



Reducing the Cultivation of Opium Poppies in Southern Afghanistan

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Cover image: Afghan children gather raw opium on a poppy field on the outskirts of Jalalabad (Reuters).

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Preface

The purpose of this report is to identify the drivers of opium poppy cultivation in southern Afghanistan, the locus of opium production in that country; assess the effects, positive and negative, of programs designed to promote rural development, eradicate opium poppies, or otherwise create incentives for farmers to make decisions to reduce the cultivation of opium poppies; and provide advice on how to design programs that might better serve to reduce the cultivation of opium poppies in southern Afghanistan.

The report should be of interest to policymakers and practitioners in Afghanistan and the donor community concerned with the design and implementation of programs to reduce the cultivation of opium poppy in Afghanistan, especially in the southern provinces of that country.

This research was requested by the U.S. Department of State's Bureau of International Narcotics and Law Enforcement Affairs, Office of Afghanistan and Pakistan, and conducted within the International Security and Defense Policy Center of the RAND National Security Research Division (NSRD). NSRD conducts research and analysis on defense and national security topics for the U.S. and allied defense, foreign policy, homeland security, and intelligence communities and foundations and other nongovernmental organizations that support defense and national security analysis.

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Summary

In 2013, Afghanistan produced about 5,500 metric tons of opium, making it the world's leading opium producer. Despite rapid economic growth in the country's non-opium economy between 2006 and 2013, the International Monetary Fund estimated that value-added from opiates still amounted to about 15 percent of Afghanistan's gross domestic product in 2013, as compared with 29 percent in 2005. Opium is a potent economic force. On the one hand, opium-based incomes sustain a large segment of the Afghan population. According to Byrd and Mansfield, opium provided around 376,000 full-time equivalent jobs in 2013. On the other hand, it fuels corruption, undermines local and national institutions and the rule of law, and provides financial support to insurgents.¹

Purpose, Methodology, and Organization

The purpose of this study is to inform the design and development of sustainable programs to induce farmers in southern Afghanistan, most notably in Helmand and Kandahar provinces, to grow less opium poppy. The study focused specifically on those two provinces because, taken together, they account for the large majority of all opium poppy cultivation in Afghanistan. The researchers systematically reviewed and synthesized information on how farmers choose to allocate land

¹ William A. Byrd and David Mansfield, "Afghanistan's Opium Economy: An Agricultural, Livelihoods, and Governance Perspective," Report Prepared for the World Bank, Afghanistan Agriculture Sector Review, Revised Version, June 23, 2014.

to opium poppy and other crops, including the factors that drive those decisions, and conducted a side-by-side assessment of rural development programs and supply-reduction incentives in terms of their effects on those factors. This factor-based approach creates a bridge between program design and farmers' decisions to cultivate opium poppy, which should assist the Afghan government and donors in developing more effective programs, from the perspective of poppy reduction. On that basis, the study provides recommendations on how to design rural development and other programs that might better serve to reduce the cultivation of opium poppies in the future, even if that is not the programs' primary goal.

The study has three major components:

- Construction of an analytical framework for tracing the effects of rural development and crop-eradication programs in southern Afghanistan on the various socio-economic and environmental factors that influence farmers' decisions to grow opium poppies.
- Use of the analytical framework to assess the effects—be they intentional or unintentional—on the various factors for an array of representative rural development and crop-eradication programs implemented in southern Afghanistan.
- Actionable guidance with which to craft such programs to provide better inducements to reduce opium poppy cultivation in the future.

We developed an analytical framework to conceptualize and better understand farmers' incentives to grow opium poppy in a given year. The framework consists of a taxonomy of factors that influence farmers' decisions to grow opium poppy at the start of the growing season, plausible assessments of the direction of effects of the factors on farmers' decisions to grow opium poppy in that season, and an encapsulating template, or "map," that can be used to trace the effects of various programs on the factors and, hence, on opium poppy cultivation. Relevant factors included, for example, security, eradication, and environmental risks; governance and religiosity; landholding remoteness, arrangements, and size; household size, accumulated debt, and outside

income; agricultural input costs and technology; and opium, wheat, and other commodity prices. In this context, we focus on understanding the direction of an effect, its potential strength, and its importance relative to other effects.

At its core, the framework draws on microeconomic principles: specifically, an underlying model of household production and consumption that conceptualizes farmers' behavior in terms of a series of incentives, constraints, and directional responses. The model lets farmers choose the allocation of their land to opium poppy or a food crop, namely wheat, subject to concerns about feeding their families, earning cash income, risks of violence and eradication, and other factors, as noted above. In that way, the model focuses on farmers with decisionmaking authority, referred to as "landholders," and it enables us to consider issues of income and food security and potential trade-offs between them on equal footing. A given landholder would make the allocation decision at the start of the growing season and face the same decision year after year.

The framework distinguishes among farmers with very small, small, and medium to large landholdings, defined as less than one-half to one, one to two, and two or more hectares, respectively. Such households might respond differently to a factor, depending, for example, on their concerns about food security and abilities to mitigate risks—one of our most important findings is that few factors tilt in only one direction for all households and that many have indeterminate effects. Depending largely on the amount of land under a household's disposition and, relatedly, its tolerance for risk, the same factor could encourage or discourage opium poppy cultivation. Moreover, that so many of the factors have indeterminate effects speaks to the challenges of designing successful counternarcotics programs, as we discuss in this report.

Our framework also serves to highlight the role of "input intensity" in cultivation decisions; for example, because opium poppy requires substantially more labor than most alternatives, including wheat, decisionmaking can depend crucially on the availability of labor from the household and the local community and its cost.

We used the framework to evaluate whether and how rural development and crop-eradication programs implemented in southern Afghanistan have affected—or might have affected—the various factors that influence decisions to grow opium poppy, wheat, or other crops. As a practical matter, we deconstructed the components of ten programs, implemented between 2004 and 2014, in terms of potential effects on the various factors represented in the map and then traced the effects of those factors, separately and collectively, on cultivation decisions. The ten programs spanned all major program activities, ranging from eradication to rural infrastructure to agricultural projects to opportunities for off-farm income. Some specifically targeted reducing opium poppy cultivation and most, but not all, focused on conditions in southern Afghanistan.

Seven of the ten programs concentrated on promoting rural development:

1. Agricultural Development Program—Southern Region (ADP South)
2. Afghanistan Vouchers for Increased Production in Agriculture (AVIPA)
3. Afghanistan Vouchers for Increased Production in Agriculture—Plus (AVIPA-Plus)
4. Helmand Agriculture and Rural Development Program (HARDP)
5. Comprehensive Agriculture and Rural Development Facility (CARD-F)
6. Incentives Driving Economic Alternatives for the North, East, and West (IDEA-NEW)
7. Commercial Horticulture and Agricultural Marketing Program (CHAMP).

Crop eradication featured in three others:

1. Governor-Led Eradication (GLE)
2. Good Performers Initiative (GPI)
3. Helmand Food Zone Program (HFZ).

In each case, we characterized the program based on program documents and conversations with practitioners, and discussed the program's results based on program evaluations, interview data, and statistical data on outcomes and goals. We then traced the plausible effects of the program on farmers' decisions to cultivate opium poppy, using the factor map and linking factors that influence the cultivation of opium poppy to key program elements.

The analysis also drew on previous work on Afghanistan and in other countries.

We then synthesized the results of the program analyses to provide recommendations for the policy community to use in the design, implementation, and assessment of future programs involving rural development, crop eradication, and other supply-reduction incentives, to provide better incentives for farmers to reduce poppy cultivation.

We provide further documentation of our background analysis, crop budgets, details of the household model, an annotated list of programs, and other countries' experiences with counternarcotics and related programs in online appendixes.

Synthesis of Analysis

Here, we report the findings of our analysis of the seven rural development and the three other programs on farmers' decisions to cultivate opium poppy.

Rural Development Programs

The core elements of the seven rural development programs fell into seven broad categories, with projects oriented toward

1. subsidizing agricultural inputs, such as fertilizer, seeds, saplings, and vines
2. subsidizing or providing grants for farm equipment or facilities
3. repairing, expanding, or constructing new infrastructure
4. introducing or diffusing new technologies
5. providing cash-for-work opportunities

6. promoting links between farmers and markets
7. promoting non-agricultural rural enterprises.

We addressed training as part of various categories, rather than in its own category, as it serves largely to introduce or diffuse new technologies and also to promote links between farmers and markets; however, we give training its own bullet in our list of findings below.

The principal findings from this research effort can be summarized as follows:

- **Fertilizer.** Distributing subsidized fertilizer could have a modest but tangible impact on farmer incomes by reducing costs and improving yields, but whether it will serve to reduce the cultivation of opium poppy is uncertain. The indeterminacy in our analysis stems from two sources, both relating to the yield effect: First, farmers with smaller and larger landholdings might respond differently to an improvement in yields; second, farmers might choose to apply fertilizer—a non-crop-specific input—to opium poppy. For farmers with smaller landholdings, the better yields on wheat might relax concerns about food security and could promote cultivation of opium poppy. For farmers with larger landholdings, the ultimate effect would depend more on the relative returns of wheat, other commodities, and opium poppy, which might still favor opium poppy cultivation. Finally, because fertilizer is applied each season, one-off subsidy programs do not generate sustained increases in yields or farm incomes.
- **High-quality wheat seed.** Distributing subsidized high-quality wheat seed could help to raise farm incomes through higher yields, if not lower costs, but might not serve to reduce the cultivation of opium poppy. (In contrast to fertilizer, the cost of seed constitutes a very small share of input costs, so the subsidy, per se, would not appreciably reduce input costs.) As was true of fertilizer, better yields on wheat might relax farmers' concerns about food security and could promote cultivation of opium poppy, especially among farmers with smaller landholdings. For farmers with larger landholdings, the ultimate effect would still depend largely on the

relative returns of wheat and opium poppy. In this case, the yield of wheat would rise—the input is crop-specific; however, absent a dramatic change in relative returns, it is unlikely that wheat would supplant opium poppy as a cash crop.

- **Saplings and vines.** Investments in higher-quality, yield-improving orchards and vineyards can significantly raise farm incomes and might dissuade some opium poppy cultivation, as orchards and vineyards are likely to compete with opium poppy for land use, even if opium poppy is interspersed initially. The effects of lower input costs, higher prices, and higher yields are mutually re-enforcing; moreover, empirical evidence suggests that fruit crops can generate net income comparable to that of opium poppy, albeit with substantial start-up costs. Among the many different types of projects that we considered, those oriented toward distributing subsidized high-quality saplings and vines—especially if accompanied by training in orchard and vine care—appear to have been among the most efficacious in the pursuit of rural development.
- **Farm equipment.** Programs that subsidize the purchase of tractors and water pumps might boost farm incomes, but might not lead to reductions in opium poppy cultivation. Although tractors might be somewhat more important to cultivating wheat (a relatively capital-intensive crop) than to cultivating opium poppy (a relatively labor-intensive crop) and, hence, are more likely to improve the relative attractiveness of wheat, they can be used for cultivating opium poppy, too. Thus, the issue of relative returns among commodities comes into play. Moreover, if the equipment results in higher yields and helps to relax concerns about food security, it could serve to promote opium poppy cultivation, especially among farmers with smaller landholdings. Recent tractor programs have been plagued by corruption; loss, e.g., through resale and damage; and poor targeting, e.g., to those lacking need of subsidies.
- **Facilities.** Subsidies for the construction of plastic hoop greenhouses, cool rooms, beehives, drying sheds, and chicken coops, when coupled with assistance in marketing and management,

have led to profitable, sustainable operations—e.g., growing winter vegetables and helping raise rural incomes—and, in some instances, could lead to reductions in opium poppy cultivation. The result would depend, in part, on whether the operations compete head-on for land and other resources, as might be more likely if they target winter, spring, or year-round agricultural production. However, if the operations do not compete directly with opium poppy for household resources and, thus, are functionally equivalent to outside income opportunities, they could encourage opium poppy cultivation. Projects involving more-complex technologies or requiring electricity, such as cold storage facilities, have performed poorly or failed.

