, through rehabilitating irrigation infrastructure and management at local levels, providing better extension, and promoting small-scale and more efficient irrigation technologies (e.g. sprinklers).
- Improve agronomic practices, such as fertilizer use and planting practices, through better extension. The most likely causes of sub-optimal yields in Afghanistan are drought, weeds, sub-optimal plant density, limited access to quality seed of superior varieties, and post-harvest losses. There is extensive scope for raising the productivity of irrigated wheat with improved varieties and better agronomic practices. This requires reforming and building the capacity of MAIL, but also expanding the role of private agents and NGOs in providing extension services (see cross-cutting discussion of extension in section on extension services below).

²⁷ ASR background paper on wheat (see appendix, no.1).

- Bring down the cost of milling—which is high in Afghanistan compared to neighboring countries, notably Pakistan—through encouraging greater private investment in more modern and efficient milling plants.

The Potential

Raising the yield of irrigated wheat should not be very difficult even within five to ten years. Past World Bank investments in rehabilitating the country's irrigated areas have achieved an average wheat yield increase of 25 percent over original levels (of about 3.0 mt/ha).²⁸ If yields continue to rise at 4.5 percent per year as they have for the past decade, they would be 1.65 mt/ha higher within 10 years than they are today. Assuming that over the next ten years the irrigated wheat area can be increased by 10 percent and the yield can be raised by 1.5 mt/ha, to 4.5 mt/ha, then by 2024 total additional irrigated wheat production would be 2.253 million mt and would contribute an extra US\$1.575 billion annually to GDP.²⁹ These increases would create 173,828 FTE jobs in wheat production and 54,748 FTE jobs in agro-industry, including wheat milling and baking.³⁰

An increase in wheat production of 2.253 million mt over 5-10 years would lead to a national output of 6.75 million mt on average. At the current level of demand (estimated at about 6 million mt) this would lead to a national surplus, but if wheat demand grows in line with population, then national demand will reach 6.854 million mt within 5 years, which is more than enough to absorb all the extra production.³¹

Since irrigated wheat is grown on about 45 percent of all farms, the benefits to poorer households from raising yields could be widespread. But the benefits from using rehabilitated or

²⁸ World Bank, Interim Strategy Note for Afghanistan, March 9, 2012, para 44.

²⁹ The baseline data are: 1,155,000 ha of irrigated wheat cultivated with an average yield of 3 mt/ha, an average production of 3.5 million mt, and a GDP contribution of US\$0.9 billion. Average employment is 0.35 FTE jobs/ha on-farm, plus off-farm employment of 0.027 FTE jobs/mt, giving a total baseline employment of 485,000 FTE jobs. The production increase is the extra output from the existing area (1,155,000 times 1.5 = 1.733 million mt, plus the output at the higher yield on the additional irrigated area (115,500 times 4.5 mt = 0.520 million mt), which gives total additional production of 2.253 million mt/year by the end of year 10. This would be an increase of 75% over the base production amount, and since it would displace imports at border prices, wheat GDP would increase by the same percentage to give an addition of US\$1.575 billion/year by year 10.

³⁰ The on-farm employment increase is the extra FTE jobs created on the additional irrigated area (115,500 times 0.35 FTE jobs/ha = 40,425) plus the extra employment created by the yield increase on the entire irrigated area (1,270,500)(1.5)(0.07) = 133,403), where it is assumed that an extra 1.5 mt/ha adds only 20% of the FTE jobs/ha of the impact of adding another ha. This gives a total on-farm employment of 173,828 FTE jobs by the end of year 10. There will also be additional off-farm employment, and it is assumed this arises mainly from production (harvesting, milling, baking, etc. plus additional inputs to get the higher yield) rather than from the extra area that needs to be prepared and weeded each year. In the baseline data, each metric ton of wheat gives 0.027 FTE jobs. Taking 90% of this amount, then the additional off-farm employment by year 10 is 2.253 million mt times 0.0243 = 54,748 FTE jobs. Adding the on- and off-farm employment, the addition by year 10 is 228,576 FTE jobs by year 10.

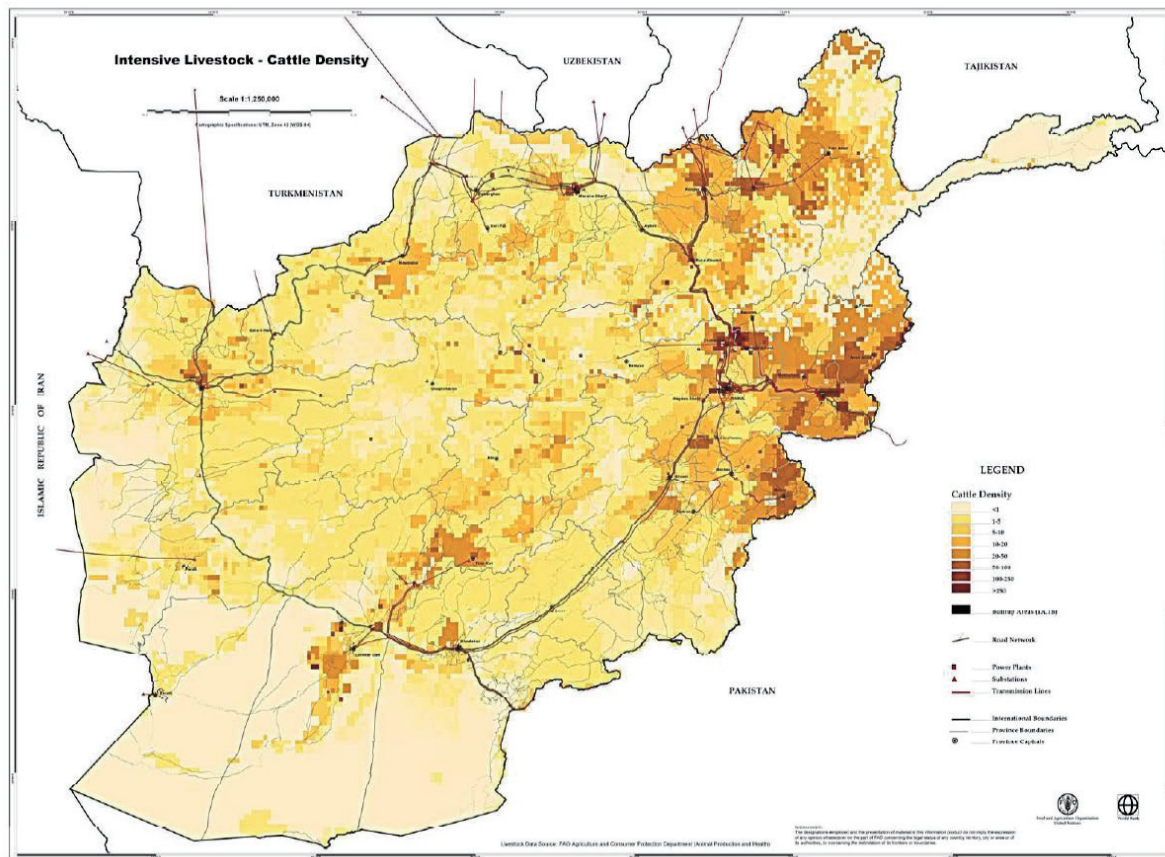
³¹ ASR background paper on wheat (see appendix, no.1).

newly developed irrigated land for wheat are less certain for the poor. If they voluntarily grow more wheat on their own holdings then so much the better, and some will also benefit from jobs created within the newly irrigated areas. But there is also the risk that poor sharecroppers or tenant farmers will be evicted by their landlords once the land they farm becomes irrigated. Avoiding these problems requires resolving some important land tenure issues, as discussed in section on land policy below.

Livestock

Livestock is another subsector that could contribute much to growth and employment, substitute for imports, and perhaps exploit more export opportunities. Currently, it contributes 3.8 percent to national GDP, or US\$684 million annually, and creates about 1.1 million FTE jobs, 15 percent of which are off the farm. This subsector could also leverage more agro-processing activity at small and medium scales. Livestock provide perhaps the most inclusive production activity in Afghanistan, being widely held by the poor in all regions, providing protein-rich food staples in everyone’s diet, and being cared for largely by women, for some of whom they are an important source of employment. Intensive livestock production systems can also be competitive with growing opium poppy (map 3).

Map 3: Potential areas for intensive dairy production



Afghanistan exports some livestock products—mostly skins, wool, and cashmere—but it imports much larger amounts (by value) of live animals, meats, eggs and dairy products from India, Pakistan, Iran, and the UAE. The demand for these imported products has more than doubled since 2008, while domestic production has lagged. If Afghan farmers are to compete with imports in the urban market, significant productivity gains will be needed to bring production costs down to below border-price levels, as will improvements throughout the domestic distribution system to ensure competitiveness on cost, quality, and safety standards.

The livestock subsector consists mainly of sedentary and nomadic production systems. The nomadic system provides the main source of livelihood for many of the poorest people, especially the nomads (*Kuchi*), and supplies most of the red meat, skins, and wool that reach the market; it is a low productivity subsector that is particularly prone to losses from drought and severe winters. The sedentary system consists of settled farmers who hold some sheep and goats and most of the country's cattle on small agricultural holdings. Any occasional surplus (usually of milk, but also of animals) is available for sale. The intensity of livestock farming on sedentary farms mainly depends on the availability of irrigation for producing fodder and other feeds or forage, and perhaps to a lesser extent on the availability of improved livestock breeds and sufficient animal health care. The landholdings from which increased output is possible (of dairy products in particular) exist where there is irrigation, and where adjacent population centers demand enough milk to justify its collection and processing. Farmers on these landholdings can also add value to some livestock through fattening.

The main constraints on the livestock subsector are low productivity breeds, diseases, poor feeding, drought, and the difficulties of marketing perishable commodities. These constraints are most difficult to overcome in the widely dispersed nomadic and subsistence-oriented sedentary systems. It is the farmers in areas with easy access to irrigated land and urban markets who have the best prospects for producing dairy, poultry meat, and eggs to compete with imports in supplying the rapidly growing urban market. Most of these better-placed farmers produce on a small scale, though some larger-scale units are found in commercial poultry production (egg layers and broilers).³²

The constraints on the intensive production of eggs, poultry meat, and dairy products are quite similar and are shown in Table 3 above. On the production side, there are common problems in accessing more productive breeds, breeding materials, feeds and concentrates, and with disease control.

The poultry industry depends heavily on imported day-old chicks and hatching eggs from Pakistan and India that are of variable quality. Dairy cow improvement depends on access to bulls or Artificial Insemination (AI) —inputs that are largely unregulated and of uncertain

³² Except for one large farm of 180,000 bird capacity in Jalalabad, the Afghan Social Poultry and Farmers' Association reports about 240 layer units nationally of between 2,000 and 20,000 birds each. There are an estimated 4,530 broiler farms of between 1,500 and 5,000 bird capacity in operation.

quality. The several non-governmental organizations involved in cattle breeding often import semen without regard to animal health quarantine controls or the suitability of the breeds they import for crossing with the smaller local cattle. MAIL exercises no control over the activities of these agencies.

The best examples of successful small-scale dairying occur where fodder can be intercropped with other high-value crops, such as stone fruits, or otherwise integrated into a cropping regime where there is effectively no opportunity cost to produce it. On commercial farms, fodder crops in irrigated areas must compete with crops like wheat and horticultural crops, so will only be economic if dairying is sufficiently productive. The breakeven levels of productivity are not known, but the fact that some farmers are engaging purposefully in producing milk in some areas but not in others suggest that the economics of fodder-based milk production vary across agro-ecological zones. If favorable zones can be identified, these should be the focus of any effort to promote the production and collection of milk. In some areas, such as the lower-lying districts of Nangarhar near Jalalabad, the combination of fodder production, horticulture, and dairying has provided farmers with returns that compete with those from opium poppy cultivation.

Control of diseases like brucellosis and foot and mouth in dairy cattle; and Newcastle disease, respiratory disease complex, and gumboro in poultry, is severely hampered by the failure of the public sector to monitor and control contagious animal diseases, and by a virtual absence of veterinary services and certified veterinary medicines. For example, poultry associations complain that commercial poultry raisers generally do not have access to the vaccines they need, nor to sound veterinary personnel, who can treat, as well as vaccinate or provide advice on disease prevention and control.

On the marketing side, common problems arise in collecting, handling, processing, and distributing these perishable products. There is virtually no vertical integration along value chains. Dairy items, eggs, and broilers are produced mainly by large numbers of small-scale producers who have no control over input pricing, quality, or supply (much of which is imported), or over the pricing of finished products, and face critical coordination problems in accessing the full range of inputs and services they need to improve efficiency.³³

³³ Intensive livestock technologies require a package of complementary inputs (e.g., improved breeds, access to breeding services like AI or day-old chicks, veterinary services and medicines, quality feeds and concentrates, credit, and a market outlet) and farmers may choose not to acquire individual inputs until they can obtain the entire package. On the supply side, specialized suppliers of modern inputs, credit, and the like may hesitate to supply inputs to farmers who lack access to other complementary inputs. This is known as the coordination problem and is a form of market failure that leads to sub-optimal levels of technology adoption from an aggregate economic perspective. See Poulton and Lynne, 2009, "Coordination for Market Development," at http://www.ifpri.org/sites/default/files/publications/oc61abr_0.pdf. Conventional liberalization policy does not recognize this as a problem, but takes for granted levels of market and institutional development that are unlikely to exist in most parts of Afghanistan.

What needs to be done?

- Expand the supply of irrigated land for livestock production through irrigation rehabilitation, especially in areas with good road access to urban areas.
- Improve animal breeds through importation and cross-breeding (e.g. creating hybrid heifers). Support NGO schemes for “loaning” improved breeds of heifers. Expand reliable AI and siring services, and regulate their quality. Expand the production of domestically produced day-old chicks and hatching eggs.
- Build on successful experiences with privatizing veterinary services (Box 1).
- Develop certified medicines, vaccines, and concentrated feeds that are of assured quality for sale by trusted agro-dealers and vets. A non-profit NGO (social enterprise) might set up a franchised network of private agro-dealerships and veterinary shops that sell branded products and provide technical advice (the “McVet” model).
- Improve the availability and quality of livestock feeds by assisting small and medium-sized agro-industrial firms to produce concentrated feeds of import quality. This requires providing finance to help private sector start-ups to purchase efficient milling equipment, improving the technical capability of local feed millers in formulating complex feed rations, and strengthening MAIL’s capacity to regulate feed quality.
- Improve farm livestock management by delegating extension services to private agents and NGOs, and reforming the capabilities of the public extension system.
- Strengthen public capacity to monitor and control diseases, building on the ongoing support from the World Bank-funded Capacity Building for Results (CBR) project.
- Incentivize the private sector and producer organizations to build more modern slaughter houses, cold storage, and processing facilities (e.g. UHT processing for milk) for perishable products.
- Consider strengthening coordination along value chains. Donors, such as FAO and IFAD have focused on integrating down the milk chain by forming community-level producer organizations to collect and market milk from members, but the outcomes have been mixed. Some successful dairy processors established entirely by the private sector employ a simpler, cheaper, and possibly more sustainable model (Box 2). Overcoming the more general coordination problem for inputs, collection, processing, and marketing may require the formation of trade associations, or cooperatives—at least until the value chains have been more fully developed.

Box 1: Livestock extension services: privatization of veterinary field units

Veterinary field units (VFUs) are a key component of the animal health system, but until recently they were publicly run and failed to provide farmers with needed extension services and support in controlling livestock diseases. To rectify the situation, the GoIRA with support from the USAID, EU, and the World Bank introduced a privatization program in which privately operated VFUs are contracted to provide veterinary services to smallholders. This was consistent with the Government's intent to shift its role from implementer to regulator.

There are now about 1,200 privately operated VFUs in Afghanistan, which regularly provide livestock producers with animal health and production services, including taking responsibility for disease-sentinel services, prevention, and control measures of highly contagious and zoonotic diseases. While the transfer process initially faced some hiccups, further development of the support package provided to operators of privatized VFUs helped to consolidate their status within the communities they served and their economic feasibility. This deepened the initial support, which was for veterinary services, and VFUs now provide regular training on the delivery of better animal production messages to complement the animal health ones.

The service delivery system through VFUs is proving to be extremely efficient and effective. It is efficient in that the engagement relies on performance-based contractual arrangements for the delivery of specific services that cease once the specified targets are achieved. If adopted widely, the system would allow for reduction of MAIL's payroll costs, while achieving more efficient and effective service delivery. This includes implementation of "public goods" functions, such as national disease-control programs, disease surveillance, food hygiene, and emergency disease control, as well as "private goods" functions like vaccination and treatment of livestock owned by individual farmers and herders.

The consolidation of the units has allowed delivery of improved animal health services as part of the implementation of MAIL's sanitary mandate, and also livestock extension services that otherwise would not have been possible if based on the public extension system. The increasing use of VFUs as the conduit for delivery of services and the excellent results being achieved prove that the transition of MAIL's role away from implementer to regulator is feasible.

Increased reliance on local actors for the delivery of services is important to ensure the sustainability, as well as quality, of the services delivered, because private VFUs depend on the well-being of the community in which they are inserted/established. Furthermore, they provide a good degree of business continuity in a volatile environment where access to communities is regularly compromised. This increasing interaction between communities and VFUs, as well as reliance on their services, is also helping slowly to replace the notion that "Poor farmers can't afford to pay for veterinary services" by the belief that "Poor farmers can't afford *not* to pay for veterinary services." Through outreach and extension efforts based on the use of farmer field schools (see Box 7 below), livestock owners are being made aware of the relative benefit-to-cost ratio of preventive veterinary interventions that will reduce livestock mortality, help replenish their diminished herds, and improve their income by increasing the numbers of animals that can be brought to market in this period of increasing demand for foods of animal origin.

- The livestock subsector could benefit from the development of a specific Government policy that covers: (a) livestock breeding;³⁴ (b) import regulations for biological substances (semen, other breeding material, and vaccines) and livestock feeds; (c) the disengagement of Government technicians from AI;³⁵ and (d) the role of Government in artificial breeding and the provision of veterinary services and livestock production extension. The subsector is also without a slaughter and meat supply act, which would define and regulate the standards to which meat and meat products are processed and packaged for formal retail trade and/or export. A food bill to incorporate the requirements for veterinary public health as it relates to meat products is yet to be developed.

Box 2: Emerging milk processing by private sector

The main and longest-standing dairy producer in Herat is the Herat Ice Cream Company (HIC). With its owner-financing of US\$0.5 million, HIC has operated on a half hectare compound in the Herat industrial park since 2003, initially producing ice cream, but gradually increasing its product range to include yoghurt, dogh (a yoghurt-based drink), and pasteurized milk. HIC is now a substantial entity valued at US\$15 million, supplying these dairy products to major cities in Afghanistan and using its own fleet of vehicles for distribution. As with other companies producing dairy products, the main competition HIC faces is from dairy products imported from Iran, often at dumping prices.

The other privately owned dairy processing plant in Herat is the Kamel Dairy Company (KDC), which has a one million dollar investment in equipment and operating capital. It began operation in early 2013 on the outskirts of the city. KDC produces yoghurt, liquid curd, and cheese from its plant with a capacity of between 5 and 25 mt daily, depending on product. KDC purchases its raw milk from surrounding farms and sells its products in the local market. The dairy processing plant employs about 15 people.

Noticing an increasing market demand for local cheese, KDC undertook a survey of cattle feeds around Herat city in fall 2013. The survey found that there was surplus of animal feeds (particularly straw) in some areas, sufficient to produce approximately additional 10 mt of milk per day. KDC intends to exploit this opportunity by installing more equipment for processing cheese and other products; and by committing to collect an additional 5 mt of raw milk per day.

KDC suppliers (and those of the five other commercial milk-processing plants in Herat) are among the estimated 2,100 members of the Herat Dairy Union (HDU). While the processing plant is entirely privately owned and operated, KDC has an annual contract with the HDU, which currently buys raw milk from some 60 farmers through seven privately owned milk collection centers. These utilize middle-men collectors and operate with the technical assistance of MAIL.

³⁴ The Draft Country Report on the Status and Perspective of Animal Genetic Resource Development and Conservation in Afghanistan (Zafar, FAO-AFG) contains material that provides an excellent starting point for developing a national breeding policy.

³⁵ Both Government and private sector personnel provide AI services. Private sector AI delivery has improved considerably over the last two decades. But salaried Government personnel are providing AI services using subsidized semen, and are doing so in competition with private sector technicians operating at full cost.

The Potential

Rapid urbanization and an emerging middle class have led to strong growth in the domestic demand for milk, meat, eggs, and poultry. There has been a fast and spontaneous supply response in many peri-urban areas, as well as rapid growth in imports. With appropriate support, there is an opportunity to gain a larger share of the growing national market.

Yields are currently very low. For example, milk yields average only 400 liters per cow/year (though they are about 1,000 liters from intensively managed cows), compared to 1,200 in India, 1,300 in Pakistan, and 2,800 in Iran. With modern cross breeds and better management and disease control, milk yields could be increased to 2,000 - 3,000 liters per cow/year.

Without additional support, intensive livestock production will increase only modestly over the next ten years. But with support there is reasonable potential to double the output of intensive dairy and poultry production over this period. This would add approximately US\$274 million annually to GDP and create 715,320 FTE jobs within the period.³⁶

Horticulture

The horticulture subsector extends to about 360,000 ha, covering almost 14 percent of the total irrigated land area and involving more than 2 million people. The country's diverse geographical and climatic conditions allow a wide range of crops to be produced at different times of the year. The most prominent crops are grapes, almonds, and pomegranates, most of which are exported. Some of the horticultural products, such as pistachios are believed to be native to the country, implying that they are easy to produce. Cumin grows well in rain-fed, semi-arid areas, making it an exception among horticultural crops and creating many opportunities for production increases.

³⁶ The calculations for dairy products are as follows. Baseline numbers for cows and milk vary widely and do not differentiate between intensive and extensive dairy cows. The best figures seem to be 1.26 million higher-yielding cows producing 1.26 million mt of milk/year, or 1,000 liters/cow/year. This is probably about half the total cow population, but producing nearly 80% of national milk production (1.575 million mt). From the ASR background paper on Jobs (see appendix, no. 13), on-farm employment is 0.222 FTE/liter of milk and off-farm employment is 0.044 FTE/liter of milk. Assuming the size of the intensive dairy herd could be increased by 50% and milk yields could be increased by 100% within 10 years, this would lead to extra milk production of $(1.26m)(0.5) = 0.63$ million mt from the extra cows, plus $(1.26m)(0.5)(1) = 1.89$ million mt from the extra yield on the expanded herd, giving a total increase of 2.52 million mt (or a doubling of the base year quantity). Using the per liter labor requirements from above, the additional on-farm employment is $(2.52m)(0.222) = 559,440$ FTE jobs, and $(2.52m)(0.044) = 110,880$ FTE jobs off-farm, or 670,320 FTE jobs in total. Employment in intensive poultry production is currently small, estimated at only 22,500 FTE jobs in broiler production with no figure available for egg production. Assuming production is doubled within 10 years, this would add at least another 45,000 FTE jobs. Livestock as a subsector contributes 3.8% of national GDP, or US\$684 million. There is no breakdown for intensive poultry and dairy production, but the share of poultry and dairy consumption in the value of total food consumption (adjusted for imports) is 51%. Assuming that, as with milk, about 80% of total poultry and egg production comes from intensive production systems, then the intensive livestock systems account for $(0.51)(0.8) = 40\%$ of total livestock GDP, or US\$274 million. In the employment calculations above it has been assumed that dairy and poultry production can be doubled within 10 years, so this would be equivalent to an extra US\$274 million.

Saffron cultivation is very labor intensive and is a good source of employment for women. The country has a long history of horticultural production and exports and has considerable potential to regain some of its lost market shares.

Horticulture contributes US\$1.4 billion to national GDP,³⁷ equivalent to 34 percent of agricultural GDP and 6.7 percent of national GDP. It accounts for some 350,000 FTE jobs, of which some 90,000 are in the non-farm economy. Horticultural exports (the most important of which are raisins, almonds, cumin, and pomegranates sold to India and Pakistan) are worth more than US\$700 million per year, while fruits, vegetables, and flowers for the domestic market account for about two thirds of the value of output.

Horticulture has grown at 5.5 percent over the past decade, and with a little additional investment it is well positioned to expand even faster. It shows considerable promise for raising farm incomes, generating productive jobs, improving rural and urban diets, opening up agro-processing opportunities, and competing with poppy production. Horticulture is also something that many of the smallest and poorest farmers can engage in, especially women farmers, and it uses relatively little water in relation to the value realized (high value per drop).

As of 2013, the subsector has recaptured its 1970s levels of production, but is still characterized by low yields, lack of consistency in quality and quantity, poor post-harvest practices, and weak producer and marketing organizations. The main constraints are listed in Table 3 above. Those on the production side include: insufficient irrigated land (mainly because of destruction and lack of maintenance of irrigation schemes during the three decades of conflict and insurgency) to expand the horticultural area; inadequate supplies of improved crop varieties and certified seeds; old orchards that need replanting with improved planting materials; insecure property rights, especially for tenant farmers and sharecroppers, that discourage long-term investments, such as in orchards; insufficient access to credit; inadequate extension; and poor on-farm management of water, crops, and pests.

On the marketing side, farmers have limited access to the cold storage and refrigerated transport they need for many of these high-value but perishable products. Most storage facilities in Afghanistan remain sub-standard. Traditional storage facilities are cellars built partly underground to keep fruit and vegetables cool. The cellars range from small rooms to somewhat larger spaces with a capacity of 15 - 20 mo. Spoilage can be quite high in the cellars, as the temperature fluctuates and the humidity is not controlled. Farmers estimate that spoilage is in the 30 - 35 percent range once the commodities have been placed in the cellars. On the other hand, modern cold storage plants are expensive to operate (Box 3), and Afghanistan lacks the technical and financial resources to maintain such modern assets as have been built, especially outside of

³⁷ Fresh grapes generate about US\$150 million of income each year, raisins about US\$280 million, almonds US\$120 million, and pomegranates about US\$100 million. These products are largely exported. Vegetables grown in the country for the domestic market generate about US\$475 million per year.

major cities. Further, maintaining a constant supply of electricity remains a major challenge in many areas, and the use of generators raises costs substantially.

Box 3: Kandahar Cold Storage

Kandahar Cold Storage was established in 2006 with support from the Indian Government in the Industrial Park in Daman District. The plant is owned by the Government of Afghanistan, but is leased out to a private firm. The storage facility has three separate holding compartments each of 120 square meters. Maximum capacity is approximately 5,000 mt. The managers of the facility state that it operates on 95 percent city electricity and 5 percent on generators in a given month. This figure is debatable given that frequent blackouts are a major issue in Kandahar.

Major monthly expenses:

- Afs 1,705,000 (US\$31,000) rent paid to the Government
- Afs 47,700 (US\$870) salaries for 4 employees
- Afs 8,000 (US\$145) electricity bill, if all three compartments are being used
- Afs 8,000 (US\$145) for air conditioning during the summer months
- Total: Afs 1,768,700 (US\$32,160) per month

Monthly income:

- Afs 1.11 (US\$0.02) per kg, or Afs 1,110 (US\$20) per mt, per month
- Max capacity income (5,000 mt): Afs 5,550,000 (US\$100,900)
- 70 percent capacity income (3,500 mt): Afs 3,885,000 (US\$70,640)
- **Break-even point (1,600 mt):** Afs 1,786,700 (US\$32,160)

Interviews with key informants suggest that the facility is rarely used at maximum capacity. Over the course of a year, it does not make much profit. In the summer season potatoes are stored, and in the fall, pomegranates, apples, potatoes, and oranges. A minimum of about US\$32,000 of income per month is necessary to break even for the Kandahar facility. This equates to 1,600 mt of product per month based on US\$0.02 rent/kg/ month. This breakdown does not include potential equipment maintenance expenses that are required per year.

Transport costs are also high, and the lack of an effective grading system means that farmers do not receive prices that reflect the quality of the products they sell. Market opportunities are also constrained by limited agro-industrial capacity to process horticultural products (e.g. oil pressing, canning, freezing, drying, and juicing), while opportunities for export to high-end markets are constrained by poor grading, low phytosanitary standards, and limited air-freight capacity.

What needs to be done?

Interventions need to be crop-specific, but some general needs emerge:³⁸

³⁸ Detailed interventions are discussed by crop in the ASR background paper on horticulture (see appendix, no. 2).

- Upgrade orchards. Many orchards contain old, low-productivity trees that need to be replaced. This requires access to quality planting materials, secure property rights, and investment credit.
- Increase access to improved and certified seeds and planting materials. A certification scheme for fruit and nut trees offers farmers a choice over the many uncertified nurseries available (Box 4), but little attempt has been made thus far to improve and certify the available vegetable seed varieties.
- Improve on-farm water management and encourage the use of more water-efficient technologies like drip irrigation. The most commonly used irrigation system for horticulture products is furrow irrigation, which entails small parallel channels following the slope, above rows of plants, delivering water by gravity, often in surges. Afghan horticultural producers often have limited knowledge of crops' water requirements along the crop cycle, and over-irrigation is common.
- Improve crop management and pest control. Afghan farmers use few pesticides and herbicides in horticultural production—a feature that is considered a strong advantage in many foreign markets. When chemicals are used, standards are generally not observed, and there are no controls on residues. Several donor-led programs have promoted safe pesticide use in the past, providing equipment, materials, and instruction. Pesticides are available on the Afghan market and generally sold in the same shops as seed. However, the high cost of quality pesticides limits their use,³⁹ and the quality of the most readily available chemicals is popularly viewed as low.⁴⁰ While it is likely that imported pesticides are largely of low quality, their efficiency is also limited by farmers' poor knowledge of their application. The World Bank-funded AAIP is addressing this issue.
- Reduce post-harvest losses. Incentivize the private sector to invest in more cold storage facilities, refrigerated transport and shipping, and processing of horticultural crops. This may need to be considered as part of more integrated incentive packages for promoting the development of entire value chains.
- Revamp the extension system to achieve recommendations c) and d) above, partly through reforming and building the capacity of MAIL, but also by expanding the role of private agents and NGOs in providing extension services.
- Expand the credit available to small and medium-sized farms to meet their needs for investment and working capital. Horticulture is capital intensive. A hectare of trellised

³⁹ For example, pesticides distributed by international donors in Uruzgan in 2009 to fight shield lice affecting almond orchards cost US\$400 to treat one hectare. (Altai/GTZ, 2010). This is higher than the average monthly farm income of US\$328 in Uruzgan during the period when almonds are marketed (ADCUS, 2013).

⁴⁰ For example, of seven chemicals observed to be on sale in a shop in Jalalabad, the shopkeeper described the results obtained by five of the seven as “not good.”

vines, for example, requires an initial investment over the first three years of about US\$10,000, and does not yield any sizeable return until the fourth year. Horticultural crops also have high seasonal working capital requirements for modern inputs and seasonal employment, and farmers need credit to be able to store their output to obtain better prices.