- **Infrastructure.** Well-maintained irrigation systems and roads could help to raise rural incomes, but could affect opium poppy cultivation negatively or positively via their effects on yields, in the case of irrigation, and remoteness, in the case of roads. Roads, for example, can reduce the cost of transporting perishable and heavier, non-perishable crops like wheat, but also lower the cost of transporting opium. The benefits might be relatively greater for most legal crops, because they are bulkier than opium poppy, but, for poorer households, better connectivity to markets and a relaxation of concerns about food security could favor opium poppy. Similarly, irrigation can be of benefit to legal and illegal crops and affect food security, through yield effects. In practice, both types of projects have struggled to ensure ongoing post-project maintenance.
- **Training.** Many rural development programs, including several of those that we examined, provide training to promote technology diffusion or to provide new skills in support industries, which could eventually discourage opium poppy cultivation. Program implementers find training is needed in conjunction with the provision of subsidized inputs like higher-quality seeds, saplings, cuttings, or chicks and to add value to agricultural products through better techniques for drying, sorting, and processing. Projects that appeared to deliver effective training were hands-on and coupled with input delivery, but might have promoted better learning

with more hours and refresher courses. The least-successful training projects lacked strong, existing markets for new skills.

- **Non-traditional crops.** The introduction of non-traditional, high-value crops could boost rural incomes and, if competing directly with opium poppy for land use, help to discourage opium poppy cultivation, but only if tied to efforts to train farmers and processors, develop commercial markets and other supporting infrastructure, and establish and expand links between farmers and commercial markets. Regarding the relevance of existing markets, interviewees harshly criticized a project to grow chili peppers, a non-traditional crop that lacked an existing market.
- **Cash-for-work.** Cash-for-work programs are intended to provide new or additional work and income to participants; on that basis, the effects of such programs on farmers' decisions to cultivate opium poppy would depend, in part, on whether they draw labor from poppy cultivation and stimulate rural wages or serve to provide non-competing additional household income. If the former, cash-for-work programs might negatively affect farmers' decisions to cultivate opium poppy, especially those with medium to large landholdings; if the latter, these programs might positively or negatively affect those decisions. Evidence to date suggests little if any rural wage effect and, at most, a modest effect on the availability of rural labor at harvest. Such programs require ongoing financing by donors but cannot, by their very nature, contribute to sustained increases in rural incomes.
- **Market links.** Establishing and expanding links between farmers and commercial markets are a necessary step for developing commercial agriculture in Afghanistan, and could serve to discourage opium poppy cultivation. The development of links to commercial agriculture can create a more favorable environment for measures intended to promote higher-value agricultural products and, potentially, foster incentives to reduce the cultivation of opium poppy. Projects that link farmers to markets can be thought of as both mitigating "remoteness" for commercial commodities and enabling production of higher-value commodities, which could, in turn, either constitute competing products for opium poppy

or generate something akin to outside income. If the former, they might be more inclined to discourage poppy cultivation—thus suggesting the desirability of promoting commercial commodities that compete directly with poppy for land and other resource use. In our view, projects that have been most able to promote links have focused on making introductions, informing Afghans of export requirements, and assisting Afghans in improving the quality of their products for commercial sale.

- **Non-agricultural rural income.** Projects to create opportunities for non-agricultural rural incomes, such as through handicraft production and re-invigorated carpet weaving, in southern Afghanistan have had little lasting effect, measured on their own terms. Moreover, were they to succeed in the future, they could act to create outside income opportunities, which might imply an increase or decrease in opium poppy cultivation or, if they were to draw labor away from agriculture and boost rural wages, could discourage opium poppy cultivation. However, the recent track record of such projects in Afghanistan suggests little or no likely effect via either channel.

Our factor analysis suggested that a modest set of different types of projects holds the most promise for opium poppy reductions, in the sense that the projects tend to point in the right direction—i.e., largely away from opium poppy—and might eventually steer farmers toward legal alternative opportunities. In that set, we included projects that focus on substantially improving the relative returns of high-value, poppy-competing, legal commodities with well-established accessible markets and boosting rural wages. Training, primarily to support such projects, also appeared to hold value in the mix of options.

However, to the extent that the projects point in the right direction, they might not do so with sufficient strength to induce a change in a household's behavior. For example, agricultural wages might need to more than quadruple to engender a shift from opium poppy to wheat cultivation, though perhaps less so for other high-value crops. Moreover, more projects hold promise for farmers with medium to large landholdings than for those with smaller landholdings—and, inso-

much as we observed conflicting incentives within a particular program, the conflicts appeared more often across categories of landholders than across channels of influence.

National survey data suggest that a substantial share of opium poppy in Afghanistan might grow on medium to large landholdings, even if a majority of farmers hold only small amounts of land. If a substantial share of opium poppy in Afghanistan does grow on larger farms, then gearing programs and projects toward farmers with medium to large landholdings might seem reasonable or desirable as an immediate strategy; however, to develop mechanisms with only those households in mind would be to set aside the concerns—and cultivation—of the also large share of farmers who occupy smaller plots, the needs of those working the land, and the potential for shifts in opium cultivation to new regions.

These last observations on the distribution of landholdings point to an important, if implicit, dimension of our findings—that of time. In our framework, we treated very small (less than one-half to 1 hectare), small (1 to 2 hectares), and medium to large (2 or more hectares) households as embedded in fixed categories in a static rural “system,” but they need not be. To the extent that policy, programs, and projects can, over time, move farmers from the lesser categories of very small and small to the greater category of medium to large, the more amenable the system might be to re-orientation toward legal pursuits. Farmers with greater wealth can be expected to respond more readily to the incentives of net returns and less to those of food sufficiency, which would imply greater susceptibility to programs that reduce the relative profitability of opium poppy, even if, in a static model, an increase in outside income, taken on its own, could have other effects.

Moreover, the system is profitable for such farmers—and somewhat insensitive to modest wage increases—in large part because of the existence of a substantial population of impoverished sharecroppers who are seeking opportunities to feed and shelter their families and to improve their status. The availability of unpriced or underpriced labor, specifically women—oftentimes unable to seek off-farm employment, but sometimes able to serve limited on-farm roles—and children also

bolsters this system. Thus, the persistence of poppy in Afghanistan is not just about rural incomes, but also about socio-cultural conditions.

Taking the longer view, higher rural incomes—which would likely support higher wages—appear to be a necessary, if insufficient, condition for substantially curtailing the cultivation of illegal crops. We find evidence for this statement both in our factor analysis and, by implication, in the experience of other countries. For example, over the past five decades, Thailand and Turkey have successfully all-but-eliminated the illegal cultivation of opium poppy, but only in conjunction with rising rural incomes.

Eradication

In our examination of the ways in which eradication might affect farmers' decisions to cultivate opium poppy, we found little evidence—in either theory or empirical observation—to suggest that eradication can, *as a blanket policy*, shift this system away from illegal cultivation. In its programming, the Bureau of International Narcotics and Law Enforcement (INL) explicitly recognizes this limitation of eradication. Eradication was one of the few program areas for which we observed conflicting incentives—to decrease and increase opium poppy cultivation—across landholder types and across channels of influence. Eradication risk might discourage opium poppy cultivation among farmers with medium to large landholdings, but concurrently rising Taliban influence might also encourage opium poppy cultivation among all farmers. Taliban influence might rise concurrently if, for example, insurgents offer farmers protection from eradication. This does not mean that eradication cannot play a strategic, targeted role, particularly with the advancement of incomes, good governance, and social change, but that a widespread eradication policy is unlikely to induce Afghan farmers, writ large, to shift out of opium poppy cultivation.

Moreover, as Mansfield's extensive fieldwork has shown, whatever part eradication might have played in reducing opium poppy cultivation in parts of Helmand in past years, farmers have found other places to grow opium poppy in the former desert areas, or *dasht*—and, if need be, can eventually relocate to other parts of Afghanistan. Although opium yields in the *dasht* are lower than in more fertile parts of Hel-

mand, the widespread availability of land in the *dasht* has made it possible for farmers to maintain and even increase overall levels of opium production by bringing more land into cultivation for opium.

If promoting a shift of cultivation locations, as Mansfield's fieldwork indicates, eradication might drive opium poppy further into regions outside the Afghan government's sphere of influence, foster the development of new areas of entrenched cultivation, and, at the same time, introduce or exacerbate violence and corruption in those areas—depending, in part, on the nature of policy responses. In calculating the net societal consequences of such a shift, Paoli, Greenfield, and Reuter, and Greenfield and Paoli, argue that one would need to consider not just the spillage of opium poppy from one region to another, but the spillage of the income and social ills that might be conveyed with the crop.² Thus, whether shifting poppy from a densely populated and relatively fertile and well-off area to a sparsely populated and previously infertile and impoverished area implies a net societal gain or loss, remains to be determined.

Recommendations

Nothing in our analysis suggested the plausibility of a near-term, program-led decline in aggregate opium poppy cultivation, but assistance and other programs can still be directed to foster the necessary conditions, especially with regard to incomes, to create better conditions for reducing cultivation of opium poppy over the long term.

In the few countries that have successfully reduced the cultivation of illegal drugs, rural incomes have increased substantially over the course of these efforts, sometimes over several decades. Arguably, all rural development programs are intended to lift incomes, but, depending on the means of implementation, some hold more or less prom-

² Letizia Paoli, Victoria A. Greenfield, and Peter Reuter, *The World Heroin Market: Can Supply Be Cut?* New York: Oxford University Press, 2009; Victoria A. Greenfield and Letizia Paoli, "If Supply-Oriented Drug Policy Is Broken, Can Harm Reduction Help Fix It? Melding Disciplines and Methods to Advance International Drug-Control Policy," *International Journal of Drug Policy*, Vol. 23, No. 1, 2012, pp. 6–16.

ise. Based on our analysis of the effects of the programs on incomes, in combination with our assessment of the various factors that affect opium cultivation decisions and with reference to concerns about sustainability and corruption, we recommend that rural development and opium poppy reduction programs

- focus on traditional agricultural products, such as fruit, nuts, grapes, and other perennial orchard crops, with well-established markets
- improve product quality through better sorting, grading, and processing
- establish stronger links between farms and markets
- employ inexpensive, readily available, maintainable, and simple technologies
- reach a large enough number of farmers to stimulate and sustain associated support and marketing industries.

Regarding the last recommendation, we are not ruling out the value of smaller-scale pilot programs, but they should be designed as means to test scalable ideas, with appropriate controls and expectations, not as ends in themselves. The types of projects that we are recommending might not require large expenditures—arguably a good thing in an environment that is highly susceptible to corruption—but, on the basis of established track records and conditions in Afghanistan, are more likely to succeed as engines of growth than others. Specifically, we also recommend that INL and others refrain from projects that

- try to introduce agricultural products new to Afghanistan
- rely on complex technologies, especially those that need electricity and other not-yet-developed or widely accessible supporting infrastructure
- fail to ensure a local market for the product.

Within the broad contours of that framework, programs that focus on substantially improving the relative returns of high-value,

poppy-competing, legal commodities with well-established, accessible markets and boosting rural wages are more likely to shift the rural economy in the direction of legality than other programs, particularly as incomes rise.

Although many of the programs under consideration spoke to the issue of social change with regard to the role of women, none appeared likely to engender lasting social change. In particular, the effects of any project in our analysis that intended to draw women into the economy, e.g., through training programs for women, beekeeping, handicrafts, and carpet-weaving, were short lived, possibly due in part to the social condition of women in Afghanistan. Although outside the scope of our analysis, we note that past research has found that education of girls is key to such social change.

Our recommendations on eradication speak to current conditions. In light of the pervasiveness of opium cultivation in southern Afghanistan, the security challenges facing the Afghan government in that region, the strength of farmer opposition to eradication, the susceptibility of eradication to corruption, the deficiencies with which eradication is pursued, and the potential for shifting cultivation, we find little evidence to support a blanket policy of widespread eradication efforts in Helmand or Kandahar.

We also recommend that INL continue to review the selection process for awards under the Good Performers' Initiative. Areas that have been hit by eradication might warrant additional recognition of the costs imposed. The program's focus on projects in rural areas that have or might cultivate opium poppy represents a positive development.

Acknowledgments

We would like to thank Amy Schmisser, Sarah Bealer, and Alia Waly, our sponsors and partners at INL, for numerous helpful comments and their shepherding of this project through to completion. We are grateful to Dr. Shanthi Nataraj of the RAND Corporation and Ambassador Ronald Neumann for two very helpful formal reviews. We also greatly appreciate comments provided by David Mansfield. We would also like to thank the many individuals in the Afghan government, and at INL, the U.S. Agency for International Development, the European Union, the Department for International Development of the United Kingdom, the U.S. Embassy in Kabul, and assistance providers who gave of their time and insights to help us better understand the cultivation of opium poppy in Afghanistan and the programs that have been implemented to foster rural development and to try to reduce the cultivation of opium poppy. We would also like to thank Helen Seese of Eureka Research for running the survey of Afghan project implementers. We greatly appreciate the participation of the Afghans who responded to the survey. We would also like to thank Blair Smith for her patient, careful support in preparing this document for publication and Bryce Schoenborn for an exceptionally thoughtful edit.

Abbreviations

ADP South	Agricultural Development Program–Southern Region
AREU	Afghanistan Research and Evaluation Unit
AVIPA	Afghanistan Vouchers for Increased Production in Agriculture
AVIPA-Plus	Afghanistan Vouchers for Increased Production in Agriculture–Plus
CARD-F	Comprehensive Agriculture and Rural Development Facility
CCA	Canal Command Area
CDC	Community Development Council
CHAMP	Commercial Horticulture and Agricultural Marketing Program
CN	counternarcotics
DAI	Development Alternatives, Inc.
DAP	diammonium phosphate
DfID	Department for International Development (UK)
EDP	Economic Development Package

FAO	Food and Agricultural Organization of the United Nations
GAO	Government Accountability Office
GLE	Governor-Led Eradication
GPI	Good Performers Initiative
HARDP	Helmand Agriculture and Rural Development Program
HFZ	Helmand Food Zone
IDEA-NEW	Incentives Driving Economic Alternatives for the North, East, and West
IMF	International Monetary Fund
INL	Bureau of International Narcotics and Law Enforcement Affairs
INL/AP	Bureau of International Narcotics and Law Enforcement Affairs, Office of Afghanistan and Pakistan
IRD	International Relief and Development, Inc.
ISAF	International Security Assistance Force
MAIL	Ministry of Agriculture, Irrigation, and Livestock (Afghanistan)
MCN	Ministry of Counter Narcotics (Afghanistan)
MISFA	Microfinance Investment Support Facility Afghanistan
NABDP	National Area-Based Development Programme
NGO	non-governmental organization
NRVA	National Risk and Vulnerability Assessment
NSDP	National Seed Distribution Program

PEF	Poppy Eradication Force
TA	Transitional Administration
UNODC	United Nations Office on Drugs and Crime
USAID	U.S. Agency for International Development

Introduction

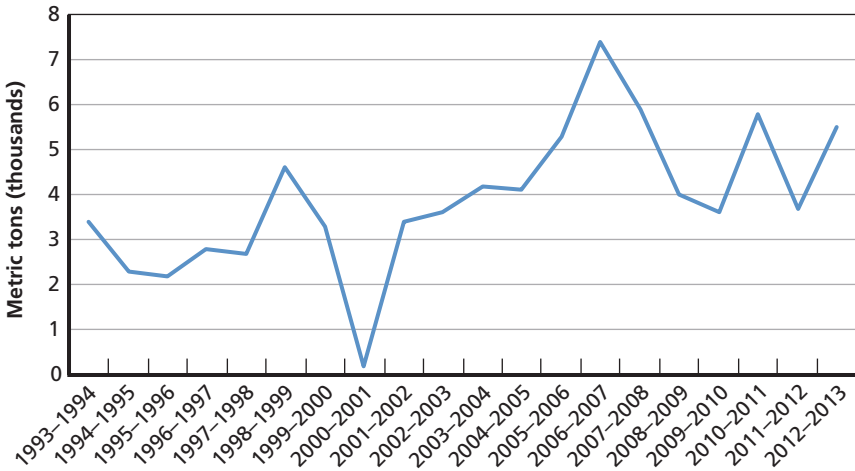
Afghanistan dominates the world opiate market. In 2013, it produced about 5,500 metric tons of opium, making it the world's leading opium producer (Figure 1.1).¹ It has held that position in all but one year of the past 20.² At the same time, opiates contribute substantially to the Afghan economy: Despite rapid economic growth in the non-opium economy between 2006 and 2013, the International Monetary Fund (IMF) estimated that value-added from opiates still amounted to about 15 percent of Afghanistan's gross domestic product in 2013, as compared with 29 percent in 2005.³ Opiates, consisting primarily of opium

¹ Following Paoli, Greenfield, and Reuter, we worked with the United Nations Office on Drugs and Crime's (UNODC) time-series data on hectares and tonnage for their widespread use, documentation, longevity, and public availability (Letizia Paoli, Victoria A. Greenfield, and Peter Reuter, *The World Heroin Market: Can Supply Be Cut?* New York: Oxford University Press, 2009). Likewise, we note the frailties of the data and the marked differences between UNODC and U.S. government data for some years (Paoli, Greenfield, and Reuter, 2009, pp. 42–43). In their words, "When assessing producer countries, the big picture is clear, but the specifics are sometimes blurry." Further supporting that claim of a clear big picture, we note that in Fishstein's (2014, Section 3.1, Figure 1) comparative plot of national-level opium poppy cultivation data, UNODC and U.S. government numbers largely track in all but a few years (Paul Fishstein, "Despair or Hope: Rural Livelihoods and Opium Poppy Dynamics in Afghanistan," Afghanistan Research and Evaluation Unit, AREU Synthesis Paper, August 2014). We highlight particular shortcomings in those and other data, as relevant, throughout the text.

² UNODC, *Afghanistan Opium Survey*, various years.

³ IMF, *Islamic Republic of Afghanistan*, IMF Country Report No. 14/128, May 2014, p. 7; Edourd Martin and Steven Symansky, "Macroeconomic Impact of the Drug Economy and Counter-Narcotics Efforts," in D. Buddenberg and W. A. Byrd, eds., *Afghanistan: Drug*

Figure 1.1
Opium Production in Afghanistan, 1993 to 2013



SOURCE: UNODC, *Afghanistan Opium Survey*, annual surveys 1994–2013.

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and heroin, remain Afghanistan’s largest export by far, amounting to about \$2.9 billion in 2013; Afghanistan’s total exports of legal goods were valued at about \$2.6 billion in that year.⁴ Opium production and exports are potent economic forces. On the one hand, they sustain a large segment of the Afghan population. According to Byrd and Mansfield, opium provided around 376,000 full-time equivalent jobs in 2013.⁵ On the other hand, opiate cultivation fuels corruption, under-

Industry: Structure, Functioning, Dynamics, and Implications for Counter-Narcotics Policy, Washington, D.C.: United Nations Office on Drugs and Crime and the World Bank, 2006, p. 28.

Further substantiating the earlier figure, the opium industry, from farm gate to export, was estimated to account for over one-quarter of Afghanistan’s gross domestic product as recently as 2006. Martin and Symansky, 2006.

⁴ IMF, 2014, pp. 7, 44.

⁵ William A. Byrd and David Mansfield, “Afghanistan’s Opium Economy: An Agricultural, Livelihoods, and Governance Perspective,” Report Prepared for the World Bank, Afghanistan Agriculture Sector Review, Revised Version, June 23, 2014, p. 6.

mines local and national institutions and the rule of law, and provides financial support to insurgents.

In an effort to reduce the cultivation of opium poppy and the economic dependence of Afghanistan on that crop, the challenge facing Afghan policymakers, strategists, and their foreign supporters is to design sustainable programs that can change the conditions that lead farmers to grow opium poppy. Some such programs might target opium poppy directly, and others indirectly, but they will only be successful in reducing the cultivation of opium poppy if they are developed and implemented in accordance with the socio-economic and other environmental factors that encourage farmers to grow this crop.

Purpose

The purpose of this study is to inform the design and development of sustainable programs to induce farmers in southern Afghanistan, most notably in Helmand and Kandahar provinces, to grow less opium poppy. The study focused specifically on those provinces because, taken together, they account for the large majority of all opium poppy cultivation in Afghanistan. The study was designed to enhance policymakers' understanding of poppy cultivation in southern Afghanistan. We systematically reviewed and synthesized information on how farmers choose to allocate land to opium poppy and other crops, including the factors that drive those decisions, and conducted a side-by-side assessment of rural development programs and supply-reduction incentives in terms of their effects on those factors. This factor-based approach creates a bridge between program design and farmers' decisions to cultivate opium poppy, which should assist the Afghan government and donors in developing more effective programs to reduce the cultivation of opium poppy. On that basis, the study offers concrete recommendations for crafting programs that can reduce the dependence of Afghan communities on opium poppy and is intended to assist Afghan policymakers and strategists in creating sustainable programs to reduce the dependence of Afghan communities on this crop.

Methodology and Organization

The study has three major components:

- Construction of an analytical framework for tracing the effects of rural development and crop-eradication programs in southern Afghanistan on the various socio-economic and environmental factors that influence farmers' decisions to grow opium poppies.
- Use of the analytical framework to assess the effects—be they intentional or unintentional—on the various factors for an array of representative rural development and crop-eradication programs implemented in southern Afghanistan.
- Actionable guidance with which to craft such programs to provide better inducements to reduce opium poppy cultivation in the future.

Analytical Framework of Decisions to Grow Opium Poppies

We developed an analytical framework to conceptualize and better understand farmers' incentives to grow opium poppy. The framework consists of a taxonomy of factors that influence farmers' decisions to grow opium poppy, the direction of the effect of the factor, its potential strength, and its importance relative to other effects on farmers' decisions to grow opium poppy. These effects are encapsulated in a template, or "map," that can be used to trace the effects of various programs on the factors and, hence, on opium poppy cultivation. The factor map shows the direction of an effect (if the direction can be determined), the potential strength of an effect, and its importance relative to other effects. In many instances, the factors push in different directions, so the direction of the effect is indeterminate. At its core, the framework draws on microeconomic principles: specifically, an underlying model of household production and consumption conceptualizes farmers' behavior in terms of a series of incentives, constraints, and directional responses. The model lets farmers choose the allocation of their land to opium poppy or a food crop, namely wheat, subject to concerns about feeding their families, earning cash income, risks of violence and eradication, and other factors, as addressed below. In that way, the model

focuses on farmers with decisionmaking authority, whom we refer to as “landholders,” and it enables us to consider issues of income and food security and the potential trade-offs among them on equal footing. A given farmer makes the allocation decision at the start of the growing season and faces the same decision year after year.⁶ The farmer makes the decision based on whatever information about the factors is at his disposal at that time.

We developed the factor map in three partially overlapping and iterative phases. First, we identified a preliminary set of socio-economic conditions and other environmental factors that drive decisions to grow opium poppies or engage in other activities, drawing on Mansfield’s longitudinal studies, annual and periodic surveys, government reports, academic publications, media accounts, the grey literature, and on-the-ground discussions with program implementers and other subject-matter experts in Afghanistan, as well as discussions with civil servants and program implementers in the United States and Europe. The candidates included the prices of opium and other agricultural commodities; costs of credit, seeds, fertilizer, irrigation, fuel, labor, and other inputs, as well as farmers’ access to those inputs; perishability and storability; adequacy of transportation and other infrastructure; extent of insecurity, corruption, weak governance, and pressure from insurgents; and prevalence of poverty.

Second, we undertook a process of validation, during which we sought to cross-check the relevance, importance, and direction of influence of the proposed factors against economic theory and empirical evidence, be it qualitative or quantitative. We also checked for consistency among and across qualitative and quantitative data sources.

Third, we charted the relationships between the factors and the cultivation decision to produce the factor map, which largely encapsulates the analytical framework.

⁶ For purposes of simplicity, we describe the land allocation decision in terms of one growing season per year, but could re-specify the framework to accommodate multiple growing seasons per year. In the framework, the allocation decision is the dependent variable and the factors are independent variables.

To the extent possible, we also considered relationships among factors, including the potential for some factors to offset others in a given project or to affect different stakeholders differently. Some factors might interact positively, generating mutually reinforcing incentives to reduce poppy cultivation, whereas others might interact negatively or ambiguously. In the extreme, a change in the status of one factor might render other factors irrelevant. For example, if security conditions deteriorate to the point that no one—farmer or trader—can or will travel, then the construction of roads will not affect cultivation decisions. Taking a less extreme case, farmers with more or less land might be expected to respond differently to changes in the price of opium, the costs of fertilizer, or other factors. Thus, programs might have different effects depending on the factors they influence and characteristics of the target population.