Box 4: Production and distribution of certified saplings by private nurseries

A certification scheme for improved varieties of fruit trees and nuts is run by the EU-funded Perennial Horticulture Development Project (PHDP), and administered through the Afghanistan National Horticulture Development Organization and the Afghanistan National Nursery Growers' Association (ANNGO). PHDP has established and improved six national collections of fruit varieties at Agricultural Research Institute of Afghanistan centers in Herat, Jalalabad, Kabul, Kandahar, Kunduz, and Mazar. Through this program, saplings are certified as true-to-type and disease-free, and sold through certified nurseries throughout the country. Though farmers can reproduce fruit and nut trees themselves, they will most often purchase saplings from nurseries.

Both certified and uncertified nurseries are present across Afghanistan. Certified nurseries, members of the ANNGO, number more than 1,000, and operate 22 provinces. Further expansion of privately operated nurseries for certified saplings and seedlings would be necessary if Afghanistan horticulture production and productivity is to be improved. These nurseries carry improved, certified varieties produced through the PHDP certification process. Many uncertified nurseries also operate; they generally sell products for a much lower price and carry a larger number of varieties. A certification program similar to those enacted for wheat and fruit trees would be less effective in the case of vegetables, whose seed is traded between individuals and shops much more freely.

Though most Afghan horticultural exports go to India and Pakistan, there is scope to reach high-end markets in Europe, North America, South East Asia, and the UAE/Gulf states if quality and phytosanitary standards can be met, and if additional airfreight capacity for perishable products can be added. These developments might be facilitated through contract arrangements with large importing firms (e.g. supermarkets) from these countries.

The Government has already prioritized horticultural development within its NADF strategy. MAIL has recently developed a horticulture policy, though this has still to be enacted [OK?] and a detailed implementation strategy is still lacking.

The horticulture policy correctly identifies the main challenges to the development of the subsector:

- **Production level:** shortage of high quality inputs, poor post-harvest practices, insufficient knowledge, lack of programs to expand irrigated areas and improve water management.
- **Technical support:** weak national research and technical support (extension), insufficient pest and disease control, insufficient quality control and certification for some of the inputs, and limited access to credit facilities.

- **Markets and trade:** insufficient market information systems, lack of storage facilities at customs ports to facilitate exports.

The policy also recognizes the low capacity of MAIL, and the Ministry's Directorate of Horticulture in particular, to implement policy and acknowledges that while assistance to the sector has been of great help, "external funding is unlikely to continue at this level. Future support should be targeted to achieve more specific objectives, such as capacity building and financial sustainability."

MAIL's horticulture policy addresses all major issues and opportunities for the sector in a satisfactory manner. Should it be enacted, it would provide a solid base on which to build the future of the subsector. Two issues with the draft are: (a) the lack of prioritization of the many proposed interventions; and (b) the lack of clear implementation methods. As such, the policy needs to be complemented by the developing a clear and credible horticulture strategy that addresses implementation problems.

In the meantime, with donor support, MAIL can build on much that is already happening in the horticultural subsector. Several donor-funded programs have been tackling the core areas of horticultural production and productivity, development of farmer/producer institutions, and access to finance and markets:

- **Production and productivity.** The World Bank-funded National Horticulture and Livestock Project (NHLP), which is a follow-on project to the Horticulture and Livestock Project, focuses on promoting the adoption of improved production practices by target farmers, with gradual rollout of farmer-centric agricultural services systems and investment support. The EU-funded Perennial Horticulture Development Program (PHDP) is supporting orchard rehabilitation and planting of certified and proven mother-trees on six key research farms across the country: Kabul (Badam Bagh), Nangarhar (Shesham Bagh), Kunduz (Center Kunduz), Balkh (Dehdadi), Kandahar and Herat (Urdokhan). The USAID-funded Afghanistan Agricultural Extension Program (AAEP) and Afghanistan Agricultural Research and Extension Development (AGRED) provide extension services training to MAIL extension agents and farmers. The USAID-funded Commercial Horticulture and Agricultural Marketing Program (CHAMP) focuses on high-value crops, developing post-harvest systems and establishing trade networks in neighboring countries for exporters. PHDP is also working with MAIL to develop a modern nursery industry, including imparting greenhouse technology; the program is headed by the Afghanistan National Nursery Growers' Organization (ANNGO) to re-introduce certified saplings and seedlings native to Afghanistan for quality production that meets international export standards. Vegetable production and pest management are being promoted by programs, such as the USAID-funded e-Afghan Agriculture online repository, which provides planting and production research and videos applicable to the Afghan context, and is being used by AGRED and AAEP implementers to extend training to MAIL extension staff and farmers across the country. University research

farms and greenhouses have been built and largely maintained in key universities by the USAID-funded Advancing Afghan Agriculture Alliance and Strengthening Afghan Agriculture Faculties, but they are grossly underutilized.

- ***Farmer/producer institutions.*** The Perennial Horticulture Development Program is supporting the formation of organizations at the producer level. ANNGO, the umbrella nursery growers' organization, has 32 sub-nursery associations and more than a thousand individual nursery members in 22 provinces. PHDP led the formation of the Afghanistan National Horticulture Development Organization (ANHDO), which has a multitude of partner organizations at the producer and trader levels, including the Afghanistan Almond Industry Development Organization, the Export Promotion Agency, and the Citrus Promotion Group, among others. The Agence Française de Développement is funding the Horticulture Cooperatives Development Project, which focuses on strengthening horticulture cooperatives and establishing a cooperative development fund.
- ***Access to markets.*** The CHAMP has focused on value chain analysis, including for key high-value crops, such as grapes and raisins, apples, apricots, almonds, pomegranates, and melons. E-Afghan Agriculture, AGRED, and AAEP provide training and disseminate best practices for farmers in post-harvest techniques. New programs such as the USAID-funded Regional Agriculture Development Program (RADP) will have components that focus on reducing post-harvest losses and increasing value addition for producers, traders, and exporters.
- ***Quality control.*** The design and enforcement of the legal and institutional framework for inputs and outputs requires inter-ministerial collaboration between MAIL, the Ministry of Public Health, and the Ministry of Commerce and Industries. Programs focusing on such efforts specifically for horticulture include PHDP, through the establishment of the Plant Biotechnology Laboratory, the FAO Seed Enterprise Development Project, and the World Bank-funded Afghanistan Agricultural Inputs Project. Each of these programs is working on further developing legislation and regulatory frameworks, equipping laboratories, training technicians, and laying the foundation for the system of certifying horticultural products destined for export markets.
- ***Market information system.*** CHAMP focuses on connecting farmers, traders, middlemen, wholesalers, exporters, and foreign buyers. The Afghan Raisins, Fruits, and Vegetables Promotion Administration takes a lead role in investment and export promotion of horticultural commodities. The EU-funded Food, Agriculture, and Animal Husbandry Information Management and Policy Unit, Roshan's Malomat, the World Food Program, MAIL, the Central Statistical Office, and ACE's Paywand provide information on wholesale and/or retail prices of selected commodities in a number of markets on a daily, weekly, and monthly basis. The Agricultural Data Collection and Utilization System (ADCUS) program mainly focuses on strengthening the Agricultural

Statistics and Management Information System Directorate at MAIL to collect, analyze, and disseminate credible agricultural production data on a national scale.

- **Cold storage.** To help kick-start more private sector involvement in cold storage, a number of donors have invested in building storage facilities and then transferring their ownership to the Government for leasing out. In 2006, the USAID-funded Rebuilding Agricultural Marketing Program (RAMP) program built 21 cold stores in 10 provinces. However, outside of major markets, such as Kabul, Herat, Mazar-e-Sharif, Jalalabad, and Kandahar, cold storage facilities are not operational. India financed a cold storage plant at Kandahar, but this is barely breaking even (Box 3).

A difficulty with many of these donor-supported projects is that they have not been coordinated very effectively, leading to some duplication of effort and failure to ensure the sustainability of the gains achieved. Greater coordination within a national planning framework is needed, to build on the investments already made and to partner more effectively with the private sector.

The Potential

The potential gains from horticulture are large. Current trends suggest that the subsector will grow to 400,000 ha and contribute US\$1.6 billion annually to GDP by 2024. Additional growth is possible with the right investments and policies. It is reasonable to expect that the irrigated area devoted to horticulture could be increased (through rehabilitation) by 25,000 ha each year, which would add another 250,000 ha by 2024. Additional yield gains of two percent per year are feasible through better extension and better on-farm crop and orchard management. Together, these changes could lead to an annual GDP contribution of about US\$3.23 billion by 2024 (compared to US\$1.4 billion in 2012).⁴¹ This would add another 361,828 FTE jobs by 2024: 267,268 in horticulture and 94,560 in other activities through forward linkages.⁴² All these gains are consistent with projected demand in the domestic and export markets.

⁴¹ The calculations are as follows: the proportional gain in irrigated area is $650,000/360,000 = 1.8$, which applied to the GDP contribution in 2012 gives a GDP contribution of US\$2.52 billion by 2024. If yields are also increased by an additional 2% per year, then GDP will increase by another 28% over 10 years, leading to an annual GDP contribution of US\$3.23 billion by 2024.

⁴² The ASR background paper on jobs (see appendix, no. 13) shows a baseline of 261,000 FTE jobs on-farm and 92,344 FTE jobs off-farm, all from 232,252 ha. This gives 1.1238 and 0.3976 FTE jobs per ha for on-farm and off-farm, respectively. Assuming an 80% increase in the horticulture area within 10 years (see previous footnote), this would generate additional employment of $(232,252)(0.8)(1.1238) = 208,803$ FTE jobs on-farm, and $(232,252)(0.8)(0.3976) = 73,875$ FTE jobs off-farm, and a total of 282,678 FTE jobs by 2024. We further increase these amounts by 28% to reflect a 2% per year growth in yields over 10 years. The final employment estimates for 2024 are 267,268 on-farm, 94,560 off-farm, and a total of 361,828 FTE jobs.

The Opium Economy and Agricultural Strategy

Opium poppies are by far Afghanistan's most important cash crop and the country's main illicit economic activity. Poppy cultivation affects the agriculture sector and rural livelihoods in multiple positive and negative ways. It injects hundreds of millions of dollars into the rural economy each year, provides access to land and credit for poorer rural households, and funds agricultural inputs and investments that also benefit other crops. But long-term dependence on poppy cultivation is not in Afghanistan's interest from a development or governance perspective. Poppy production distorts economic incentives against competing licit crops, undermining state legitimacy and the rule of law, funds a variety of corrupt and anti-government actors, and subjects Afghanistan to international opprobrium.

All signs point to further growth in the opium economy in 2014 and beyond. Because Afghanistan is the near-monopoly producer of illicit opium globally, the next several years are likely to see a continuing expansion of opium poppy cultivation, or at least no decline, unless sustainable alternative on-farm and off-farm livelihood strategies are provided, particularly to poor and landless farmers (sharecroppers).

Poppy cultivation and opium production have been rising in Afghanistan since the mid-1990s, though with sharp ups and downs reflecting weather fluctuations, disease, and other factors affecting yields, price changes, and counter-narcotics efforts. After some suppression during 2008-11, cultivation has rebounded in recent years, and, at an estimated 209,000 hectares, set a new record in 2013. Patterns and trends vary widely across different provinces, districts, localities, and rural households within Afghanistan. Poppy cultivation has been concentrated in Helmand and a few other provinces in recent years, and has rapidly expanded in former desert areas in the south and south-west. But in some areas (most notably, central parts of Nangarhar Province) that have ample land and water resources and proximity to markets for agricultural products and labor, as well as a modicum of security and Government presence, poppy growing has been fully or largely eliminated on a sustained basis.

Simplistic models of household decision making with regard to opium poppy growing, whereby gross financial returns are compared with those for other crops, most notably wheat, can be grossly misleading. They usually lead to the conclusion that other crops cannot compete with poppy and therefore harsh law enforcement measures are the only solution. In fact, net financial returns to some horticultural crops in Afghanistan are in the same range as those for opium poppy, and sometimes considerably higher. Even for irrigated wheat, net returns are sometimes close to or even occasionally higher than those for poppy, particularly when wheat prices are favorable and hired labor is used for poppy cultivation and harvesting. But even in such situations farmers usually stay with poppy growing because of other considerations, which the simplistic models ignore: the values placed on by-products of opium poppy and of other crops; major differences in input mix and costs; and—most important—the other benefits that poppy cultivation brings to growers. These include access to land and credit; easy marketing, because traders will buy at the farm-gate; and the fact that poppy is a relatively low-risk crop in an

insecure, high-risk environment. Finally, it must be remembered that Afghan rural households manage portfolios of agricultural and non-agricultural activities to maintain their livelihoods and rarely face an either-or choice between poppy and any specific other crop.

Investing in each of the three subsectors of Pillar I—wheat, livestock, and horticulture—poses some risks of raising illicit opium production, as well as risks to the agricultural investments themselves and broader risks on the security and governance fronts. These risks need to be managed. One way is to direct the investments to regions that are relatively secure and where drug control measures are already effective, but need to be maintained and supported by broad-based rural development; as discussed earlier, such an approach is consistent with the spatial targeting of Pillar I. Another way is to ensure that viable licit livelihoods from a variety of sources are available to rural communities where opium poppy is or might be cultivated. This requires taking a coordinated approach to ensure that new and expanded on-farm and non-farm opportunities add up to a viable alternative to poppy growing, in terms of the income and job opportunities they offer to farmers and rural communities.

Investing in irrigated wheat by facilitating irrigation poses the most significant risk of resuscitating opium poppy cultivation. Wheat is typically a lower value crop than poppy, and parts of the rehabilitated irrigation areas intended for wheat might end up under poppy production. It is also possible that irrigation rehabilitation and higher wheat yields might lead to greater land consolidation by landlords and to the displacement of land-poor and landless rural households—forcing these households to cultivate more poppy on their remaining land, or to move elsewhere and grow poppy. Where counter-narcotics measures have forced a shift from poppy to wheat, these kinds of risks have already materialized, for example in the case of the Helmand Food Zone counter-narcotics initiative (Box 5).

Nangarhar's experience is also relevant. In this province, banning opium poppy cultivation in remote areas that lack the conditions for viable alternatives has typically been highly counterproductive. Households with limited prospects and markets for cash crops have had little choice, but to shift to wheat. But where person-land ratios are high, wheat cultivation alone is far from sufficient for food security or income security, and the affected households are forced to sell off assets, reduce their basic expenditures (e.g. on food, health, education), and resort to other adjustments, including—at the extreme—outmigration. Moreover, opium bans in areas that depend heavily on poppy cultivation can potentially fuel violence and rural rebellion, not least because the bans present an image of a state and a local leadership that does not care about the welfare of the population, but prioritizes its own interests and those of foreign benefactors.

Box 5: The Helmand Food Zone Initiative

The Helmand Food Zone initiative (HFZ) started in the 2008/09 growing season and is still considered a flagship intervention to reduce opium poppy cultivation in the canal-irrigated parts of central Helmand Province. However, the dramatic reductions in opium poppy cultivation in this area since 2008 must be viewed in a wider context. This includes the significant investments that have been made in security and economic growth in the province in the last few years, not just the counter-narcotics interventions of HFZ. Central Helmand has seen profound changes: rapid expansion in the amount of annual and perennial horticultural crops being grown in well-irrigated areas near urban centers, and farmers' adoption of new technologies and agricultural techniques such as production of off-season vegetables under poly-tunnels. An expansion in non-farm income opportunities, including in transport and trade, has helped farmers build resilience. Improvements in security along with significant presence of Afghan National Security Forces, have aided mobility, enabled the sale of goods and services, and allowed easier access to health services and education. In this context, the provision of wheat seed and fertilizer, contingent on reductions in opium poppy cultivation and combined with the threat of poppy eradication, provided a political impetus for the counter-narcotics effort in Helmand, but it alone was sufficient neither to compel communities to abandon poppy cultivation nor to sustain reductions in it over time.

HFZ's focus on substituting wheat for opium poppy has caused large numbers of land-poor and landless households to leave the canal command area to settle in desert lands north of the Boghra canal, where they cultivate poppy in a concentrated manner using tube-well irrigation. They have done so because the shift out of poppy to less labor-intensive wheat has enabled landowning households in the canal command area to manage their farms without the need for sharecropped or tenant labor. This has created a displaced, cheap, and mobile population, skilled in poppy cultivation, and has accelerated the process of settlement in the former desert lands of south-western Afghanistan. Absent sufficient jobs and development assistance (and with landless households the least likely to receive what assistance was available), these farmers had little choice but to settle on new land to the north in former desert areas, build homes there, and bring the area under agricultural production relying on poppy cultivation. Buoyed by the relatively high price of opium, these farmers have been able to purchase the land and technology required to bring the land under cultivation or to use their skills as poppy producers to gain access to land through sharecropping arrangements.

Hence, as a result of the shift to wheat under the HFZ, any reductions in opium poppy cultivation in the central well-irrigated areas have increasingly been offset by increases in new cultivation in former desert areas, leaving Afghanistan with higher long-term opium production capacity and greater dependence on opium than prior to the HFZ.

The canal-irrigated areas of Helmand, where poppy cultivation has been reduced or eliminated, could easily revert to poppy growing—and there are some signs that this is beginning to happen in 2013, and especially 2014. These changes in cultivation patterns are not good for Afghanistan agriculturally nor environmentally (there are good reasons why in the absence of surface irrigation, the former desert areas were never cultivated in the past), and their impacts on security and governance also have been problematic.

To address such risks in opium poppy growing areas, Afghanistan should prioritize interventions to raise productivity in irrigated wheat (i.e. to raise yields per unit area), rather than to expand the area under irrigated wheat, even though this might not result in large increases in commercial production of wheat. In other words, expanding wheat cultivation could be assigned lower priority than investments in perennial horticulture and intensive livestock production, as discussed below. Where the total cultivable area is being increased through investment in irrigation, rather than by encouraging large-scale expansion let alone mono-cropping of wheat, cultivation of wheat might best be expanded modestly, as part of an integrated crop mix that includes annual horticultural crops (mainly vegetables) and offers producers an attractive alternative to poppies.

The risk that promoting horticultural crops will encourage opium poppy growing is smaller than the risk from promoting wheat, because the output values per hectare of horticultural crops are more competitive with that of poppy. But some annual horticultural crops might form part of a cropping system that includes opium poppy (through good-practice crop rotation and/or where there are two growing seasons each year), and hence their development may synergize rather than compete with poppy. Prioritizing the development of perennial crops, such as vines and tree fruits rather than annual horticultural crops might help in this regard, because once in place the perennial crops commit land over the entire year and for an extended period (typically 25 - 30 years), and represent “sunk” investments that would make it costly to shift back to opium poppy cultivation.

Livestock is the subsector where there is a high degree of consonance between agricultural development and counter-narcotics objectives. Targeting livestock interventions to poorer rural households, which own little or no land and have very limited assets—or at least ensuring that these households benefit proportionally and are not discriminated against—would help to maximize both anti-poverty and counter-narcotics outcomes, while also being consistent with the agriculture sector strategy as a whole. Dairy development can play an important role in rural areas close to cities and where there may be a risk of poppy cultivation coming back, particularly in the south and east. There are also some specific synergies that could be exploited for livestock, for example intercropping fodder crops with tree crops during the trees’ first three to four years.

For irrigation expansion, as noted above, the most obvious risk is that since opium poppy offers high returns on irrigated land, irrigation rehabilitation schemes could lead to expanded poppy cultivation. The two river basins recommended for the expansion of irrigation under Pillar I (Panj-Amu Darya and Kabul river basins) have histories of significant opium poppy cultivation, and could potentially resume or even exceed their peak levels of cultivation seen in the past.

Without alleviating the critical constraint of water and expanding the cultivated area, Afghanistan will not be able to make much progress in agricultural development or in reducing its dependence on opium poppy cultivation over the longer term. Measures through which to mitigate risks, and maximize the potential benefits associated with irrigation, are:

- to target a strong combination of interventions to promote horticulture and livestock, as appropriate, in newly irrigated areas;
- to allocate newly irrigated land in small parcels to landless and land-poor farmers, rather than better-off landowners;⁴³ and
- to institute mandatory counter-narcotics impact assessments for irrigation projects.

Other risks arise because expanding the road network facilitates the transport of opium, opiates, and chemical precursors. Yet roads form a crucial part of the rural infrastructure necessary to develop other cash crops, as well as access to services, including not least security. Without road development, poverty is likely to worsen in rural Afghanistan and farmers will have greater incentives to grow poppies. The risks can be reduced if significant road projects are built in conjunction with other interventions to promote horticulture and livestock production, and non-farm income-generating opportunities (e.g. agro-processing) in the same areas. Counter-narcotics impacts should be one of the criteria for determining which areas and roads should be prioritized: road projects should not be implemented, let alone prioritized, in remote, insecure and resource-poor areas where their development is likely to promote (or at least enable) opium poppy cultivation.

Pillar I interventions that offer viable alternatives to poppy cultivation will often require integrating a farming systems perspective with a regional economy perspective. Horticultural crops and intensive livestock production need to be combined on-farm in ways that provide a high annual return per hectare of irrigated land. Hence a relatively low-value crop like wheat may need to be grown as a secondary crop within a seasonal or multi-year rotation. Horticulture and livestock not only create high on-farm income and employment, but also offer good prospects for value-addition activities in the regional economy, which might be enhanced by appropriate regional economic policies. Taken together, the total on-and off-farm impact (increased productivity and rural incomes) on employment could be high in a region, creating significant new opportunities for many small farms and landless workers. Since such an integrated approach has been little tested in Afghan agricultural development interventions, a high priority should be to develop and pilot it within some of the Pillar I target areas.⁴⁴ Such pilots could also shed light on the possible tradeoffs between constraining poppy production and promoting agricultural growth, and provide a framework for integrating non-agricultural with

⁴³ This will be a challenge to implement in Afghanistan's current environment, but nevertheless must be attempted, at least to ensure that the land is not entirely grabbed by better-off and politically connected farmers as well as power-holders.

⁴⁴ However, diversified livelihoods, rising incomes, and rural development have emerged naturally (with only limited and fragmented support from development projects) in some centrally located and well-endowed localities where opium poppy cultivation was banned, based on their good land and water resources and easy access to markets for agricultural products and labor. Experience and lessons from these areas may usefully inform interventions to promote these outcomes more generally in Pillar I target areas.

agricultural interventions to constrain poppy production without sacrificing as much licit agricultural growth.

Agro-industry

Agro-industry (e.g. food and beverages, textiles, and leather) accounts for more than 90 percent of the country's manufacturing sector. It has considerable capacity to grow with wheat, livestock, and horticultural production and, as shown in Table 2 above, could create more than 260,000 FTE jobs within 10 years. However, to achieve these spillover benefits and growth in agro-industry more generally will require an enabling business environment to attract more private investment, including foreign direct investment.

Agro-industry is dominated by small and medium-sized enterprises, which face similar constraints as the rest of the small and medium enterprise (SME) manufacturing sector. A recent World Bank Enterprise Survey in Afghanistan found that access to finance was seen as the most important constraint on the growth of domestic agribusiness players, while security concerns and political instability have been the main deterrents for foreign investors. The current levels of risk have resulted in virtually no foreign investments, except from the Afghan diaspora. The country's policy and regulatory environment for agribusiness is quite liberal, with relatively few regulations on prices, margins, markets, and imports, and is not widely seen as a constraint.

Beyond security and access to finance, the growth of agribusiness has been constrained by difficulties in accessing high-value markets and serviced industrial land.

Difficulties in accessing high-value urban and export markets

Although the country's road infrastructure has improved, transport remains costly and of poor quality, and refrigerated trucks are lacking. For most rural households, connectivity to the road system is limited and strongly affected by seasonal fluctuations. The average distance to the nearest drivable road nationwide is about 3 km and there is no connection to a main road system for at least one month each year. Insecurity and depredations by security forces and other armed actors (who often extract informal "tolls" from transporters) further increase transport costs and risks.

Furthermore, as seen above, the country has very limited cold storage capacity. The lack of cold storage means that local seasonal products arrive in the market only when they are in season, and all at the same time, depressing prices.⁴⁵ Products going to higher value/quality export markets carry much higher prices (for example, apricots sell for three times more in Dubai than Pakistan), but supplying fruit to those markets would require refrigerated trucks and cold storage. As an alternative, products have been air-freighted at extremely high cost to Dubai.

⁴⁵ For example, Afghan pomegranates in season sell at US\$10 for 7kg, but three months later lower quality pomegranates from China are sold at US\$60 for 7kg. Similar price differentials can be observed for grapes.

In addition to the lack of transport and storage infrastructure, access to markets is affected by the lack of certification for fresh horticultural products, as well as issues with customs, including at the Karachi port where containers are often blocked. Red tape in customs is reflected in Afghanistan's very poor performance in the "Trading across Borders" Doing Business Indicator (184th out of 189 countries). For example, it takes 81 days and costs US\$5,000 to move a 20-foot container from Kabul to Karachi port in Pakistan.⁴⁶

Recommendations for facilitating access to markets:

- Develop the secondary and tertiary road network.
- Negotiate and enforce regional agreements, especially with Pakistan and India, to facilitate high-value horticultural exports from Afghanistan to India through Pakistan.
- Simplify rules and automate customs processes to reduce red tape and corruption.
- Establish quality control and certification procedures to promote the export and import of high-value products, and build on efforts by the Afghanistan Agricultural Inputs Project (AAIP) to establish some of the institutional infrastructure needed for quality control and certification.
- Support private investments in (cold) storage infrastructure.

Difficulties in accessing serviced industrial land

Poorly functioning land markets and lack of space in industrial zones mean that attempts to acquire land for business space are time-consuming and risky. For example, would-be investors in agribusiness, including investors in cold storage, face prices of up to US\$1 million for a hectare of industrial land in Kabul, two years of waiting time, and many disputes. Registering a property is costly (5 percent of the value) and lengthy (250 days), resulting in Afghanistan being ranked 175th out of 189 countries on the "Registering a Property" Doing Business indicator. Obtaining a construction permit for industrial premises is an expensive and lengthy process (330 days, according to Doing Business, which ranks Afghanistan 167th out of 189 countries on the "Dealing with Construction Permits" indicator). The cost of industrial land is further raised by the need for security. For example, a security wall—a must for most ventures—costs around US\$150,000 for a 3,000 square meter industrial lot. The risks of acquiring industrial land are increased by difficulties with enforcing contracts; here Afghanistan ranks 168th out of 189 countries on the Doing Business indicator.

In view of these difficulties, the Government has supported the establishment of industrial parks (in some cases, with support from development partners). These parks are all publicly owned and operated and have varying degrees of success. In some cases, such as Hesar-e-Shahi (near

⁴⁶ According to the ASR background paper on horticulture (see appendix, no. 2), road transport costs in Afghanistan are the highest in the South Asia Region.

Jalalabad), less than optimal site selection and a deteriorating security environment have led to failure. In some, a weak regulatory regime has led to non-industrial land use. There are a few successes, such as the fully occupied Bagrami park on the outskirts of Kabul.

The Government recently decided that the Afghanistan Investment Support Agency (AISA) should be the agency in charge of industrial parks, and should take a leadership role in ensuring that existing and planned industrial parks in Afghanistan are effectively and transparently serving the needs of the private sector.

In implementing its new responsibilities, AISA should take into account international experiences in developing successful industrial parks. These include:

- Industrial estates should be developed around comparative advantage.
- Patience is required; they often take a number of years to fully develop.
- Infrastructure reliability is far more important than incentives.
- In most cases the private sector does a better job of developing industrial estates: private bodies will only agree to develop if they can see that (a) the location is right, (b) the market exists, and (c) they can resolve any infrastructure needs. Efforts to develop industrial estates can be structured as public-private partnerships.
- While political support is important, political interference in site selection and management is not helpful.
- General levels of competitiveness of the national economy and investment environment are important.
- A clear and transparent legal and regulatory framework for industrial parks together with regulatory and implementation capacity is needed; and
- Linking industrial estates to key infrastructure investments, such as road and rail networks can be a powerful route to competitiveness.

5. Pillar I: Cross-Cutting Constraints on the Prioritized Value Chains

Some of the constraints on individual value chains that were identified in Table 3 above are common to all three chains. They include water resources; technology development; extension; quality assurance for inputs; land tenure security; and rural finance. Another cross-cutting challenge is to engage with women farmers, as this could unlock additional growth in productivity, as well as contribute to an important social goal.

Water for Irrigation

Expanding the irrigated area for wheat, horticulture, and livestock fodder is critical for achieving early growth. About 2 million hectares are currently irrigated on a regular basis and, with rehabilitation of the infrastructure degraded during the years of conflict; another 600,000 ha might be added within 5 -10 years. Experience with rehabilitating irrigation schemes is well established in Afghanistan: with the support of various donors, including the ADB, JICA, USAID, and the World Bank, schemes covering about 1.8 million hectares have been rehabilitated over the last 12 years. This can be done at an average cost of US\$300 – US\$400/ha⁴⁷ (or US\$600 – US\$800/ha if tertiary canals are included) with a return of between US\$1,000 and US\$4,000/ha if used for wheat or horticulture, respectively.

An assessment of water resources shows that Afghanistan has 4.4 million ha of potentially irrigable land, but that to develop this potential would require significant new investment in dams and water conveyance, as well as in new irrigation infrastructure, and that agreements would need to be reached with downstream riparian countries.⁴⁸ At around US\$4,500/ha, new investment in irrigation is much more costly than rehabilitation, and its benefits would take much longer to materialize. But developing this potential will be critical for Afghanistan's long-term growth. Given the long lead time required for these types of investments, the sooner trans-boundary water negotiations with downstream countries are started the better.

Short-to medium-term development of water resources

To maximize agricultural growth over the next three to five years, efforts should focus on rehabilitating existing irrigation schemes, building on the success of past rehabilitation projects (Box 6). The realistic target is 500,000 - 700,000 ha within 10 years.

⁴⁷ This is the cost of building the main structures, but farmers then need to invest a comparable amount in on-farm irrigation infrastructure.

⁴⁸ ASR background paper on land and water resources (see appendix, no. 7).

Box 6: The World Bank's Experience with Irrigation Rehabilitation and Development

In 2002, it was estimated that the area under irrigation had shrunk by two thirds since 1993, and that irrigation systems were working at a very low conveyance efficiency of about 25 percent. Further, Afghanistan was seen to be using only about 30 percent of its water resources, with considerable potential for hydropower, irrigation, and potable water supplies. Under such circumstances, the World Bank approved the Emergency Irrigation Rehabilitation Project (EIRP) in 2003. The original project cost was US\$75 million, but after two additional financings the final project cost came to US\$142.5 million. MEW was the implementing agency.

With the main focus on restoring irrigation capacity and helping to raise agricultural production and productivity, the EIRP managed to restore irrigation services on about 810,000 ha at a cost of US\$300 - US\$400/ha (US\$600 - US\$800 if tertiary canals are included). The economic rate of return was estimated at 25.8 percent, resulting from increases in both irrigated area and cropping intensities. EIRP closed in 2011. The Bank continued to support the irrigation subsector through a US\$75 million Irrigation Restoration and Development Project (IRDP), which started in 2012. While the IRDP will continue the rehabilitation of irrigation schemes, it also includes support for developing small and medium-sized dams; and strengthening the capacity to collect and analyze the hydro-metrological data essential for irrigation development.