In each phase, we elicited feedback from our project sponsor, the U.S. Department of State’s Bureau of International Narcotics and Law Enforcement Affairs, Office of Afghanistan and Pakistan (INL/AP), and input from other U.S. government offices.

Assessing Assistance Programs in the Framework of Incentives to Grow Opium Poppy

We used the framework to assess whether and how rural development and crop-eradication programs implemented in southern Afghanistan have affected—or might have affected—the various factors that influence decisions to grow opium poppy. As a practical matter, we deconstructed the components of each program in terms of potential effects on the various factors represented in the factor map and then traced the effects of those factors, separately and collectively, on cultivation decisions. The focus of the assessment was on programs implemented in Helmand and Kandahar provinces.

To identify projects of interest, we cataloged the universe of rural development programs—explicitly or implicitly tied to incentives to reduce opium poppy cultivation—and opium poppy eradication programs that had been implemented in southern Afghanistan since 2002. We conducted a comprehensive search of databases and program documents maintained and posted by INL, the U.S. Agency for Inter-

national Development (USAID), the World Bank, the United Kingdom's Department for International Development (DfID), the Asian Development Bank, UNODC, and others. Many rural development programs were not explicitly designed to provide incentives to reduce the cultivation of opium poppies. However, efforts to increase incomes and expand the range of opportunities for gainful employment are often components of strategies to make cultivation of opium poppies less attractive. We considered development programs that focused, for example, on boosting farm productivity by expanding access to higher-yielding seed varieties, fertilizers, and irrigation; encouraging farmers to cultivate livestock; expanding non-farm employment opportunities; improving transportation infrastructure; promoting the development of rural enterprises; and expanding farmers' access to credit.

We then selected a subset of 35 programs for review by INL/AP—out of a list of 93 programs identified as potentially affecting decisions to grow opium poppy—in an effort to draw on a wide range of programs and experiences with rural development, including some programs designed to reduce poppy cultivation. The 35 programs were intended to span all major activities, ranging from eradication to rural infrastructure to agricultural projects to opportunities for off-farm income. We selected a few programs outside of southern Afghanistan because of their unique features or breadth, believing that they could shed light on opportunities to reduce the cultivation of opium poppy in the south.

We discussed the subset with our sponsors at INL and arrived at a final list of ten programs—all of which were implemented between 2004 and 2014—for in-depth assessment. Seven of the final ten programs focused on promoting rural development:

1. Agricultural Development Program—Southern Region (ADP South)
2. Afghanistan Vouchers for Increased Production in Agriculture (AVIPA)
3. Afghanistan Vouchers for Increased Production in Agriculture—Plus (AVIPA-Plus)

4. Helmand Agriculture and Rural Development Program (HARDP)
5. Comprehensive Agriculture and Rural Development Facility (CARD-F)
6. Incentives Driving Economic Alternatives for the North, East, and West (IDEA-NEW)
7. Commercial Horticulture and Agricultural Marketing Program (CHAMP).

Crop eradication was an important component of three others:

1. The Government of the Islamic Republic of Afghanistan's Governor-Led Eradication (GLE) program
2. The Good Performers Initiative (GPI)
3. The Helmand Food Zone (HFZ) program.

These ten programs spanned all major activities. Some specifically targeted reducing opium poppy cultivation and most focused on conditions in southern Afghanistan. They also included programs financed and implemented by INL/AP, which are of particular interest. In each case, we characterized the program based on program documents and conversations with practitioners and discussed the program's results, based on program evaluations, interview data, and statistical data on outcomes and goals.

We then traced the plausible effects of each program on farmers' decisions to cultivate opium poppy each year, using the factor map and linking factors that influence the cultivation of opium poppy to key program elements. As suggested above, the effects of programs—depending on their constituent parts and the characteristics of the target population—could be synergistically “good,” synergistically “bad,” or, perhaps, a mix of both. For example, two or more programs operating contemporaneously or in close proximity could generate either reinforcing—for better or worse—or negating outcomes. A program can, at the same time, make it easier to grow both opium poppy and a legal commodity, for example, by improving transportation infrastructure. The net effect of the improvement could depend on whether the

relative effect of better infrastructure is greater for opium or the legal product.

The analysis of program effects on the decision to grow opium poppies also drew on previous work in Afghanistan and in other countries. In addition to a trip specifically for this project and dedicated to discussions of rural development and eradication programs in September–October 2013, the project team drew on interviews and analyses of counternarcotics (CN) and development programs from previous studies of Afghanistan, most notably study trips in the fall of 2011 and in May and September–October 2012. We also drew on prior research on CN programs in other countries that have produced illegal crops.

We provide further documentation of our background analysis, crop budgets, details of the household model, an annotated list of programs, and other countries' experiences with counternarcotics and related programs in online appendixes.

Policy Recommendations

We synthesized the results of the program analyses to provide recommendations for the policy community to use in the design, implementation, and evaluation of future programs involving rural development, crop eradication, and other supply-reduction incentives affecting opium poppy cultivation. The intended impact of this project is to enable Afghan policymakers and strategists to create sustainable mechanisms to reduce the dependence of Afghan communities on opium poppy.

Household-Level Conditions and Dynamics

In 2013, Afghanistan's per capita gross domestic product of \$679 was in the bottom 7 percent of countries in the world.¹ Economic opportunities for individuals, especially those in remote areas, are limited.

Opium poppy is Afghanistan's most important cash crop. Between 2006 and 2010, an estimated average of 363,000 households, amounting to 12 percent of rural households, farmed opium poppies in Afghanistan each year.² In southern Afghanistan, an average of 219,000 households, over one-half of rural households, grew opium poppy.³

In this chapter, we present contextual information on the ground conditions and dynamics that affect decisions to grow opium poppy in southern Afghanistan. The chapter focuses on Helmand province, as it currently grows more opium poppy than any other province in Afghanistan. The purpose of this chapter is not to provide a comprehensive review of the conditions and dynamics affecting opium poppy cultivation, but to delve into a subset of issues of particular relevance to decisions by households to cultivate opium poppy. The issues we have selected here are risk and uncertainty, shifting cultivation patterns, landholdings, household size, and observed land allocations.⁴ In our

¹ IMF, 2014, p. 38.

² UNODC, *Afghanistan Opium Survey*, various years.

³ Calculated from UNODC data.

⁴ For comprehensive reviews of the household-level conditions and dynamics that affect opium poppy cultivation in southern Afghanistan, see David Mansfield's collected reports

view, these conditions or dynamics each play a major role that affects decisions by households to grow opium poppy.

A central concern of this report is the decision to allocate agricultural land to growing opium poppy or other crops, so we focus our attention on the individuals who control that decision. Thus, we use the term *landholder* to connote a farmer with such control, most typically but not exclusively a landowner. Our reading of the literature suggests that landowners often make decisions on what to plant, but, in some instances, sharecroppers and especially tenants (lessees and renters) also have a say in the allocation of land to a primary crop, to a household garden, or to both.⁵ In the case of sharecropping, the arrangements between the landowner and the sharecropper might well—but not always—amount to labor arrangements: the landowner needs labor and the sharecropping household provides it in exchange for a share of production and, oftentimes, shelter and food.

In the sections that follow, we first review the risks and uncertainties facing households that cultivate opium poppy in southern Afghanistan. We then examine shifts in the areas in which opium poppy has been cultivated in Afghanistan over the past decade, but particularly more recent shifts within Helmand province. We then turn to a discussion of landholdings, household size, and observed land allocations to opium poppy and other crops in Helmand province.

Risk and Uncertainty

The setting for agricultural production in southern Afghanistan is risky and uncertain. For many or most farmers in Afghanistan, in the

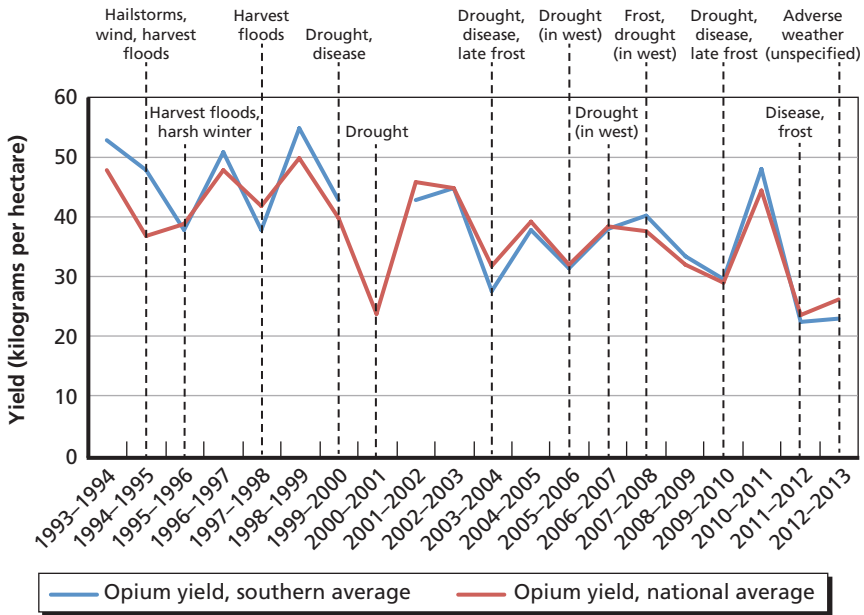
and essays; David Mansfield and Paul Fishstein, “Eyes Wide Shut: Counter-Narcotics in Transition,” Afghanistan Research and Evaluation Unit, Briefing Paper Series, September 2013; and UNODC’s annual surveys.

⁵ They might make this decision, *de facto*, in the sense that they provide the seed and other inputs. In a personal communication (January 21, 2015), Mansfield notes the diversity of arrangements and the potential for negotiation and give-and-take between landlords and sharecroppers. We present evidence on the distribution and terms of these arrangements below and in Appendix B.

south or elsewhere in the country, risk and uncertainty are the only true “givens.” Among many potential hazards, environmental, political, and market forces stand out as introducing substantial risk. Some of these forces affect all farmers, regardless of what they produce; some affect only a subset.

The environment has a major effect on opium yields, but also on the yields of other crops. Figure 2.1 shows the frequency of environmental “shocks,” such as drought and plant disease, in relation to opium poppy yields from the mid-1990s to the 2012–2013 growing

Figure 2.1
Frequency of Environmental Shocks in Relation to Yields, in Afghanistan as a Whole and Southern Afghanistan, 1993–2013



SOURCES: UNODC, *Afghanistan Opium Survey*, 1994–2013; RAND calculations.
NOTES: The UNODC, from which the yield data are taken, defines southern Afghanistan as the provinces of Day Kundi, Helmand, Kandahar, Uruzgan, and Zabul. The national yield data that were originally published for the years 2006–2009 were subsequently revised by the UNODC; revisions to the southern yield data have been extrapolated accordingly.

season⁶ in Afghanistan. As can be seen in the figure, environmental shocks that significantly affect opium yields occur, on average, at least every two to three growing seasons, but not always in the south. Table A.1 in Appendix A lists the environmental shocks in Figure 2.1 from the 1999–2000 growing season through the 2012–2013 growing season. In particular, it highlights the recurrence of disease that has affected opium poppies in recent seasons and the impact the disease has had on opium yields, especially in southern Afghanistan.

Environmental risks can take many forms. Some risks, particularly crop-specific diseases, affect crops differently. Other environmental shocks, like drought, can affect all crops, albeit to a greater or lesser extent.