Another irrigation operation, the On-Farm Water Management Project (US\$25 million financed by the Afghanistan Reconstruction Trust Fund (ARTF) through the Bank), was approved in 2011, with MAIL as an implementing agency. This was in recognition that poorly functioning tertiary water distribution channels are leading to huge water losses at farm level. Therefore, OFWMP rehabilitates the tertiary canals of the EIRP and small irrigation schemes. OFWMP is also supporting the establishment of irrigation associations, which are responsible for operation and maintenance and various demonstration programs (e.g. land leveling) that further increase water use efficiency.

As well as rehabilitation to improve water conveyance efficiency, it is also important to improve water management efficiency in farmers' fields. This requires a number of actions:

Invest in strong institutions and policies to improve irrigation water management. Building on the national Water Law, Afghanistan needs to create the regulatory structure for managing water and then a set of institutions at all levels:

- *Define the legal and regulatory framework and strengthen inter-agency coordination.* The Government needs to develop and pass subsequent laws and by-laws in line with the national Water Law. The legal framework should clarify the institutional setting in the irrigation sector: it should identify a single institution/ministry responsible for irrigation development, consolidate various models for on-farm water management entities (irrigation associations and *mirabs*), and define the role of public entities in the sector. The World Bank has a competitive advantage in advising on the institutional framework for irrigation, having provided support in this regard in other countries (e.g. Albania and Vietnam).
- *Strengthen the Irrigation Department in MAIL to manage the irrigation network.* MAIL's Irrigation Department, established in 2009, is responsible for providing support to on-farm

irrigation and will ultimately be responsible for: (i) designing, implementing, and supervising civil works (rehabilitation and new construction) of on-farm and small irrigation schemes; (ii) facilitating the establishment of irrigation associations (IAs) and building their capacity; (iii) monitoring the performance of IAs, providing technical guidance and undertaking technical and financial audits; and (iv) monitoring the economic benefits of irrigation. The capacity of the Irrigation Department to execute the above mandates remains low even after four years. It is therefore critical for MAIL to develop and implement a plan for strengthening the Department.

- *Strengthen irrigation associations.* Ultimately, the users of irrigation water are responsible for its proper management on-farm. IAs have been established under several projects to build on and strengthen the traditional *mirab* system for operation and maintenance of irrigation infrastructure. Existing and new IAs need training in comprehensive aspects covering public administration, on-farm water management, dispute resolution, and agriculture.

Help farmers better manage their water and get more crops per drop. As noted earlier, over-irrigation is common in Afghanistan. Farmers need extensive training in water management, as well as technical inputs and training in good agricultural practices to translate increased water into increased agricultural productivity and higher incomes. This includes investing in canal lining, land leveling, and installing control and measurement structures. All of this will require close cooperation between the Irrigation Department of MAIL and the extension services, as well as between MAIL and the Ministry of Energy and Water (MEW).

Long-term Development of Water Resources

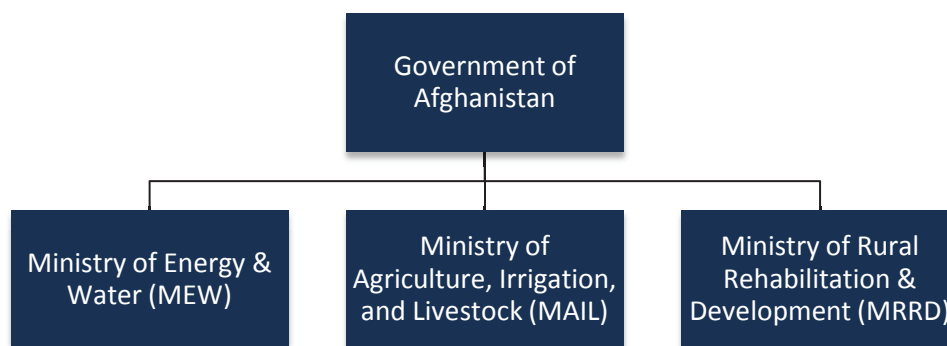
As Afghanistan's economy continues to develop, the demand on water from other sectors including households, industry (particularly mining), and hydropower will increase. The country currently has no coordinated effort to promote integrated water resources management (IWRM), following the completion of the Afghanistan Water Resources Development Project (AWARD). It needs to move towards IWRM in order to harmonize the use of water resources and to clarify the allocation trade-offs among various sectors. In particular, the following actions are recommended:

- *Strengthen the basic water resource management function at MEW.* MEW is best positioned to implement integrated water resources management because its mandate covers both water and energy (hydropower). MEW's Water Resources Department should be able to carry out basic functions (water resources governance), such as hydro-meteorological data collection and analysis, water quality monitoring, hydrological modeling, and ground water monitoring, but its current capacity is limited, with a critical need for technical assistance.
- *Update the river basin investment plan.* Originally a plan was developed for each river basin under the AWARD Project, but with recent economic development the underlying assumptions regarding demographic change, urbanization, and hydropower development now need to be revised. An update of the plan should be carried out jointly by all concerned

ministries, so as to identify possible conjunctive uses (e.g. hydropower and irrigation, irrigation and domestic water) to be promoted. The plan should identify the priority investments, particularly in the Kabul River Basin for domestic water, and water storage facilities in the Northern River Basin, where riparian notification is not necessary.

- *Develop water storage facilities.* Demand for water will very likely outrun Afghanistan’s current water storage capacity. Climate change will impact the timing and volume of snow melts and hence river flows, and ultimately irrigated crop production. Therefore, development of water reservoirs is vital for the country.
- *Initiate a strategy for disaster risk management.* Flood risk in Afghanistan is serious, and floods carry severe costs to human life, infrastructure, and economic activity. Several early warning activities are ongoing, including hydro-meteorological monitoring at MEW and a Food Security and Agriculture Cluster that works with the Afghan National Disaster Management Authority, plus several NGOs working on early warning. Building on these activities, Afghanistan should: (a) establish an inter-ministerial committee to address disaster risk management in a comprehensive manner; and (b) initiate actions on community-based disaster risk management.
- *Initiate discussions with other riparian countries.* As four out of the five river basins in Afghanistan are international waterways, it is critical for the Government to start discussion with riparian countries and negotiate the utilization of the water resources, including construction of new storage facilities. Afghanistan needs to have the technical capabilities, as well as the information (monitoring of water flows going out through borders etc.), to strongly advocate its position as an upstream riparian.

The development and management of irrigation water could be improved by streamlining ministerial responsibilities. At present three ministries are responsible for irrigation management:



MEW is responsible for overall water resources management, including hydro-meteorological data collection, hydropower development, and off-farm facilities for large-scale irrigation. MAIL is engaged in on-farm irrigation facilities and in small-scale irrigation schemes (typically of less than 500 ha). MRRD, too, is engaged in small-scale irrigation through its rural development programs. The three ministries have different approaches to irrigation rehabilitation and

management. The transition that is in progress from traditional to modern management arrangements has led to the testing of new management models, such as irrigation associations and water user associations, but there is as yet no clear definition of the role of the communities and the public sector, particularly as regards primary canals and head-works.

Research and Development

Afghanistan's capacity for technology development is extremely limited. Farmers are not receiving the technological support they need from the national agricultural research system, as evidenced by low crop and livestock yields compared to those of neighboring countries, and by the trend decline in agricultural TFP (Figure 5 above). Before the conflict years the country had a well-functioning agricultural research system with a network of twelve research stations, but these were subsequently looted of their equipment and most of the scientific staff left.

Since 2002, MAIL has led an effort to initiate and re-establish the research system, which is now structured as the Agricultural Research Institute of Afghanistan (ARIA). By 2010, ARIA had 17 research stations and sub-stations in addition to a head office at Kabul. Various research organizations were carrying out experiments at 15 of the stations, while the remaining two stations were inactive. New genotypes for wheat, other cereals, and legumes provided by ICARDA, CIMMYT, and ACIAR, among others, have been adapted and trialed for release, with both the public and private sector playing roles in multiplying and releasing certified seed of high quality that farmers can purchase.

A comprehensive assessment of Afghanistan's agricultural research system was completed by USAID in June 2010.⁴⁹ The report emphasized the imperative of maintaining an adequate network of research stations and on-farm research across a range of locations to bring research, extension, and farmers together. It also recommended that in addition to commodity-specific research, cross-cutting research should be undertaken on irrigation, water harvesting, post-harvest technologies, agricultural and livestock product processing and marketing, and economics. Consistent with the goals of Pillar I, the report emphasized the need for research on crops and livestock that are economically important to Afghanistan and that help develop value chains while benefiting small farmers.

Fulfilling the agenda set out by USAID will require rehabilitating and resourcing the existing research stations, including introducing new IT equipment to enable them to connect globally and serve as knowledge centers, and building up a trained and motivated staff. Shortages of trained and experienced scientific staff are a major limiting factor. In 2010, there were only 21 professionals with a post-graduate degree (PhD or MSc) in the whole of ARIA, and 11 of them were stationed at ARIA headquarters and not at the research stations. The USAID study recommended that support be given for MSc, PhD, and long- and short-term in-service training

⁴⁹ The assessment reviewed the full range of research on field crops (wheat and other cereals), tree crops (horticultural), horticultural crops (vegetables), livestock (cattle, small ruminants and poultry), and irrigation.

(up to six months, both domestically and internationally) and study tours in various agricultural disciplines. It also recommended that Afghan PhD and MSc candidates be sent to a variety of international institutions, so as to bring back wider knowledge, experiences, and professional linkages. The World Bank-financed AAIP is helping to support the rehabilitation of some of ARIA centers. The USAID is also supporting rehabilitation through AGRED.

As an interim measure while ARIA's capacity is being restored, more research could be outsourced to regional centers of excellence, international agricultural research centers that are members of CGIAR (especially ICARDA), and the research systems of developed countries with similar agro-climatic zones (e.g. ACIAR in Australia). Collaboration with other South Asian national research systems, such as the Indian Council of Agricultural Research (ICAR) would also be beneficial. But there should be more detailed assessment of how this partnership should be structured in the near term to compensate for absent national capacity, and then evolve into a different partnership over the longer run. The intent here is to temporarily outsource more of the adaptation research that ARIA should be doing for itself, and to seek training and capacity-building assistance from such partners.

Extension Services

The public extension service of MAIL reaches few Afghan farmers—fewer than 1.5 percent of them nationwide, according to the NRVA 2007/08, though it does seem to reach 32 percent of irrigated wheat farmers.⁵⁰ About 15 percent of households with livestock ownership receive some veterinary services.⁵¹ MAIL's extension service suffers from an unrealistically ambitious mandate, outdated models of extension, and inadequate human and financial resources. MAIL needs to develop a clear and realistic extension policy that is appropriate to a constrained financial environment and that recognizes the increased capabilities of the private and NGO sectors. It should establish minimum standards for extension service delivery, and define indicators to be used for monitoring and evaluating the performance of all actors.

An effort is in progress to provide such a strategic framework for extension services—the Afghanistan Agricultural Extension Model (AAEM)—but the plan it proposes is overambitious and does not set clear objectives, so it will be difficult to implement. The AAEM should be revised to approach the delivery of extension services in a more focused way, concentrating on those first-mover agricultural commodities with high potential for production and productivity growth (i.e., irrigated wheat, horticultural crops, and intensive livestock production) in irrigated areas with good market access. In addition, a review of the Agricultural Management Information System needs to be made, aiming to identify processes and tools for collecting and analyzing data related to agricultural extension.

⁵⁰ ASR background paper on wheat (see appendix, no. 1).

⁵¹ ASR background paper on livestock (see appendix, no. 3).

MAIL needs to update its models for service delivery to farmers, and then focus on organizing, regulating, and resourcing these effectively. Consistent with international best practice, MAIL should gradually move out of direct service provision into an enabling and regulatory role, leaving some if not most services to be provided through contract arrangements with the private sector and NGOs. It should build on successful experiences like the privatized veterinary field units (Box 1) and horticultural extension services (Box 7).

Box 7: Empowering horticultural producers through farmer field schools

The National Horticulture and Livestock Project (NHLP) uses a demand-driven approach in its horticultural extension services delivery system, aimed at promoting the adoption of improved farm practices through learning by doing. The strategy is based on identifying common interest groups among farmers, and using farmer field schools (FFSs) to provide them technical support.

As part of the methodology, a lead farmer plot (LF) is made available to the extension agent for teaching common interest groups (CIGs) proven production practices, through which they can increase their yield and protect their crops. Once the CIG members have mastered the techniques on their own farms, they can teach other farmers in the community, thus multiplying the positive effects of the new technologies. Overall, the FFS approach has been successful in NHLP provinces. Initially, on the LF plot, farmers were taught improved orchard and vineyard husbandry practices, including sapling and seedling selection, planting techniques, weeding, pruning, and harvesting. Farmers were able to adopt better agricultural practices and appreciate that FFS was the main source of new knowledge.

CIG members who applied what they learnt from FFS managed to increase production and productivity by two to five fold depending on the crop or livestock enterprises they chose. The FFS approach has been particularly successful in improving grape productivity through trellising (from an average of 10 mt/ha in traditional production systems or 16mt/ha from well-maintained bush vines) to 25 - 30mt/ha, depending on the age and variety of vineyard. At farm-gate price of US\$400/mt, this is equivalent to a gross return of up to US\$12,000/ha.

However, not all members of the FFS formed under NHLP have been as successful. Some of them are still struggling for lack of irrigation water and farm credit for investing in trellis (costing about US\$10,000/ ha), as well as replanting their orchards or vineyards. Until these issues are addressed, it may remain difficult for NHLP to scale up the dissemination of new agricultural technologies.

The most positive impact of the FFS is the empowerment of farmers. In the past, farmers were asking for cash or subsidized inputs, but now they are asking for training and support to develop new orchards, and of course they are witnessing increases in productivity and earning more income.

MAIL also needs to strengthen the capabilities of its extension staff, many of whom are poorly trained in modern farming techniques and have limited communications skills for reaching groups of farmers. Part of the problem is the quality of new recruits. Most extension agents are recruited from Afghanistan's 25 agricultural vocational high schools (for grades 10 and 12) and two training institutes (which provide more advanced training through grade 14). These training centers are ill equipped and poorly maintained and their graduates lack the skills they need to be effective extension agents. Very few extension officers are recruited from among the agricultural graduates of the various universities.

Much remains to be done to strengthen agricultural education. The World Bank-funded Skills Development Project could be used for this purpose. A curriculum that would guarantee minimum agricultural education training standards for the Pillar I commodities prior to joining the extension service needs urgently to be developed. It is also imperative to attract more women into agricultural education, so that they can become research scientists and extension staff.

MAIL has no national training plan to improve the skills of existing extension staff. The research directorate delivers training to extension services staff at the Badam Bagh Research Station in Kabul (and at its six other stations across the country), but this training is limited and does not happen regularly. The only efforts to provide a repository of agricultural knowledge adapted to the Afghan context have been undertaken by donor-funded initiatives, and the General Directorate of Extension does not maintain, let alone build on, such a knowledge base. The extension services are also poorly equipped and trained in using modern mass communication methods to engage with farmers, even though radio and TV programs and mobile phones are now important sources of knowledge for many farmers.

According to a recent survey, 74 percent of the Afghan population now have mobile phones, up from one percent in 2004.⁵² This is about the same level as observed in Bangladesh, India, and Pakistan. Moreover, 80 percent of Afghan women either own or have access to a mobile phone. Separate figures are not available for rural and urban areas, but since 80 percent of the population lives in rural areas, then clearly a large and growing share of rural people have access to mobile phones. Mobile phones not only offer a promising channel for spreading extension messages, but also for linking farmers to market information systems. Mobile phones could also serve as a powerful way of reaching women farmers by female extension agents. MAIL staff need appropriate training to enable them to tap into this new medium.

MAIL is receiving funding from the World Bank-funded CBR project to recruit, pay, and manage a cadre of skilled national staff as part of its professional civil service at both the central and sub-national levels. This will enable MAIL to align the civil service to its strategic priorities: establishing performance-based management systems; strengthening career and human resource development, policy, and legal analyses; improving delivery of key services (including regulatory functions); and coordination and monitoring.

The way MAIL's extension work is funded also needs to change. Too much of the available funding is spent on administrative functions at the central and provincial levels, rather than at the district level for field interactions with farmers. As a result, many district extension officers are paid their salaries but do not have an operation and maintenance budget to discharge their assigned duties; hence they are demoralized. MAIL needs to develop a more transparent and norm-based mechanism for allocating its budget to provincial and district-level departments of

⁵² Survey conducted by GSMA Intelligence in the first quarter of 2014.

agriculture and livestock for service delivery, and which is consistent with the kind of new strategy discussed above.

Another problem is that the bulk of the development expenditures on agricultural services delivery come from off-budget bilateral donor-funded projects, leaving MAIL very little discretion over their allocation. The Bank and other donors need to plan jointly with MAIL the transfer of their projects to the Ministry's operational directorates. The EC and USAID wish to mainstream their support through the directorates, but the obstacles to achieving this at operational level are formidable, given the Ministry's limited implementation capacity. As noted above, CBR project is one of the instruments to build MAIL's technical, administrative, and regulatory capacities.

Regulation of Agricultural Inputs

Afghan farmers spend significant amounts annually on purchased inputs including fertilizers, seeds, breeding materials, veterinary medicines, and equipment. Many of these inputs are successfully distributed by the private sector but, as discussed above for individual Pillar I value chains, there are many problems with the quality of the materials supplied because of the virtual absence of effective regulatory systems.

A key area for crop improvement is to develop a more effective system for certifying the pedigree and quality of seeds and planting materials. With the assistance of FAO, the national Seed Policy (2005) was updated and signed into law by the Minister in December 2012. Afghanistan has a National Seed Law (2009), and draft Official Seed Rules and Regulations are undergoing legal and technical scrutiny. A National Seed Board oversees the seed sector, which consists of variety selection and improved seed production by public and private sector agencies, and a Seed Certification Agency. These organizations require capacity building to help them more effectively perform their regulatory functions.

MAIL has also developed the Pesticides Act and Plant Quarantine Act, together with their respective regulations, and has submitted them to the Ministry of Justice for processing and eventual submission to the Parliament for approval.

Another important area for improvement is to prevent the marketing of banned, hazardous, sub-standard, and unreliable pesticides and fertilizers. The AAIP is providing support for establishing: (a) a mechanism for pesticides registration, administration, and quality control; (b) well-equipped laboratories for testing pesticides and fertilizers.

MAIL also needs to improve its ability to lower the risks from foreign pests and diseases. The AAIP provides support for: (a) expediting the enactment of the Plant Quarantine Act and Regulations; (b) undertaking a nationwide quarantine survey of insect pests and diseases, establishing an inventory of areas of their prevalence, analyzing risks of spreading, and developing an effective management plan; (c) establishing plant quarantine stations; and (d)

strengthening the Insect Pests and Diseases Diagnostic Facility, by providing requisite equipment and training.

On the livestock side, MAIL needs to strengthen its control of the quality of production inputs, particularly breeding materials, veterinary medicines and services, and livestock feeds. Certification schemes for veterinary medicines, vaccines, concentrate feeds, AI, day-old chicks, and hatching eggs need to be introduced and enforced, at the border for imports and by licensing domestic suppliers.

Land Policy

Land issues are complex in Afghanistan, with overlapping legal and customary systems and extensive areas of state-owned land. The key challenges are the following:

- Tenure insecurity and inaccessibility of ownership titles constrain long-term investments and productivity improvements. Only about a third of the total cropland is covered by the land registration system, which is limited and outdated.
- Land disputes are widespread and damaging. Tenure security is undermined by the prevalence of competing customary and legal claims, and by the displacement and erosion of the traditional authorities and local courts over the long period of conflict. The result is frequent and widespread disputes over land, which overburden the inefficient court system and are difficult to resolve. Land disputes are exacerbating ethnic and religious conflicts, as well as undermining incentives for long-term investments in orchards and agro-industry.
- Land grabbing, plus claims made by the state, aggravates access problems, and affects the livelihoods of the poor and vulnerable.
- Lack of a legal framework for land ownership and registration poses major obstacles to smooth land acquisition for irrigation infrastructure investments and development of extractive industries.
- Lack of clear ownership discourages investments in improving residential property.
- Cumbersome administrative procedures are a recipe for rent seeking in land management and administration. According to the World Bank's "Doing Business" indicators, it takes around 350 days for a property to be transferred in a legal way with the current established court system. Recent cases of land acquisition have taken at least 120 weeks.
- Administrative corruption and fraud. Control over the formal titling system gives rise to potential rent seeking.
- Access to land is difficult for private would-be investors and the landless rural poor.
- Land cannot be easily used as collateral, so it cannot assist much in capital mobility.

- The legal and regulatory impediments to the sale and purchase of land, combined with the lack of transparent land records and the inefficient land administration system, prevent the development of an efficient land market.

Though a National Land Policy was approved in 2007 to rationalize land policy for urban and rural areas, the main land-related laws are neither properly aligned with the new policy nor supported by proper regulatory frameworks. Reforming the full spectrum of land issues will take time, and the Afghanistan Independent Land Authority, which was established in 2010 as an independent institution responsible for land management and administration, will need to be strengthened if it is to fulfill its mandate.

For the first-mover agricultural strategy, immediate land-related needs are to secure the rights of private owners, especially in irrigated and peri-urban areas; to improve land-leasing arrangements, including for agro-industry; and to facilitate the development of efficient land markets. To make progress towards these goals will require extending and updating land titles in these areas, creating transparent and easy access to land records—such as is now possible through digitization and the Internet—and improving the procedures for resolving disputes.⁵³

Significant experience has been gained and documented with out-of-court dispute settlement. Incorporating established and successful procedures into the legal framework, and adding judicial validation to *de facto* processes, could reduce the burden of legal cases in the court system and provide better protection to the poor. While the underlying legal amendments will probably take several years to pass through the system, public consultations on such reform could start immediately.

Rural Credit

Credit is a binding constraint on intensive livestock and horticultural production. The nascent financial sector in Afghanistan is fragile—which translates into an extremely low level of access to financial services, particularly for agriculture, whether for investment (e.g. for orchards, vineyards, and intensive livestock production) or working capital (e.g. for seeds, pesticides, and fertilizers). Production and market risks are high and covariate, forming a major deterrent to commercial bank or microfinance lending to agriculture.

The financial sector is poorly developed in Afghanistan compared to other developing countries. For example, in 2012, credit to the private sector was equivalent to only 4.1 percent of GDP, compared to the South Asian average of 47 percent. Within the overall low level of finance, agriculture received only 2.4 percent of banking sector loans (US\$19.6 million) and most of this went to borrowers in the Kabul region. The Afghanistan Microfinance Association (AMA) reports that 13 percent of borrowers are in agriculture and 12 percent in livestock production,

⁵³ Deininger, Klaus, 2014, “Securing land rights for smallholder farmers.”

respectively. Kabul represents 27 percent of the loan portfolio, Balkh 18 percent, and Herat 9 percent.

Two institutions dominate the agriculture finance landscape: First Microfinance Bank and the Agriculture Development Fund.⁵⁴

First Microfinance Bank (FMFB) is a commercial bank established in 2003 with the Aga Khan Agency for Microfinance and with the Aga Khan Foundation, KfW, and IFC as shareholders. FMFB offers agriculture and livestock loans ranging from US\$100 -US\$4,000, with a maximum maturity of 2 years. As of February 2014, the Bank had 63,000 borrowers with outstanding loans amounting to US\$73 million. FMFB took over a portfolio of agricultural and livelihood credit from the Afghanistan Rural Microcredit Program in 2009, and since then the share of the agricultural and livelihood loans in the FMFB portfolio has been steady at 25 - 29 percent. In February 2014, livestock represented 16 percent of the FMFB loan portfolio (US\$11.7 million) and agriculture 11% (US\$8 million).⁵⁵ FMFB's portfolio at risk over 30 days stands at 2.2 percent. The Bank's loans initially focused on supporting farmers to buy inputs for agriculture, but since 2011, with support from Microfinance Investment Support for Afghanistan,⁵⁶ FMFB is piloting new agricultural loan products that allow farmers a flexible seasonal repayment schedule, depending on the type of crop.

The Agriculture Development Fund (ADF) began operation in 2010 with initial capital of US\$100 million, as part of the USAID Agricultural Credit Enhancement (ACE) project. Two years later it was established as a Government-owned financial institution⁵⁷ serving the agriculture sector. ADF is governed by a High Council comprising representatives of the Government (MAIL and the Ministry of Finance), the private sector, and the donor community. ADF lends to non-financial institutions, particularly farmer associations and cooperatives, which in turn on-lend to their members engaged in agricultural activities; it also lends directly to agribusinesses. The current minimum loan size is US\$100,000, and the maximum loan tenure is three years.⁵⁸ For indirect lending through non-financial institutions, the end loans are between US\$2,000 and US\$5,000 per farmer. ADF has an outstanding loan portfolio of US\$19 million, and its portfolio at risk over 180 days stands at 3.9 percent. As ADF transitions from a USAID-

⁵⁴ First Microfinance Bank is included in both the banking sector (as it is a commercial bank) and in the microfinance sector and is covered by AMA statistics.

⁵⁵ While the overall classification of loans is not always fully accurate (with agriculture representing 2.4% of banking sector loans), this suggests that FMFB accounts for most of the agricultural loans from the banking sector (estimated at US\$19.6 million).

⁵⁶ Though owned by the Ministry of Finance, MISFA is an independent financial institution with a strong governance structure. Under the recently approved World Bank-financed Access to Finance Project (November 2013), MISFA has an "innovation window" which supports, through grant funding, innovations aimed at increasing access to financial services. This innovation window is open to a wide range of institutions and is not limited to MISFA's partners.

⁵⁷ As a non-bank financial institution, it cannot collect public deposits.

⁵⁸ The maximum loan size (disbursed) stands at US\$4.7 million, for the Afghanistan National Seed Organization.

funded project to a financial institution, the support of international staff from ACE will be gradually phased down and it is expected that after 2015 a small number of advisers will provide management assistance to ADF. Currently, ADF is raising additional funding to fuel its ambitious growth plan, which would in turn allow it to reach operational self-sufficiency.⁵⁹

The potential to expand agricultural finance in the short to medium term is constrained by the youth and fragility of the Afghan financial sector. Further financial system development is required, to ensure financial sector stability and to broaden access to financial services. The Government can help advance the first of these goals through strengthened banking sector supervision, and can also play an enabling role in the development of agricultural finance. For example, the recent approval of the leasing law will allow the development of leasing products, which are well adapted to the agriculture sector.

International experience shows that in a weak governance environment, a government should avoid being a *direct* provider of financial services, to avoid the political capture of these services. Within GoIRA, there is an appetite to re-establish an agricultural development bank. But given that the performance of the existing state-owned banks is poor, establishing a new state-owned agricultural development bank appears to be a risky and costly option. Moreover, the World Bank's experience is that in most developing countries the performance of state-owned agricultural development banks has been disappointing. Most of these banks have incurred high loan losses, because of poor management and governance, as well as political interference. To maintain their operations they have needed significant subsidies from their respective governments.

The Afghan Government should therefore *indirectly* support the expansion of existing agricultural finance institutions. The Microfinance Investment Support Facility for Afghanistan (MISFA) can support the development of financial products adapted to the agriculture sector. The Government and donor community should support ADF in its effort to evolve into a sustainable financial institution dedicated to the agriculture sector. ADF is functioning well and providing much-needed agricultural finance through intermediaries. However, its heavy reliance on international staff needs to be addressed for it to sustainably operate in a cost-effective manner. The Afghanistan Credit Guarantee Facility (ACGF), which provides partial risk guarantees to commercial banks that are lending to small and medium-sized businesses, aims to scale up its operations with a focus on the rural sector.⁶⁰ Its efforts are welcome as they promise to be critical for agro-industry development.

Women in Agriculture

Women are not much engaged in wheat production but they are very much involved in many horticultural, livestock, and local processing activities, sometimes including opium poppy

⁵⁹ Operating revenues covering operating costs.

⁶⁰ The recently approved World Bank-financed Access to Finance Project provides capital and technical assistance to the Facility to further expand its operations.

cultivation.⁶¹ The products in which women are most involved are: grapes and raisins, almonds, apricots, saffron, pomegranates, pistachios, embroidery, carpets, and poultry. Women take a central role in the daily tasks of livestock management and in processing animal bi-products, such as milk, eggs, and wool for domestic use or sale. They also make the dung cakes used for household fuel.

Despite their extensive involvements in production and processing, women are widely discriminated against in accessing land, knowledge, finance, inputs, and markets. This undermines their ability to be as productive as men. Correcting the gender gap offers an additional source of agricultural growth, as well as advancing the equitable distribution of assets or income.

- Key challenges facing women in the agricultural sector are:
- Women are largely confined to production activities that are unrelated to decision-making responsibilities, asset ownership, or brokering trade exchanges with the market.
- Reproductive or care work often takes up most of women's daily time. These home duties present a big challenge to increasing women's participation in agricultural production.
- Women farmers are likely to have less access than men to agricultural extension services, due to social-cultural restrictions on their mobility and interaction with men. Given these restrictions, the central constraint for women producers is the lack of women-to-women service delivery at every stage of the value chain.⁶²
- Women typically have less access than men to agricultural infrastructure and agricultural decision-making structures.⁶³
- Few women in Afghanistan own land or agricultural assets.⁶⁴ Thus, women rarely benefit from the security, collateral opportunities, and increased decision-making that come with land or asset ownership.
- Rural women typically have little market information, such as market prices for inputs and products, or knowledge of improved crop varieties and animal breeds or product

⁶¹ In the south women may not be involved in cultivation outside the home during harvest, due to a tradition, but will be particularly busy preparing three "good" meals per day for those working during the harvest period.

⁶² World Bank, 2011, "Understanding gender in agricultural value chain: The cases of grapes/raisins, almonds, and saffron in Afghanistan," p. 23.

⁶³ Government of Afghanistan, 2008, Afghanistan National Development Strategy: Agriculture and Rural Development, p.39.

⁶⁴ USAID, 2012, "Land Reform in Afghanistan: Gender Assessment," p.12.

quality standards, because most of the key actors in the value chain (input suppliers and middlemen/village-level traders, along with extension workers) are men.⁶⁵

- Women are less likely than men to be able to access financial services to support agricultural investments or agro-entrepreneurship. This holds back the income-generating potential of their agricultural participation.⁶⁶ Women's uptake of microfinance services, in areas where these are provided, is encouraging and demonstrates significant need/interest.
- Interventions with women should be designed to: (a) support their traditional roles, as entry points to strengthening their productivity; and (b) look for options for involving women increasingly in higher levels of value chains, in order to expand their decision-making and livelihood opportunities within those value chains. In particular, women's participation should be prioritized when new value chains—in which the actors' roles are less established—are being introduced. The following approaches offer promise for supporting women in agriculture in Afghanistan:
 - **Female extension workers:** The use of female extension workers across interventions is critical for effective service delivery to female farmers in Afghanistan. This has been amply demonstrated by projects, such as the NHLP.
 - **Female producer groups and enterprise groups:** Facilitating women working with other women has proven to be an important strategy for improving their access, mobility, and income generation potential. This practice can be used in both horticulture and livestock production.
 - **Poultry and small ruminants production:** Backyard poultry and small livestock typically are cared for mainly or wholly by women and girls. With more than three quarters of Afghan households keeping poultry at home,⁶⁷ poultry offers a critical entry point for supporting and increasing women's involvement in intensive animal production and related income generation, and women's contribution to household food security. Poultry farming is offered to female beneficiaries across provinces covered by the NHLP, but that approach could be expanded significantly, both geographically and to sheep and goats.
 - **Animal by-product value chains:** Women play a central role in processing animal by-products. They milk cows and make yogurt and other dairy products for household consumption or for sale. They often take center stage in the sale of eggs and chickens and in collecting and processing wool and cashmere, including producing *namads* (felt carpets) and other carpets and wool products. Cashmere production in particular

⁶⁵ Ibid.