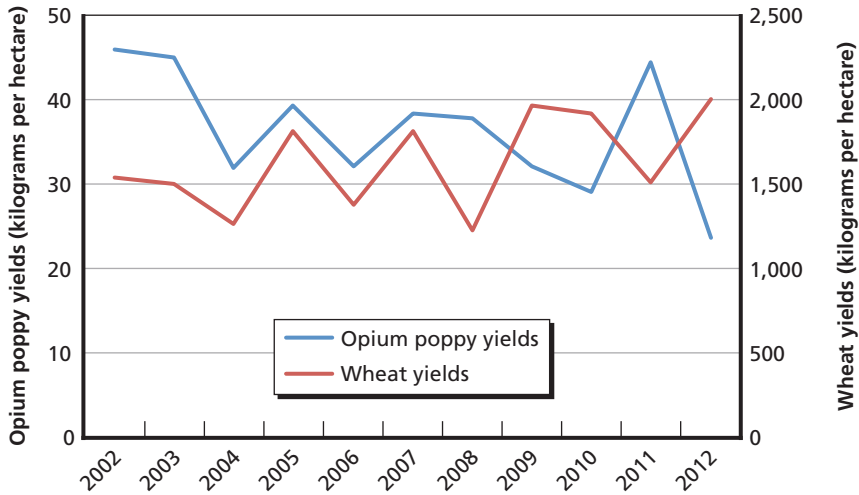
Indicative of such risks, Figure 2.2 juxtaposes wheat and opium poppy yields from 2002–2012, the post-Taliban years. In this period, opium poppy yields averaged about 36.4 kilograms per hectare nationally, with a standard deviation of about 7.2 kilograms; wheat yields averaged about 1,634 kilograms per hectare nationally, with a standard deviation of about 285 kilograms. In proportional terms—standard deviation relative to mean—opium poppy appears to be about as risky as or just slightly riskier than wheat.⁷ Between 2002 and 2007, the yields of opium poppy and wheat appeared to rise and fall together, but they appear to have diverged since.

Figure 2.3 shows the ubiquity of CN and other policy shocks that have affected opium poppy cultivation in Afghanistan. Table A.2 in Appendix A provides detailed descriptions of these policy shocks. Afghan opium poppy farmers have experienced a series of policies focused on reducing the cultivation of opium poppy over the past decade, including bans or eradication programs, which are often fol-

⁶ The opium poppy growing season typically spans two calendar years, i.e., cultivation occurs in the autumn of one calendar year and harvesting occurs in the spring of the next calendar year.

⁷ Note that opium poppy is commonly characterized as a resilient crop (e.g., Paoli, Greenfield, and Reuter, 2009, citing others), but it displays at least as much yield variability as wheat, under current agricultural practices.

Figure 2.2
Comparison of Wheat and Opium Poppy Yields in Afghanistan, 2002–2012



SOURCE: UNODC, *Afghanistan Opium Survey, 2003–2013*; Food and Agriculture Organization of the United Nations (FAO), FAOSTAT database, 2013.

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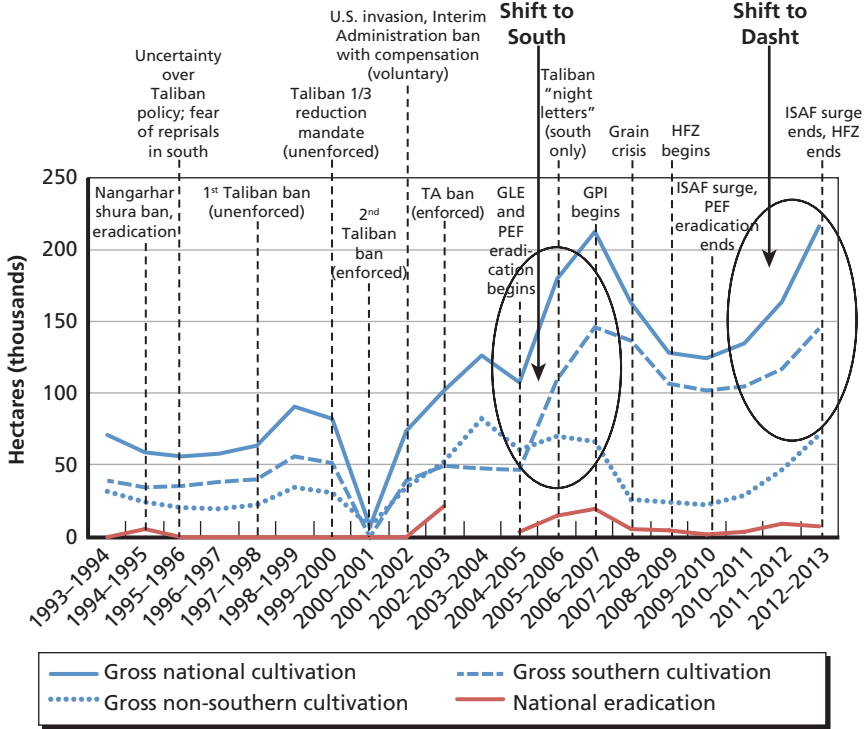
lowed by halts or relaxation of these programs.⁸ Farmers have also occasionally received subsidies or transfers in cash or kind to reduce the cultivation of opium poppy.

Prices of wheat and opium have also fluctuated substantially over the past several years, but somewhat more so in the case of opium than in the case of wheat.⁹ In the case of opium, Afghanistan, writ large,

⁸ Over the years, the eradication data have been verified to varying degrees. Based on UNODC (*Afghanistan Opium Survey*, various years) reporting, we assume little or no verification through 2003–2004 and partial to complete verification for subsequent years. For 2002–2003, UNODC reported that the eradication data were not verified. UNODC did not present an eradication estimate for 2003–2004. For 2004–2005 through 2006–2007, UNODC reported verification of the majority of each of the estimates that it presented in the annual surveys. From 2007–2008 onward, UNODC reported full verification of the eradication data.

⁹ One measure of variability or risk is the coefficient of variation, which is equal to the standard deviation divided by the mean. The larger the coefficient of variation, the greater the variability or risk. Between 2002 and 2010, the coefficient of variation for the price of

Figure 2.3
Counternarcotics and Other Policy Shocks in Afghanistan, 1993–2013



SOURCES: UNODC, *Afghanistan Opium Survey*, executive summaries, annual surveys 1994–2013; David Mansfield, Alcis Ltd., and the Organisation for Sustainable Development and Research, *Managing Concurrent and Repeated Risks: Explaining the Reductions in Opium Production in Central Helmand Between 2008 and 2011*, Afghanistan Research and Evaluation Unit, May 2011, pp. 16–25; RAND calculations. NOTES: Over the years, the eradication data have been verified to varying degrees. Based on UNODC (*Afghanistan Opium Survey*, various years) reporting, we assume little or no verification through 2003–2004 and partial to complete verification for subsequent years. For 2002–2003, UNODC reported that the eradication data were not verified. UNODC did not present an eradication estimate for 2003–2004. For 2004–2005 through 2006–2007, UNODC reported verification of most of each of the estimates that it presented in the annual surveys. From 2007–2008 onward, UNODC reported full verification of the eradication data. PEF = Poppy Eradication Force; TA = Transitional Administration; ISAF = International Security Assistance Force.

is the dominant global supplier and, hence, changes in prices may be largely endogenous to the aforementioned environmental and political circumstances. In the case of wheat, Afghanistan is not a major producer and is therefore a “price taker” in the global market. For example, the especially high price of wheat in the 2008–2009 growing season reflected a period of relatively high wheat prices on international markets.

Shifting Cultivation Patterns

This discussion draws heavily from Mansfield’s extensive fieldwork in Afghanistan, especially as it concerns the south.¹⁰ The past two decades have been tumultuous for opium poppy cultivation in Afghanistan. In that time frame, opium cultivation has undergone a substantial increase, a ban, a dramatic rebound, a decline, another rebound, and, eventually, two pronounced shifts in the location of cultivation, largely involving Helmand province. Nationally, the number of hectares allocated to opium poppy rose from 1994–1995 to 1998–1999, and then plummeted when the Taliban banned cultivation in 2000. It rose sharply, if somewhat unevenly, through 2006–2007, after the fall of the Taliban and when, as an insurgent group, the Taliban reversed policy. Opium production fell and then rebounded again to the 2006–2007 peak in 2012–2013 (see Figure 2.3).

opium was 0.73, while the coefficient of variation for the price of wheat was 0.47; a difference indicating 32 percent less variability in the price of wheat than for the price of opium.

¹⁰ For example, see David Mansfield, “From Bad They Made It Worse,” Afghanistan Research and Evaluation Unit, May 2014; David Mansfield, *All Bets Are Off! Prospects for (B) reaching Agreements and Drug Control in Helmand and Nangarhar in the Run Up to Transition*, Afghanistan Research and Evaluation Unit, January 2013a; Mansfield and Fishstein, 2013; David Mansfield, *Between a Rock and a Hard Place: Counter-Narcotics Efforts and Their Effects in Nangarhar and Helmand in the 2010–11 Growing Season*, Afghanistan Research and Evaluation Unit, Case Study Series, October 2011b; David Mansfield, “Briefing Paper 6: Central Helmand in the 2012/13 Growing Season,” internal briefing paper for the British Embassy Kabul, March 2013b; David Mansfield, “Briefing Paper 5: Central Helmand in the 2011/12 Growing Season—Spring Update,” internal briefing paper for the British Embassy Kabul, June 2012d.

The Consolidation of Production in the South

The first major change in the location of opium poppy occurred in the 2005–2006 growing season. Although the southern provinces have tended to dominate the market over the past two decades, other provinces still accounted for substantial shares of opium poppy cultivation in the 1990s and between 2002 and 2005.¹¹ Prior to 2005–2006, the share of hectares cultivated in the south averaged about 60 percent. A decidedly southward shift in opium poppy cultivation took place in the 2005–2006 season: Cultivation spiked in the south, particularly in Helmand, but fell elsewhere. Shortly thereafter, cultivation in the south grew to record levels, especially in Helmand, but then declined. After 2005–2006, the southern provinces have accounted for, on average, 75 percent of the land in Afghanistan dedicated to cultivating opium poppy. Since 2009, the share of opium poppy cultivation that occurs in other parts of the country has increased somewhat, but these hectares tend to be less productive, on average.

The Shift to the Desert

As Mansfield documented, the 2008–2009 growing season marked the start of a pronounced second shift, which occurred largely but not entirely within Helmand.

Cultivation of opium poppy began to move from the well-irrigated center of the province, the Canal Command Area (CCA) and other fertile production areas—often referred to as the Helmand Food Zone—to former desert areas, commonly referred to as the *dash*.¹² In the 2007–2008 growing season, the vast majority of Helmand’s opium poppy cultivation appears to have taken place within the HFZ—or, more accurately, what would soon come to be known as the HFZ—but by the 2012–2013 growing season two-thirds of Helmand’s poppy

¹¹ Ups and downs within Helmand—and unique to that province—also played a part in the emergence of these patterns. Cultivation in Helmand rebounded in the fall of 2001, as it did elsewhere after the Taliban ban, but then declined in the 2002–2003 growing season and rebounded in the 2003–2004 growing season. Governor of Helmand Sher Muhammad Akhonzade’s CN policies reportedly contributed to the 2002–2003 drop. See Mansfield, Alcis Ltd, and the Organisation for Sustainable Development and Research, 2011, pp. 14–17.

¹² Mansfield and Fishstein, 2013, p. 13.

cultivation took place elsewhere (Table 2.1). Further, as production in the *dasht* has expanded, cultivation of opium poppy has intensified through a tendency to monocrop opium poppy among at least some small landholders and transplanted sharecroppers.¹³

Arguably, the shift to the *dasht* has been most pronounced in Helmand, but it has not been limited to that province. In the past few growing seasons, major expansions in poppy cultivation have been observed in the desert areas spanning the southern part of Nawzad in Helmand province, in Spin Boldak in Kandahar province, and in areas of Zahre and Maiwand north of Highway 1 in Kandahar province, as well as in Gulistan in Farah province.¹⁴ According to Mansfield, Afghan farmers now refer to this contiguous, largely ungoverned territory north of the Boghra canal as “one desert.”¹⁵

Why did production shift from the CCA and other fertile production areas to the *dasht*? Although we provide a comprehensive, detailed analysis of the factors influencing the decision to grow opium poppy and of the effects of various programs on those factors in subsequent chapters, here we consider the evidence on the confluence of specific circumstances that appear to have resulted in the shift, drawn from Mansfield’s fieldwork, our conversations with assistance professionals, and a series of interviews with Afghan project implementers. We frame those circumstances in terms of changes in ground conditions, including the implementation of the HFZ program,¹⁶ that might have served to “pull” opium poppy cultivation to the *dasht* and, at the same time,

¹³ See the discussion later in this chapter under the section “Observations on Decisions to Allocate Land to Various Crops.” Also, see Mansfield, 2013a, pp. 72, 87.

¹⁴ Mansfield and Fishstein, 2013, p. 13; Mansfield, 2014, p. 73.