⁶⁶ Ibid.

⁶⁷ Ibid.

is a high-value activity that has potential for scaling up; and for providing increased entry points for women's participation and income generation.

- **High-value horticultural value chains:** In some regions, women are heavily involved in producing, harvesting, and processing valuable horticultural export commodities. A 2011 World Bank study identified six horticultural products that have notable current participation and future entry points for women: grapes and raisins, almonds, apricots, saffron, pomegranates, and pistachios.⁶⁸ Three of these—grapes/raisins, almonds, and saffron—have considerable potential as export commodities, while substantially involving women in their value chains. Targeting support to these high-value products, with explicit support to female producers at all stages of the value chain, provides an entry point for women to expand their traditional role in agriculture.⁶⁹
- **Household nutrition:** Women's involvement in kitchen gardening and home-based orchards makes a valuable contribution to household livelihoods, food security, and dietary diversity. Broadening the use of household gardens and orchards would help scale up this contribution. According to the most recent NRVA data (2011/12), fewer than 11 percent of households nationally have garden plots (13 percent among rural households and three percent among urban).⁷⁰ These low percentages point to a missed opportunity, considering that very low-cost inputs like plastic sheets for low-technology greenhouses can increase the growing season of vegetables. Kitchen gardening interventions should be combined with nutrition education related to specific crops, as is the case in the NHLP.

Box 8: Key successes to date in supporting Afghan women in farming

Female extension workers and female producer groups: The National Horticulture and Livestock Program (NHLP) has provided horticultural and livestock extension services through 46 female extension workers nationwide, to 368 female producer groups, with 9,426 members. The importance of female extension workers and female producer groups has been established through completed and evaluated NGO interventions, including MEDA's Through the Garden Gate.^{a/}

Female savings and enterprise groups: The Afghanistan Rural Enterprise Development Program (AREDP) has supported savings groups and enterprise groups benefiting more than 20,000 women (42 percent of all beneficiaries).

^{a/} Central Statistics Office, 2007/08, *National Risk and Vulnerability Assessment.*, footnote 1, p. 106.

⁶⁸ World Bank, 2011, "Understanding gender in agricultural value chain: The cases of grapes/raisins, almonds, and saffron in Afghanistan," p. 6.

⁶⁹ Samuel Hall Consulting, 2012, "Social Assessment of the National Horticulture and Livestock Project," pp. 52-75.

⁷⁰ Central Statistics Organization, 2007/08, *National Risk and Vulnerability Assessment*, p. iv.

6. Pillar II: Addressing the Needs of the Rural Poor

Implementation of Pillar I investments and policies should yield widespread benefits for the poor. Because Pillar I will be targeted to irrigated and peri-urban areas where most of the poor live, many poor people should gain from greater access to rehabilitated irrigated land; from wider availability of improved crop varieties or livestock breeds; from job growth both on and off the farm; and from less costly food. Some of these benefits will trickle down to poor people living outside the Pillar I target areas.

The rural people who are least likely to benefit from Pillar I are mostly those who depend on rain-fed farming in the more remote areas of the country or are nomadic herders, such as *Kuchi*. Afghanistan's nomad population is the most vulnerable to absolute poverty, with a poverty rate of 53.8 percent (see map 4 and map 5).⁷¹ In 2008, according to the Afghan Independent Directorate of *Kuchi* Affairs,⁷² the national population of pastoral nomads was 2 to 3 million, representing approximately 250,000 households and comprising long-range migratory nomads (52 percent), short-range migratory nomads (33 percent), and sedentary former nomads (15 percent).⁷³

Given the dependence of the poorest people on agriculture, interventions to improve the productivity of their rain-fed crops and extensive livestock husbandry (including in nomadic systems) are ways to help. Some interventions, such as disseminating drought-tolerant crop varieties or controlling animal diseases, may offer widespread gains at relatively low cost, as might reforms in property rights and the management of open pastures. But the prospect for significant productivity gains in these farming systems is more limited, and without irrigation it will be hard to reduce the high levels of volatility in production and incomes. It will also be very hard to increase the returns in licit farming activities to the level where they can compete with opium poppy in the livelihood strategies of many poor farm households.

Opium poppy may be a critical rather than a discretionary part of livelihoods in poorer and more remote locations.⁷⁴ In Pillar I geographical areas, where conditions are conducive to sustainable livelihoods from irrigated wheat, perennial horticulture, intensive livestock, and off-farm activities, it is less likely that poppy cultivation will resume. But in remote and underserved areas, poppy cultivation may thrive. Although politically undesirable, poppy growing enhances the livelihoods of the poor and landless farmers in these areas, who have limited alternative sources of income on- or off-farm, and no guaranteed food security.

⁷¹ Central Statistics Organization, 2007/08, National Risk and Vulnerability Assessment.

⁷² "Afghanistan: Kuchi nomads seek a better deal," Integrated Regional Information Networks (IRIN), 18 February 2008.

⁷³ De Weijer, F., 2005, "National Multi-Sectoral Report on Kuchi."

⁷⁴ ASR background paper on Afghanistan's opium economy (see appendix, no. 11).

In view of the above, other complementary and non-farm interventions will also be required, especially for people with limited access to land or livestock. Such interventions include relief programs in drought years, settlement programs for nomadic people, community-based development and social protection programs.

Agriculture

The two most promising licit areas for supporting livelihoods for most of the rural poor are rain-fed wheat and extensive livestock husbandry. Both play key roles in meeting subsistence food needs and providing modest amounts of cash income.

Rain-fed Wheat

Most of Afghanistan's rain-fed wheat production takes place in twelve provinces in a west-to-east arc to the west and north of the Hindu Kush mountain range (the arc reaches from Herat in the west to Badakhshan in the northeast). The region spans elevations from above 1,500 meters down to 400 meters or less, and has an array of soil types.

The sustainability of rain-fed wheat as a net contributor (rain-fed wheat farmers are generally food-deficit households) to national production and individual family food security is questionable, especially in light of the nearly complete failure of the 2008 wheat harvest on rain-fed land (averaged only 0.2 mt/ha). Though some believe that the land area devoted to rain-fed wheat should be reduced, it can also be argued that intense efforts should be made to stabilize rain-fed wheat productivity.

To make recommendations for this purpose would require a much deeper understanding of farmer circumstances and incentives than is yet available.⁷⁵ Research has not yet identified management practices that would minimize annual fluctuations in wheat yield in Afghanistan's varied rain-fed environments.⁷⁶ Careful assessment of the circumstances under which rain-fed wheat is grown in Afghanistan, followed by controlled experimentation both on-station and on-farm, are prerequisites to: (a) establishing sound land use policies; and (b) identifying circumstance-specific risk-minimizing approaches to cultivating rain-fed wheat. It may be that some of the superior management practices identified through research on irrigated wheat would also benefit rain-fed production systems.⁷⁷

⁷⁵ USAID, 2010, "Assessment of Agricultural Research in Afghanistan."

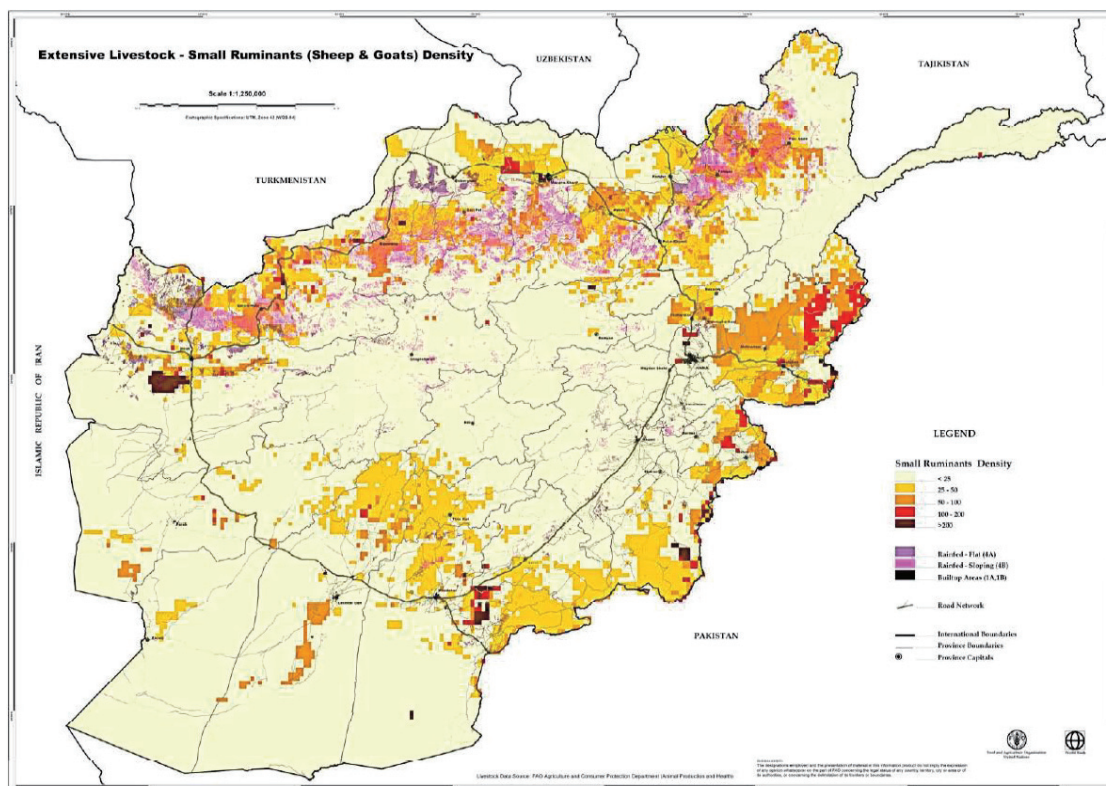
⁷⁶ Worldwide, millions of hectares of wheat are grown under chronic water-scarce conditions. In many instances (e.g. in Australia), alternative wheat varieties (with different maturity dates and drought tolerance), planting dates, planting patterns (row width, use of beds, etc.), planting depth, zero-tillage and permanent soil cover to improve water infiltration, as well as rainwater harvest and weed management techniques, have been evaluated under controlled experimental conditions to identify sustainable rain-fed wheat cropping systems.

⁷⁷ Including integrated research on cereal improvement, pests and diseases, agronomy, weed control, and seed rate and seed date.

Extensive Livestock

Extensive livestock production (mainly cattle, goats, sheep, and poultry) is important to the livelihoods of most settled small farmers in rain-fed areas (Map 6), many landless workers, and pastoral nomads. Though these systems achieve low productivity, they can still be profitable because they use few purchased inputs and employ low cost family labor, often women. On the downside, both production and livestock numbers are vulnerable to losses from drought and severe winters.

Map 6: Afghanistan extensive livestock (goat and sheep) areas



For settled small farmers, the main constraints on livestock productivity are poor feeding, particularly in the winter, and livestock diseases.

In the nomadic system, too, disease is an important constraint, as is difficulty of access to open grazing land. Traditional migration routes have been disrupted, reducing access to traditional grazing land, and many rangelands have anyway been plowed for crops. The shifting powers at the national level have changed the balance between cultivators and pastoralists in many areas; and have aggravated competition over pasture land. Among pastoralists the average flock size is trending downwards. Many nomadic livestock raisers now own no livestock at all and the remainder own smaller flocks than before. Many of the open grazing areas are badly managed so that their vegetation and productivity are increasingly degraded. The more productive enclaves in range areas are often used as a feed reserve for times of shortage, but are suffering from the

encroachment of arable producers—which places more pressure on the remaining range areas. Biodiversity, ground cover, and feed production decrease when land is overgrazed. Overgrazing and land degradation are most prevalent near settlements.

Low-cost pasture management techniques are available that could be applied in Afghanistan. Research on-station can evaluate these methods before they are tested with settled and nomadic communities.

Relatively low-cost interventions for nomadic herders include:

- Support for community-based settlement of disputes between agricultural and pastoral communities over access to open grazing lands.
- Better disease control, using travelling veterinary or para-veterinary clinics.
- Rehabilitation and better management of grazing areas—which depends on reforming the institutions that manage them. Possible approaches, including proven methods for improving biodiversity, ground cover, and feed production, could be evaluated in pilot areas with local communities of range users.
- Development and improvement of wells in traditional grazing lands, so as to decrease the grazing pressure around the few wells that now exist.
- Improvement of winter feeding, by introducing a winter feeding program for sheep and goats and evaluating the potential for growing barley, and establishing salt-tolerant fodder shrubs in areas where drainage water from irrigation systems accumulates.
- Improvement of extension services for livestock, by delegating these services to NGOs and the private sector providers.
- Exploitation of the added-value potential of sheep and goats, based on an assessment of the marketing strategies of the pastoral nomads and the market demand for fattened sheep relative to the availability of feed for fattening. One such strategy could involve selling six-month old lambs to sedentary livestock raisers (including settled and impoverished former nomads, who would grow them to marketable sale weight), so that pastoral nomads get resources to finance the fattening of older sheep to exploit the potential for adding value to them before sale.
- Exploiting the potential for collecting and processing more wool and for achieving better productive performance for karakul and cashmere, better reproductive performance of ewes, and more robust spring lambs.
- Assistance in rebuilding livestock numbers after droughts, perhaps exploring the use of livestock banks or drought insurance. Drought management policies need to be coordinated with other forms of drought relief (to counter the loss of livestock due to lack of pasture) to ensure they have a consistent impact (on restocking) on livestock strategies.

- More modern and accessible slaughterhouse facilities to facilitate more efficient collection of better quality hides, skins, and casings.

Even if successful, such interventions will unfortunately still leave the livestock holdings of many of the pastoralists in a precarious state. Clearly, many of the pastoral nomads will need further assistance in developing new livelihoods, such as through resettlement and social protection programs.

MRRD has developed a policy document to assess the needs of the *Kuchi* and identify where and how Government-led programs can serve these needs. The document has, however, not yet been ratified by the three Government institutions concerned with the *Kuchi*.⁷⁸

Integration with Non-Farm Interventions

For many of the poorest people in remote rain-fed areas, agriculture (other than opium poppy cultivation) offers limited potential to escape from poverty or the risks of losses in drought years. Other kinds of interventions need to be considered as part of any strategy for agricultural development and poverty reduction, especially if poppy production in these areas is to be reduced. One is to provide support to households who wish to leave or diversify out of farming, either through off-farm employment or migration, or through establishing an off-farm business, such as in agro-processing or trade. Education, training, microfinance, and technical support all have roles to play, though agricultural exit strategies of this kind may be more effective with younger workers.

Education and Training

The World Bank is supporting relevant skills development for young people through its Second Skills Development Project, which seeks to improve the technical and vocational education and training system. Since many illiterate young Afghans are unlikely to enter formal education, the Bank also supports the Afghanistan Non-formal Approach to Training, Education, and Jobs Project. One pilot project is providing non-formal skills training to young people in rural areas, and seeks to match them with skilled people in various trades operating in the bazaars across Afghanistan. Primary processing of agricultural products could be featured in the informal training provided to rural people.

As part of the Afghanistan Rural Enterprise Development Project, the Bank is helping in five provinces to establish village savings groups that can be used to finance the setup of small businesses, particularly for dairying, small ruminants, and poultry. It has found that mobilizing savings is not enough, and that many group members lack the technical skills to establish such businesses. Consequently, training programs and technical support will be tailored to the specific

⁷⁸ MRRD, MAIL (Kuchi Policy Unit), and Office of the President (Independent Directorate of Kuchi Affairs).

needs of these groups. In all these approaches, a challenge is to ensure that they operate in some of the more remote areas where the poorest people live.

Relief and Safety Nets

Drought relief and safety net programs have important roles to play in preventing weather shocks and insecurity from trapping people in poverty. Currently, most assistance comes in the form of emergency relief, and the transition to social protection systems is still in its infancy. The country's safety net comprises a number of relatively small schemes—most of them financed by donors and implemented by NGOs—covering fewer than 25 percent of the poor. Although targeting is generally good, the overall effort suffers from fragmentation and overlaps because of its multiple players and priorities. Poor coordination also arises because programs are mostly financed and implemented by donors and NGOs off-budget. Determining the right mix of interventions to support the chronically poor and vulnerable population in the Afghan context is challenging, especially given weak institutional capacities to target, register, and pay beneficiaries, and the potentially huge financial costs involved.

The World Bank is assisting the Government to assess options to increase the coverage of the poor. This includes assessing the feasibility and affordability of different types of social assistance programs, such as cash transfers (conditional and unconditional) and temporary employment schemes (in urban and rural areas), particularly through public works. The implementation arrangements and the appropriate mix of interventions will also be analyzed within the budget constraint facing the Government. Temporary employment schemes could be particularly attractive for use in the poorer rain-fed farming areas, since they could contribute to the construction and rehabilitation/maintenance of small-scale infrastructure, including small irrigation schemes and canals, and could assist with water and land conservation efforts, such as rain-water harvesting and afforestation programs. A coherent safety net program will require an administrative system for effective service delivery in social protection, including a robust national targeting system. The Government should enhance its role in coordinating and harmonizing the various safety net programs implemented on- and off- budget. A stable financial base will also be required.

7. Summary of Recommended Actions and Expected Outcomes

Challenge	Recommendation (S = within 5 years M =within 5-10 years L = 10+ years)	Expected outcome within 5-10 years
1. Increase Irrigated Wheat Production		
Increase yields	<ul style="list-style-type: none"> • Improve procurement and distribution of improved and certified varieties (S) • Develop additional improved varieties (M, L) • Improve supply of quality fertilizers (S) • Improve extension advice available to wheat farmers on water management and agronomic practices (S) • Promote more efficient irrigation technologies (M) • Modernize wheat milling (S) 	<ul style="list-style-type: none"> • Increase irrigated yields by 1.5 mt/ha (to 4.5 mt/ha) • Increase irrigated wheat area by 10% or 11,550 ha per year. • Increase wheat production by 2.253 million mt or US\$1.58 billion additional income • Additional 174,000 FTE jobs in agriculture within 10 years
Increase irrigated areas that are potentially available for wheat	<ul style="list-style-type: none"> • Rehabilitate existing irrigation structures (S, M) 	
2. Increase Intensive Livestock Production		
Expand fodder crops	<ul style="list-style-type: none"> • Expand supply of irrigated land for fodder crops through rehabilitation of existing irrigation (S, M) 	<ul style="list-style-type: none"> • Increase milk yields by 100% (to 2000 liters/cow/year)
Increase animal productivity	<ul style="list-style-type: none"> • Improve animal breeds through importation and cross breeding (S) • Improve AI (S) • Privatize veterinary services (S) • Certify veterinary medicines and 	<ul style="list-style-type: none"> • Increase the number of intensive milk cows by 50% • Double milk production by adding 2.52 million mt

Challenge	Recommendation (S = within 5 years M =within 5-10 years L = 10+ years)	Expected outcome within 5-10 years
	<ul style="list-style-type: none"> vaccines (S) • Improve availability quality livestock concentrates (S) • Improve livestock extension (S) • Improve availability credit (S) • Strengthen public capacity to monitor and control diseases (M) 	<ul style="list-style-type: none"> • Double poultry production • US\$274 million additional income • Additional 604,000 FTE jobs in agriculture within 10 years
Improve marketing, transport and processing	<ul style="list-style-type: none"> • Incentivize the private sector and producer organizations to build more modern slaughter houses, cold storage, collection and processing facilities (M) • Consider forming producer associations, trade associations or cooperatives to integrate value chains (S) 	
3. Increase Horticultural Production		
Increase yields	<ul style="list-style-type: none"> • Secure property rights to encourage replanting and expansion of orchards and vineyards (M) • Expand credit for long term investments and high working capital requirements (S) • Improve supply of certified seeds and saplings or planting materials (S) • Improve delivery of extension services to improve on-farm water management, crop management and pest control (S) • Promote more efficient irrigation technologies, including drip irrigation systems (M) • Improve on-farm storage to reduce post-harvest losses (S) 	

Challenge	Recommendation (S = within 5 years M =within 5-10 years L = 10+ years)	Expected outcome within 5-10 years
Improve marketing, transport and processing	<ul style="list-style-type: none"> • Incentivize the private sector to invest more in cold storage, refrigerated transport and processing of horticultural crops (S) • Upgrade phytosanitary standards and air-freight capacity to reach high end markets (M) 	
4. Counter Opium Poppy Production		
Reducing the risk that Pillar I investments will enhance incentives to grow poppies	<ul style="list-style-type: none"> • Give initial priority for Pillar I investments to areas with greater security and where poppy cultivation can be more effectively controlled (S) • Develop and pilot models for integrating Pillar I investments into farming systems that both: (a) generate high enough levels of on-farm employment and income per hectare to compete with poppies; and (b) support value addition activities in the local economy to create high levels of regional employment (S, M) • Allocate newly irrigated land in small parcels to landless and land-poor farmers rather than large or better-off landowners (S, M) • Institute mandatory counter-narcotics impact evaluations for irrigation and roads projects (S) 	
5. Expand Agro-Industrial Capacity		
Expand agro-industrial capacity	<ul style="list-style-type: none"> • Develop rural roads (S, M) • Improve security and political stability to attract FDI (M) • Increase availability of credit for SMEs 	<ul style="list-style-type: none"> • By transporting, storing, processing and marketing the additional wheat, livestock, and horticulture production indicated

Challenge	Recommendation (S = within 5 years M =within 5-10 years L = 10+ years)	Expected outcome within 5-10 years
	<p>(S)</p> <ul style="list-style-type: none"> • Support greater private investment in cold storage, collection and processing facilities (S, M) • Establish quality control and certification standards, especially for high-value products for export (M) • Revise zoning and land conversion rules together with land privatization to increase the supply of private serviced industrial land (S, M) • Reform the process for issuing and registering construction permit in urban/industrial areas (S) • Reduce red tape at customs (S) • Establish regional agreements for movements of high-value exports (M) 	<p>above, another 260,000 FTE jobs added within 10 years</p> <ul style="list-style-type: none"> • Additional opportunities exist for adding value to many agricultural products for both the domestic and export markets
6. Expand Irrigated Area		
<p>Rehabilitate existing and underutilized irrigation infrastructure</p> <p>Help farmers improve on-farm water management</p> <p>Invest in new dams and water conveyance to expand irrigated area in long-term</p>	<ul style="list-style-type: none"> • Invest in strong institutions and policies to improve irrigation water management: <ul style="list-style-type: none"> ➢ Define the legal and regulatory framework and strengthen interagency coordination (M) ➢ Strengthen the Irrigation Department at MAIL to manage the irrigation network (S, M, L) ➢ Strengthen irrigation associations and <i>mirabs</i> (S) • Provide farmers with extension on water management (S) • Invest in canal lining, land leveling, and installation of control and measurement 	<ul style="list-style-type: none"> • An extra 50,000 ha irrigated land rehabilitated each year to meet Pillar I requirements, leading to 2.5 million ha regularly irrigated land within 10 years • Water management efficiency improved by 20-30% • Strengthened capacity at MEW, MAIL, and MRRD and improved coordination across ministries for water management

Challenge	Recommendation (S = within 5 years M =within 5-10 years L = 10+ years)	Expected outcome within 5-10 years
	structures (S, M) <ul style="list-style-type: none"> • Invest in the longer term development of water resources (L) • Allocate newly irrigated land in small parcels to landless and land-poor farmers rather than better-off landowners (M, L) • Institute mandatory counter-narcotics impact evaluations for irrigation and roads projects (S) 	
7. Strengthen Agricultural Research		
Improve the capacity of the national research system to deliver more and better technologies for farmers	<ul style="list-style-type: none"> • Strengthen the existing network of research stations and on-farm research to bring research, extension and farmers together at a range of locations (S, M) • Rehabilitate and resource seven of the existing 18 research stations, including introducing new IT equipment to enable them to connect globally and serve as knowledge centers (S, M) • Urgently recruit and train up more MSc and PhD graduates and provide short and long-term in-service training (S, M) • Contract more research out to CGIAR centers and other international (ACIAR) or national (ICAR) research centers of excellence that work in similar agro-ecological areas (S, M) 	<ul style="list-style-type: none"> • More locally adapted and improved crop varieties and agronomic practices to support Pillar I and II investments. • Improved livestock breeding materials and better management practices for feeding and disease control

Challenge	Recommendation (S = within 5 years M =within 5-10 years L = 10+ years)	Expected outcome within 5-10 years
8. Strengthen Extension Services		
Improve the availability and performance of extension services to farmers	<ul style="list-style-type: none"> • Greater devolution of extension activities to the private and NGO sectors (S, M) • MAIL to develop a clear and realistic extension policy and models for service delivery to farmers that is appropriate to its constrained financial environment and the increasing importance of IT and the private sector (S) • Support agricultural education at all levels to build up the supply of adequately trained extension workers, especially women (M, L) • Improve incentives for recruiting and retaining more women extension agents (S, M, L) • Strengthen in-house training at MAIL (S, M) 	<ul style="list-style-type: none"> • Farmers have greater access to skilled extension services that meet their needs • Women farmers receive services from women extension agents
9. Improve Regulation of Agricultural Inputs		
Improve the quality of the inputs supplied to farmers through creation of effective regulatory systems	<ul style="list-style-type: none"> • Strengthen the capacities of the National Seed Board (NSB) and the Seed Certification Agency (SCA) to oversees the seed sector (S, M) • Strengthen capacity of MAIL to regulate pesticides and fertilizers(S, M, L) • Strengthen MAIL’s capacity to control the risks of exotic pests and diseases from abroad (S, M, L) • Strengthen MAIL’s capacity to control the quality of livestock inputs, particularly breeding materials, veterinary medicines and services, and 	<ul style="list-style-type: none"> • Greater availability to farmers of inputs of assured quality and safety • Reduced risk of use of banned pesticides or of importation of exotic pests and diseases from abroad

Challenge	Recommendation (S = within 5 years M =within 5-10 years L = 10+ years)	Expected outcome within 5-10 years
	livestock feeds (S, M, L)	
10. Improve Land Policy		
<p>Strengthen land rights to encourage greater investment in land improvements, and the development of efficient land markets</p> <p>Improve access to land by the poor</p>	<ul style="list-style-type: none"> • Extend and update land titles in irrigated and peri-urban areas for farmers and agro-industry (S, M) • Create transparent and easy access to land records through digitization and the internet (M) • Build on out-of-court dispute settlement processes and incorporate established and successful procedures into the legal framework, and adding judicial validation to de-facto processes (S, M) • Implement the National Land Policy approved in 2007, align related land laws, and implement proper regulatory frameworks (S, M) • Strengthen the capacity of the Afghan Independent Land Authority (ARAZI) to fulfill its newly mandated functions (S, M, L) 	<ul style="list-style-type: none"> • Farmers have greater security over their land and greater incentive to invest in land improvements. Farmers are less likely to be involved in land disputes, and the disputes that arise are resolved quickly • Land markets are more efficient enabling easier access for small farmers and the poor, and the emergence of more efficient farm sizes.
11. Expand Rural Access To Finance		
<p>Improve access to long term finance for farmers for horticulture and intensive (e.g. for planting orchards and vineyards, as well as improving breeding cows)</p> <p>Improve access to seasonal loans for purchasing farm inputs like fertilizers and wages</p>	<ul style="list-style-type: none"> • Support MISFA • ADF should pursue its effort to evolve into a sustainable financial institution dedicated to the agriculture sector (S, M) • The Afghanistan Credit Guarantee Facility, which provides partial risk guarantees to commercial banks' lending to small and medium enterprises, should focus on the rural sector (S, M) 	

Challenge	Recommendation (S = within 5 years M =within 5-10 years L = 10+ years)	Expected outcome within 5-10 years
12. Enhance Women’s Options In Agriculture		
Enhance the role and welfare of rural women	<ul style="list-style-type: none"> • Promote women’s organizations for savings, and non-farm enterprises (S) • Recruit and train more female extension workers (S) • Promote livestock and horticultural crops in which women are heavily engaged (S) • Promote kitchen gardening and home-based orchards as a way to improve household nutrition (S) 	
13. Address The Needs Of The Poor		
Improve rain-fed wheat yields and drought resistance	<ul style="list-style-type: none"> • Conduct additional research on best farming systems and practices and develop improved varieties (S, M, L) 	
Improve livestock production	<ul style="list-style-type: none"> • Improve livestock extension services for farmers (S) • Improve disease control through mobile veterinary clinics (S, M) • Build more slaughterhouses and facilities for collection and processing of skins and hides (S, M) • Develop potential for winter feeding and fattening of lambs for the market and greater wool collection and processing (S, M) • Rehabilitate grazing areas and water points, and improve community pasture management (S, M) • Assist protection and rebuilding of flocks and herds in drought years through insurance, livestock banks, feed 	

Challenge	Recommendation (S = within 5 years M =within 5-10 years L = 10+ years)	Expected outcome within 5-10 years
	subsidies, etc. (M)	
Strengthen safety nets and promote diversification into off-farm income	<ul style="list-style-type: none"> • Improve school curricula and provide non-formal technical skills training to young people in rural areas (S, M, L) • Support financing and technical support and training for rural non-farm enterprises (S, M) • Establish a coherent rural safety net program and coordinate with other relief programs (S, M) 	

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Appendix: Background Papers Commissioned

1. Afghanistan: Benchmarking Wheat Production and Marketing in Afghanistan Against Regional Producers: Competitiveness, Productivity Growth, and Future Prospects for the Sector (October 2013)
2. Afghanistan: Horticulture Subsector Review (March 2014)
3. Afghanistan: Livestock Subsector Evaluation (January 2014)
4. Afghanistan: Agricultural Extension Services (May 2014)
5. Afghanistan: Relationship between Poverty and Agriculture—Evidence from the National Risk and Vulnerability Assessment (NRVA 2007/08) Survey (May 2014)
6. Afghanistan: Women in Agriculture (December 2013)
7. Afghanistan: Land and Water Resources Assessment (May 2014)
8. Afghanistan: Review of Ongoing and Past Bank Programs (October 2013)
9. Afghanistan: Social and Land Tenure Issues (December 2013)
10. An Institutional Review of the Ministry of Agriculture, Irrigation and Livestock (MAIL) (April 2014)
11. Afghanistan's Opium Economy - An Agricultural, Livelihood, and Governance Perspective (June 2014)
12. Maps: Irrigation Potential for 34 Sub-basins and Priority Development Areas (May 2014)
13. Agricultural Sector's Job-Creation Potential (December 2013)



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