¹⁵ For this and additional information, see Mansfield and Fishstein, 2013, p. 13.

¹⁶ We evaluate the possible effects of components of the HFZ program, which began in 2008–2009 and came to an end in 2012, on decisions to grow opium poppy in Chapter Five of this report. The executive summary of the UNODC *Afghanistan Opium Survey*, 2013, p. 10, treats the shift as testimony to the validity of the HFZ program, but the program did not occur in isolation.

Table 2.1
Growth of Opium Poppy Cultivation in Former Desert Areas of Southwest Afghanistan

	2007–2008 (hectares)	2008–2009 (hectares)	2009–2010 (hectares)	2010–2011 (hectares)	2011–2012 (hectares)	2012–2013 (hectares)
Net poppy cultivation in Afghanistan	157,252	123,095	122,332	131,065	154,436	209,383
Net poppy cultivation in Helmand	103,590	69,833	65,045	63,307	75,176	100,693
Poppy cultivation outside HFZ	16,036 ^a	n/a	n/a	n/a	50,935	64,449
Poppy cultivation in HFZ	n/a (n/a)	n/a (45,917) ^a	n/a (40,972) ^a	n/a (26,632) ^a	24,241 (32,299) ^a	36,244 (n/a)
Agricultural land north of Boghra canal	11,579 ^b	n/a	26,631 ^c	n/a	34,720 ^a	n/a

SOURCES: UNODC, *Afghanistan Opium Survey*, 2009–2014, unless otherwise noted.

NOTES: For 2002, Mansfield and Fishstein estimated that only 752 hectares of opium poppy were under cultivation on agricultural land north of Boghra canal. See Mansfield and Fishstein, 2013, p. 13.

^a Mansfield and Fishstein, 2013, p. 13.

^b Mansfield, 2011b, p. 22.

^c Mansfield, 2011b, p. 20.

to “push” opium cultivation out of the HFZ—and the CCA, more specifically.¹⁷

Regarding “pull,” the advancement of new technology—i.e., the tube well—stands out most prominently.¹⁸ This technology did not just increase the allure of the desert, but enabled a transformation of the *dasht* from “desert areas” to “former desert areas.”¹⁹

The ability to pump water from deep wells—at an affordable price—was a necessary condition for opium poppy cultivation to migrate to the *dasht*.²⁰ Opium cultivation could only shift after entrepreneurs had imported drilling rigs able to reach the water table in the *dasht* and began to market drilling services to landowners. A lack of irrigation had previously limited opium poppy—or any other—cultivation in the desert areas, but tube wells became economically viable because of cheaper drilling technologies and equipment.²¹ Once the wells were drilled, landowners were able to purchase and operate

¹⁷ Mansfield provides a succinct comparison of these and other ground conditions in the two regions:

The two areas [CCA and *dasht*] present a stark contrast. In one, the population is experiencing both increasing levels of violence and falling levels of income despite the government and its international backers gaining the upper hand militarily. In the other, the insurgency dominates and the population is exposed to lower levels of violence and increasing levels of income. . . . In the area north of the Boghra Canal, the insurgency is seen by the farming population to offer a secure environment in which they can cultivate opium poppy. These are largely atomised [sic] communities that have only settled the area in the last decade, the bulk of them in the last three to four years. Most of their members appear to have sharecropped land in the [CCA], their move north of the Boghra a response to chronic poverty and in some cases the violence associated with the military campaign in central Helmand in 2008 and 2009. Opium production has provided these households with capital to purchase land, install a tube well and bring the desert under cultivation. Over time they have built houses, perhaps expanded their agricultural land, and accumulated assets such as motorbikes or tractors. These communities see the government as a threat to their way of life. (Mansfield, 2011b, p. 36)

¹⁸ Mansfield, 2013a, p. 72.

¹⁹ Discussion with U.S. agronomist working on agricultural assistance programs in southern Afghanistan, Kabul, 2013.

²⁰ Mansfield and Fishstein, 2013, p. 1.

²¹ Mansfield, 2014, pp. 61–62.

pumps to draw the water needed to cultivate opium poppy at a cost that still left room for profit.²²

This state of affairs may not last. At current rates of extraction, the water table could eventually drop as rainfall is insufficient to replenish the water table.²³ Soil quality appears to be deteriorating, primarily because of salts left from the water after irrigation.²⁴ These factors might reduce productivity and limit the ability of farmers to continue growing opium poppy on the same land in the future, but the process could take many years to play out.²⁵ However, even then, farmers might be able to develop new plots of land further out in the desert.

The adoption of this new technology, while “affordable,” was not costless. Irrigation in the *dasht* requires a substantial up-front investment in equipment, i.e., the tube well, and entails substantial recurring costs to operate and maintain that equipment.²⁶ By comparison, irrigation in the CCA involves only the latter, e.g., in the form of a contribution of fees and household labor to canal maintenance. Moreover, opium yields are likely to be lower in the *dasht* because of poorer soil quality, making the application of fertilizer more important.²⁷

At least partially offsetting the additional costs of irrigation and fertilizer was another “pull” factor; that is, the low cost of land. Land prices were initially quite low in the *dasht*, sometimes zero.²⁸ Prices have increased over the past few years; nevertheless, land still appears to be substantially cheaper in the *dasht* than in the CCA.²⁹

²² Mansfield and Fishstein, 2013, p. 15.

²³ Discussions with agricultural scientists in Kabul, fall 2013.

²⁴ Discussion with U.S. agronomist working on agricultural assistance programs in southern Afghanistan, Kabul, 2013.

²⁵ Mansfield, 2014, p. 72, notes, “While the proliferation of tube wells may have caused the falling water table, the wells appear to have been sunk to such a depth that it will be a long time before the area returns to desert, if at all.”

²⁶ Mansfield, 2013a, pp. 84–86.

²⁷ Mansfield, 2013a, p. 84.

²⁸ Mansfield, 2014, p. 50.

²⁹ Mansfield (2014) provides a detailed description of historical developments and current conditions in the *dasht*, including the land acquisition process and recent changes in land prices.

Although affordable water and land were necessary conditions for growing opium poppy in the *dasht*, other “push” factors also appear to have played their part. In particular, after the Afghan government re-established a presence in Helmand in conjunction with the surge in NATO forces, especially U.S. Marines, it embarked on a program to reduce the cultivation of opium poppy in the CCA and surrounding areas: the HFZ program. One component of the program, eradication, which became a more prominent threat in 2008–2009, may have served as an incentive for landowners to put their land into alternative uses³⁰ and move opium cultivation from the food zone to the *dasht*, an area where no eradication has taken place.³¹ Even if landowners can offer bribes to the police or government officials to forestall eradication, the cost of making “tax” payments to the Taliban in the *dasht* appears to be lower than the cost of paying off police in the CCA, to the extent that police demand bribes.³²

At the same time, as Mansfield observes, the decision to put land to alternative uses might have set in motion a process of squeezing out sharecroppers from the agricultural economy of central Helmand, thereby ensuring an abundant supply of low-cost labor for those relocating production to the *dasht* or entering the opium economy *de novo*.³³ That squeezing would have occurred, in large part, because the legal crops that replaced opium poppy in the HFZ did not need as

³⁰ One might also frame the shift in terms of “comparative advantage.” Crops like fruit that are highly perishable or bulky need to be grown close to roads so that they can be easily transported to urban markets and typically require irrigation. On the scarce irrigated land in the CCA close to roads, landowners are likely to have a comparative advantage in growing crops other than opium poppy compared to land in the *dasht*.

³¹ The HFZ program targeted a “specified geographic area that included all of the district of Lashkar Gah, and the most fertile parts of the districts of Nad e Ali, Nawa Barakzai, Garm-sir, and Nahre Seraj. It has now [also] come to include the river-irrigated parts of Musa Qala, Marjeh, Khan Nishin, and Nawzad.” See Mansfield, Alcis Ltd., and the Organisation for Sustainable Development and Research, 2011, p. 16.

³² See the discussion on bribes to law enforcement in Appendix B. David Mansfield, “Briefing Paper 4: ‘Taxation’ in Central Helmand,” internal working paper for the British Embassy Kabul, June 2012c.

³³ Mansfield, 2014, pp. 50–51.

much labor during the growing season and, especially, at harvest.³⁴ Landowners in the HFZ were able to cultivate their own land without need for sharecroppers or hired labor. Thus, in the absence of alternative agricultural employment, sharecroppers followed opium poppy cultivation to the *dasht*.³⁵ And, as harvesting opium is labor-intensive, farmers could not successfully shift venues without the arrival of sharecroppers. Moreover, because there are fewer, if any, non-farm income-earning opportunities in the *dasht*, once sharecroppers moved into the *dasht* they might have found themselves with no other options besides cultivating opium poppy.

In addition to the shift in sharecroppers, some younger men with families have moved to the *dasht* to establish farms that permit them and their households to live independently from the young men's fathers. The *dasht* has provided them with a "new frontier."³⁶

Mansfield argues that an increase in violence associated with the surge might have reinforced the propensity to head to the *dasht*.³⁷ However, we note that cultivation of opium poppy has continued in the *dasht* following the drawdown of International Security Assistance Force (ISAF) forces from Helmand and fluctuations in levels of violence in the province since 2009. This suggests that, if increased violence triggered the shift, other factors have made the shift permanent.

On balance, a combination of policy, programs, and emerging technology appears to have sparked and enabled the shift in opium poppy cultivation from the CCA to the *dasht*. The cultivation of opium poppy might be less remunerative in the *dasht* than in the CCA, but given the obstacles of bans, other policy measures, and land scarcity in the CCA, as well as the willingness of sharecroppers to make the shift to the CCA, it might still represent the best available option for those who have made the transition or are in search of a livelihood. To the extent that circumstances permitted those who had a prior claim to

³⁴ Mansfield and Fishstein, 2013, pp. 10–11.

³⁵ Mansfield and Fishstein, 2013, pp. 10–11.

³⁶ Telephone interview with foreign employee of a non-governmental organization (NGO) that conducted a survey of conditions in the *dasht*.

³⁷ See Mansfield, 2011b, p. 36.

land—or a means to acquire it—to “cash in” on a confluence of needs and wants, it might have been enriching to their households; however, it seems unlikely to have resulted in rapid gains in wealth for those who moved into the areas as sharecroppers, absent an ability to secure land of their own.³⁸

Landholdings, Household Size, and Observed Land Allocations

In this section, we address the interrelated issues of landholdings and tenancy arrangements, household size, and observed land allocation decisions.

Landholdings and Land Tenure Arrangements

Analysis for this section drew on a combination of national survey data and local observations to tease out information on the distribution of landholdings in Afghanistan, the tenancy arrangements under which they are cultivated, and some of the implications for developing mechanisms to influence opium poppy cultivation decisions.

A paper by Hector Maletta (2007) served as our primary source of information for this section. In that paper, Maletta synthesized, presented, and analyzed data from a national survey conducted in the winter of 2003 by the Ministry of Agriculture, with support from the FAO and World Food Programme (hereafter, the “Winter Survey”).³⁹ For our purposes, this survey, albeit not without its critics, appears to be the most appropriate, comprehensive survey of landholdings in

³⁸ See the discussion on returns to sharecropping in Appendix B.

³⁹ The Winter Survey used “a stratified, clustered random sample which covered all the agro-ecological zones and relevant watersheds” (Hector Maletta, “Arable Land Tenure in Afghanistan in the Post-Taliban Era,” *African and Asian Studies*, Vol. 6, 2007, p. 16). For an overview of the survey methodology and findings, see Maletta, 2007, pp. 13–52. For the full report, see Hector Maletta and Raphy Favre, *Agriculture and Food Production in Post-War Afghanistan*, Afghanistan: Ministry of Agriculture and Animal Husbandry, 2003.

Afghanistan in recent years.⁴⁰ The survey interviewed nearly 5,000 farmers in over 500 rural communities.

Malletta's data analysis sheds light on the distribution of landholdings, at least nationally. First, as shown in Table 2.2, it speaks to the inequality of the distribution of landholdings among landholders.⁴¹ In aggregate, nearly three-quarters of Afghanistan's farmers hold less than one-quarter of the country's arable hectares. The breakouts are similar, but not identical for landholdings with irrigation, as might be more typical of the landholdings found in the CCA or *dasht*. In the case of irrigated landholdings, roughly three-quarters of the farmers hold about one-third of the land. Second, the mean arable landholding size was 5.1 hectares for all farms and 2.7 hectares for those with irrigation.⁴² Third, the data work indicates that, at least as recently as 2003, most landowners operated some or all of their own farms and that among those engaging tenants, most were engaging sharecroppers.⁴³

Maletta could be understating the role of "tenancy" because of his treatment of some sharecroppers as non-farmers; nevertheless, other recent studies have also found that leasing and rental arrangements are far less common than sharecropping arrangements.⁴⁴ Although share-

⁴⁰ See later comments on the 2003 and 2005 National Risk and Vulnerability Assessments. Note that Maletta (2007) and, implicitly, the survey have been criticized:

Problematically, the study did not investigate ownership patterns and seems to assume that each farm is discretely owned and farmed, rather than sharecropped or rented. Nor is there any information on those who have no land at all. Still, the survey provides a comprehensive picture as to how farm sizes are distributed and from which farm ownership may to an extent be inferred. (Liz Alden Wily, "Land Rights in Crisis: Restoring Tenure Security in Afghanistan," Afghanistan Research and Evaluation Unit, March 2003, p. 89)

⁴¹ The data in Table 2.2 indicate that almost 30 percent of farms are less than 1 hectare, nearly one-half are less than 2 hectares, and nearly three-quarters are less than 5 hectares; by contrast, less than 3 percent of all arable land is held on farms less than 1 hectare, about 7.5 percent is held on farms less than 2 hectares, and not fully one-quarter is held on farms less than 5 hectares. See Maletta, 2007, pp. 26–30.

⁴² Maletta, 2007, p. 28.

⁴³ Maletta, 2007, pp. 18, 30–39.

⁴⁴ According to a more recent study that covered 214 households in four provinces (Ghazni, Herat, Kunduz, and Nangarhar), leasing and mortgaging arrangements accounted for only

Table 2.2
Distribution of Farms and Arable Land, by Farm Size, 2002–2003

Farm Size	Farms			Arable Land		
	Total	With Irrigated Land	With Rain-Fed Land	Total	Irrigated	Rain-Fed
Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Less than 0.5 hectares	15.8%	16.6%	3.9%	0.9%	1.8%	0.2%
0.50–0.99 hectares	13.4%	14.1%	6.4%	1.8%	3.3%	0.4%
1.00–1.99 hectares	18.6%	19.8%	13.2%	4.8%	8.4%	1.7%
2.00–4.99 hectares	25.2%	25.0%	31.3%	15.2%	20.2%	10.8%
5.00–9.99 hectares	13.4%	12.2%	20.6%	17.7%	17.9%	17.4%
10.0–19.9 hectares	8.3%	7.3%	14.3%	20.6%	17.8%	23.0%
20.0–49.9 hectares	4.4%	4.0%	8.4%	23.9%	15.5%	31.4%
50.0–74.9 hectares	0.6%	0.5%	1.3%	7.1%	4.6%	9.3%
75.0–99.9 hectares	0.2%	0.2%	0.3%	2.7%	2.3%	3.1%
100+ hectares	0.2%	0.2%	0.2%	52.0%	8.2%	2.6%

SOURCE: Maletta, 2007, Table 4, p. 28, presenting data from the Winter Survey, 2002–2003.

cropping arrangements can take many forms, in this report we focus on a particular form of sharecropping arrangement, not uncommon in southern Afghanistan, in which the landowner selects the crop and provides all of the non-labor inputs and room and board; the sharecropper provides all the necessary labor, either from the sharecropper's household or as hired labor (see Appendix B). This type of sharecropping arrangement looks more like a labor arrangement than a tenancy arrangement, in which the tenant controls what is to be planted.

Maletta (2007) references two other national surveys studying landholding sizes and tenure arrangement patterns in Afghanistan: the 2003 and 2005 National Risk and Vulnerability Assessments (NRVAs).⁴⁵ The NRVAs indicate that the distribution of landholdings is clustered more tightly around smaller plots. However, for the purposes of our analysis, we discount the NRVA data for several reasons, largely involving definitions and sampling.⁴⁶

1 percent and 3 percent, respectively, of all land tenure arrangements, but the distinctions can be blurry. Alan Roe, "Applied Thematic Research into Water Management, the Opium Economy and Livestock: Findings from the First Year of Farm and Household Monitoring," Afghanistan Research and Evaluation Unit, April 2009, pp. 10–13. For a detailed discussion of sharecropping, leasing, and mortgaging and how they differ under the Afghan Civil Code, see Alec McEwen and Brendan Whitty, *Water Management, Livestock, and the Opium Economy: Land Tenure*, Afghanistan Research and Evaluation Unit, June 2006, pp. 4–5.

⁴⁵ We have not done an independent assessment of the data in those or subsequent assessments.

⁴⁶ From Maletta, 2007, p. 29:

Both the 2003 and 2005 NRVA show a smaller than average farm size. This is due, on the one hand, to a different (implicit) definition of households: extended families managing a single farm are often considered as a single household in agricultural surveys, while they might be considered as two or more smaller households, possibly nuclear families, in the NRVA, and then they may possibly report a farm size representing only part of the total land they manage together with other members of the extended family. On the other hand, both NRVA surveys were concentrated on vulnerable groups and may have over-sampled small farmers or under-sampled larger farms. An additional problem is that in the NRVA farmers may have reported mainly on the land they actually cultivated, rather than the total land available to them, especially in the case of rain-fed land. The resulting figures show a higher discrepancy with rain-fed land and intermittently irrigated land, i.e. land cropped on a rotational basis depending on rainfall, indicating that in some cases the areas reported in the NRVA are probably those under current cultivation rather than the total land area available to the farm.

In light of regional differences in land distribution patterns in Afghanistan, we are cautious about drawing conclusions from national farm-size estimates, regardless of the source of the data. That said, to the extent that we would expect landholdings in southern Afghanistan to diverge from the national averages reported in the Winter Survey, they could differ by location, with a higher percentage of subordinate tenure arrangements.⁴⁷ Mansfield's earlier fieldwork found larger-than-average landholdings in Helmand and higher proportions of households gaining access to land through tenancy arrangements, albeit with an almost even distribution across sharecroppers and tenants. His later fieldwork suggests approximately average landholdings in the *dasht*, but a much higher proportion of sharecroppers.⁴⁸

To the extent that the distribution of landholdings among households that cultivate opium poppy mirror those of all farmers, the data suggest that households possessing little land are likely to account for

Wily provides a summary of other major landholding surveys in Afghanistan from the 1960s through the Taliban-era. We find the data from the 2003 Winter Survey more credible than these data for the same reasons that Wily does—namely, problems of reliability and comparability. For a thorough review of major land studies from the 1960s to early 2000s, see Wily, 2003, pp. 18, 85–89.

⁴⁷ Wily writes, “Regional differences of land distribution are so strong that national farm size averages are meaningless. For example, while ‘most’ own their land in the mountainous east and northeast, landlords, sharecroppers, and labourers are most common in the southern fertile plains around Kandahar” (Wily, 2003, p. 2).

⁴⁸ See, for example, David Mansfield, “What Is Driving Opium Poppy Cultivation? Decision Making Amongst Opium Poppy Cultivators in Afghanistan in the 2003/4 Growing Season,” paper prepared for the UNODC/ONDCP Second Technical Conference on Drug Control Research, April 2004, p. 5, which reports an average landholding of 18.8 jeribs, or about 3.8 hectares, but indicates that “the section of districts in the more accessible (and secure) canal irrigated areas in the south will have led to larger average landholdings.” He also reports an average cultivated land size in Helmand of 14.2 jeribs or about 2.8 hectares. The average landholding size was considerably smaller in Nangarhar, at only 4.7 jeribs, or just under 1 hectare. In a more recent personal communication (January 21, 2015), Mansfield noted smaller landholdings in the CCA than reported previously. Mansfield (2014, p. 45), working with a sample size of 602 farming households in the *dasht*, reported that 41 percent are farming under sharecropping arrangements and another 7.5 percent are farming with tenants. Mansfield (2014, p. 45) also reported an average farm size of about 2.4 hectares in the *dasht*, which is slightly smaller than but roughly consistent with the earlier national finding for irrigated farms.

the majority of all opium-growing farms, but that a substantial share of opium poppy in Afghanistan might grow on landholdings of at least 2 hectares.

Household Size, Labor Availability, and Food Security

Household size is relevant to opium poppy cultivation for at least two reasons: It bears on the availability of labor and the demand for food (hence food security), both of which, in turn, bear on decisions regarding the allocation of land to opium poppy, wheat, or some other crop. Consistent with other studies, Maletta reported the mean size of rural farm households to be about 11 people.⁴⁹ Much of Mansfield's Helmand-specific fieldwork substantiates this estimate, with some recent exceptions.⁵⁰ The data from the Winter Survey suggest a positive relationship between land size and family size; that is, as farm size increases, so too does household size (Table 2.3).

Taking an average household size of 11 members and noting that the average is about the same—within rounding error—for farms ranging from 1 hectare to 9.9 hectares in the national survey, an average household might be able to contribute about four or five laborers to at least some aspects of on-farm agricultural activities, depending largely on the age and gender composition of the household and social norms.⁵¹ Women face some of the most stringent restrictions on work and mobility in the south, but they might still play a part in on-farm

⁴⁹ Maletta, 2007, p. 31. For a review of previous studies on average sizes of rural households, see Maletta, 2007, pp. 20–21.

⁵⁰ Mansfield's recent survey of 602 households north of the Bogra canal suggests a somewhat smaller household size for households in that area, i.e., about 9.6 people. See Mansfield, 2014, p. 45.

⁵¹ Mansfield's recent fieldwork suggests that households situated north of the Bogra canal, albeit slightly smaller on average, are about equally divided between adults and children. See Mansfield, 2014, p. 45. In a personal communication, Mansfield noted that a household of ten might have three full-time male working members. To that figure we add the combined labor "equivalents" of women, who face substantial limitations in the south, and children to develop this rough estimate of four to five laborers.

Table 2.3
Farm Size and Household Size, 2002–2003

	Total Households	Number of Households, by Household Size							Average Household Size
		2–5	6–7	8–9	10–11	12–14	15–19	20+	
Farms	1,280,230	78,392	190,013	352,317	241,981	191,757	130,116	95,655	10.91
Farm size									
Less than 0.5 hectares	201,677	14,776	36,540	59,598	41,714	33,117	11,588	4,343	9.66
0.50–0.99 hectares	171,003	13,061	26,375	47,455	38,739	25,445	14,471	5,456	9.93
1.00–1.99 hectares	237,862	15,038	37,790	61,861	46,574	40,802	20,903	14,894	10.58
2.00–4.99 hectares	322,989	20,013	50,856	102,491	50,209	42,637	32,934	23,850	10.74
5.00–9.99 hectares	171,104	8,354	22,685	47,029	33,617	24,609	19,449	15,360	11.38
10.0–19.9 hectares	106,290	4,596	9,701	22,549	21,333	16,186	15,073	16,851	12.80
20.0–49.9 hectares	56,282	2,427	5,809	10,311	7,308	7,462	12,369	10,597	14.25
50.0–74.9 hectares	8,110	127	256	902	1,835	679	2,138	2,173	15.84
75.0–99.9 hectares	2,129			120	297	111	944	657	17.92
100+ hectares	2,785				354	710	246	1,475	22.71
Average farm size (hectares)	5.11	3.55	3.55	3.97	4.65	4.95	7.95	11.26	
Hectares per capita	0.47	0.81	0.54	0.47	0.46	0.39	0.49	0.44	
Hectares	6,536,971	278,122	674,988	1,398,608	1,125,444	948,393	1,034,058	1,077,357	
Population	13,972,889	344,249	1,248,735	2,960,631	2,470,716	2,416,894	2,097,919	2,433,744	

SOURCE: Maletta, 2007, Table 5, p. 31, presenting data from the Winter Survey, 2002–2003.

tasks,⁵² particularly in the absence of hired labor; children may also work in the fields, even during harvest periods.⁵³ Households might also be able to stretch their labor, by staggering harvests and sharing labor among neighbors, reciprocally.⁵⁴ Our analysis of labor requirements and household contributions in Appendix B suggests that such a household would be able to cover some of the labor requirement to grow a hectare of opium poppy, but not the entire requirement. Even with the help of neighbors, it would need to bring in workers for the harvest. A household's labor might hold value, measured in terms of

⁵² Women would be confined to the least visible tasks with little-to-no involvement in harvests. According to the World Bank,

The degree to which women and girls are excluded from the higher value-added ends of production chains varies by region. Not surprisingly, exclusion is positively correlated with restrictions on female mobility. In most parts of the country, women participate in the early stages of horticultural production: planting, weeding, and watering. As horticultural products move down the value chain and closer to sale at market—through harvesting, food processing, packing, and finally marketing—women's involvement tends to diminish, particularly in the South, Southeast and some provinces in the West (given variation within provinces). (Jennifer Solotaroff, Nadia Hashimi, and Asta Olesen, "Gender in Developing the Agriculture and Livestock Sectors," The World Bank in South Asia, Afghanistan Gender Mainstreaming Implementation Note Series, No. 2, undated, p. 4)

⁵³ Mansfield reported the more-stringent restrictions placed on females in the south and their much-limited role, but also noted the participation of boys, who might leave school for the harvest, and more rarely, girls: "Indeed it is not uncommon to see boys as young as ten working in the opium poppy fields from February to May. Girls are also drafted into working in the fields at an early age. There are even cases of girls harvesting opium poppy in the southern regions where female mobility is more restricted" (David Mansfield, "The Economic Superiority of Illicit Drug Production: Myth and Reality," August 2001, pp. 10–11, 14–15). Other sources also speak to the participation and limitations placed on women (see Solotaroff, Hashimi, and Olesen, undated) and confirm the participation of child labor in general and of school age children in Helmand, specifically. See Bureau of International Labor Affairs, "Afghanistan," in U.S. Department of Labor, *2012 Findings on the Worst Forms of Child Labor*, 2012; and "Afghanistan: Students Play Truant to Work in Helmand's Poppy Fields," *IRIN*, March 18, 2008.

⁵⁴ Mansfield (2001, p. 9) reported, "To minimise the cost of labour households have adopted a myriad of strategies, including staggered planting, the cultivation of a combination of both short and long maturing varieties of opium poppy, and maximising the use of family and reciprocal labour."

the opportunity cost of off-farm employment, if safely available and permissible,⁵⁵ but it does not require cash payment.

Assuming an average household size of about 11 members, we can also draw some inferences about the amount of food and, by extension, hectares necessary for subsistence. According to Mansfield, a typical individual requires about 35 man (a unit of measure) to 45 man of wheat annually, amounting to about 158 kilograms to 203 kilograms of wheat annually (2011b, pp. 25–26). Taking the mid-point of approximately 180 kilograms of wheat per person per year implies a household requirement of almost 2,000 kilograms of wheat for a year.⁵⁶ Given differences in wheat yields across locations and years (see Appendix B), this implies a minimum requirement of about 1 hectare of land per household for self-sufficiency in cereal.⁵⁷

Observations on Decisions to Allocate Land to Various Crops

In the next chapter, we explore a fuller range of the socio-economic and other factors that contribute to decisions concerning the allocation of land to various crops. Here, recognizing that observations on allocations in any given growing season constitute a snapshot reflecting socio-economic and other environmental conditions at the time of planting decisions, we provide two such snapshots for the 2012–2013 growing season, one depicting land allocation decisions in the CCA and the other depicting those decisions in the *dasht*. In each case, food security figured prominently in decisions concerning what to grow.

Mansfield and Fishstein (2013) described land allocation decisions in the CCA:

⁵⁵ If some household labor can only be employed *in situ*, it is immobile and might lack recognized value.

⁵⁶ This would equal approximately 0.5 kilogram of wheat per person per day.

⁵⁷ In our crop budget, described in detail in Appendix B, which considers wheat production in the CCA, we adopt an average yield of about 3,600 kilograms per hectare for our benchmark, but consider a low of 2,770 and a high of 4,550 kilograms per hectare. To allow for some shrinkage and set-asides, we take the low end in our self-sufficiency estimate and adjust it downward. Maletta (2007, p. 30) suggested a need for more than 1.59 hectares per household for cereal self-sufficiency, based on national averages, but he might have assumed lower yields per hectare. For more information about wheat yields, see Appendix B.

When planning what crops to plant, the priority for many households in the canal command area would be to allocate enough land to wheat to ensure their own food security. Those with livestock would then allocate a small amount of land (no more than one jerib, or one-fifth of a ha [hectare]) to alfalfa, which would provide feed when combined with wheat straw. Livestock could not only be sold, but would also provide both meat (particularly *landi*)⁵⁸ and dairy products for household consumption. The rest of the land might then be cultivated with opium poppy, which could ultimately account for between 40 and 60 percent of total household agricultural land during the winter season. In summer, households would then switch to cultivating a combination of maize, mung bean, cotton, melon and watermelon. (pp. 10–12)

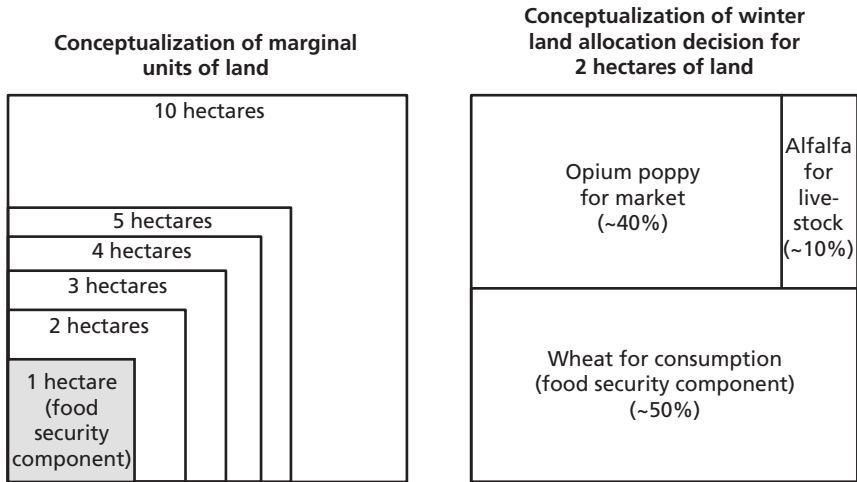
Mansfield (2013b) described land allocation decisions in the *dash*:

Over the last few years it is clear that cultivation has intensified with a growing incidence of monocropping. . . . Despite the overall trend of intensification of opium production in the desert north of the Nahre Boghra, there are also some signs that there is a lower incidence of farmers monocropping opium poppy than in the 2011/2012 growing season, particularly amongst those farmers cultivating plots of more than 10 jeribs [2 hectares]. Amongst farmers with larger landholdings, the low yields experienced in 2012, and concerns that their opium crop may be damaged once again by what is increasingly referred to as ‘spray,’ and lower farm-gate prices, has led some of them to return to a farming system that includes a level of wheat that is commensurate with household food requirements. However, amongst those with smaller landholdings, the monocropping of opium poppy persists. (p. 11)

On the basis of Mansfield and Fishstein’s (2013) description of land allocation decisions in the CCA, we drew the schematic in Figure 2.4, which conceptualizes food security requirements in relation to decisions on allocating land to crops. The left-hand graph shows six different size farms ranging from one to ten hectares. The graph shows

⁵⁸ *Landi* is a type of dried lamb meat, consumed largely during winter months.

Figure 2.4
Food Security Requirements in Relation to Land Allocation Decisions



SOURCE: RAND analysis, based on Mansfield and Fishstein, 2013.

RAND RR1075-2.4

that farmers need to set aside a minimum of 1 hectare for wheat if they wish to assure food security, but as farms get larger, they have freedom to allocate the additional land to other crops, including opium poppy.

If we assume that a household of 11 people would need to plant about 1 hectare of wheat to achieve cereal self-sufficiency, it would likely need at least 2 hectares of land, in total, to achieve the mix that Mansfield and Fishstein describe for the CCA and to allow some flexibility in the farmer's decision on how to plant his land. Below this threshold, particularly at about the 1 hectare mark, we might expect to observe—and do observe—divergent household cropping strategies. For example, in the *dasht*, farmers with less than 1 hectare of land might monocrop opium, a practice that does not usually occur on larger landholdings.⁵⁹ However, the extent to which this observed

⁵⁹ Regarding the cropping decisions of the land-poor in the *dasht* in the 2010–2011 growing season, Mansfield wrote,

Crop diversity was even more limited for the minority of farmers with five jeribs [1 hectare] of agricultural land or less. This group cultivated no wheat, and devoted their entire

monocropping reflects the household's own constrained decisionmaking or, if sharecropping, a decision made by the landowner, merits consideration. If the latter, then monocropping might be regarded as a manifestation of the flexibility granted to a landowner with a second or third hectare of land, rather than the meager options open to a land-poor household farming its first and only hectare of land.

As noted above, a substantial share of all farms with irrigated land (about one-half) and an even larger share of arable, irrigated land (over 85 percent) is held in farms of 2 hectares or more. By implication, a substantial share of the landholding population might have at least some latitude in deciding how to allocate its land to crops and an even larger share of the arable, irrigated land is under the control of those who have such latitude.

Concluding Remarks

In this chapter, we presented contextual information on the ground conditions and dynamics that are believed to affect decisions to grow opium poppy in southern Afghanistan, with a focus on Helmand province, the province that currently grows the most opium poppy in Afghanistan. When region-specific data were unavailable, we drew inferences from national or other data with the help of limited observations on regional conditions. The purpose was to delve into a subset of issues, namely, risk and uncertainty, shifting cultivation patterns, and landholdings, household size, and observed land allocations.

land to opium poppy. With such small landholdings, these households could not achieve self-sufficiency in food and had to rely on the sale of their opium crop to buy wheat from the bazaar along with other goods and services. (Mansfield, 2011b, pp. 25–26)

In summary, we note the following:

- Whereas all farming households operate under conditions of substantial risk and uncertainty, those engaging in opium poppy cultivation face some unique hazards, such as those stemming from opium-poppy-specific diseases and policies.
- The shift in cultivation to the *dasht* unfolded over a very few years and appears to have been prompted by a set of “push” and “pull” events, but could not have been possible absent a major technological breakthrough—specifically, the introduction of an affordable tube well with which to bring water to the surface. Whether cultivation continues in the *dasht* in coming years—or shifts further out into the desert—might depend, in part, on the sustainability of that technology and its implications for soil quality.
- It is likely that the average rural household can, by itself, satisfy most or all of its routine on-farm labor requirements for growing opium poppy on 1 hectare of land without seeking additional workers, but will need to enter the labor market during peak harvest periods, or, if farming larger-than-average plots, throughout the growing season. The household can choose to employ wage labor or sharecroppers, depending on the amount of land in question, the duration of the requirement, differences in costs, etc. We explore these issues in greater detail in Chapter Three and Appendixes B and C, but note here that the supply of sharecroppers seeking income, food, and shelter for themselves and their families is ample.
- Taking into account the distribution of farms and arable land by farm size, the size of the average rural household, and the daily food requirements for a typical individual, an already substantial share of the landholding population has a certain amount of latitude in deciding how to allocate its land and an even larger share of arable land could be under the control of those who have such latitude.

Effects of Socio-Economic and Other Environmental Conditions on Opium Poppy Production

In this chapter, we consider the direct and indirect influences of important socio-economic, cultural, and other factors on decisions by different types of landholding households in southern Afghanistan concerning what to plant. We do so by presenting a visual representation, or “map,” of the relationships between each factor and a household’s planting decision. Relevant factors include, for example, security, eradication, and environmental risks; governance and religiosity; landholding remoteness, arrangements, and size; household size, accumulated debt, and outside income; agricultural input costs and technology; and opium, wheat, and other commodity prices. The factor map is itself an analytical tool and provides the foundation for our programmatic assessments in the chapter that follows. In particular, after deconstructing the components of a program in terms of the factors that it is intended to affect or does affect, we use the factor map to trace the potential or likely consequences of a program on the decision to cultivate opium poppy.

In our framework, a given farmer would make a decision to allocate a certain amount of his land to opium poppy cultivation each year, at the start of the growing season, and would face the same decision each year.¹ The farmer makes the decision given whatever information about each of the factors he has at his disposal at that time.²

¹ For purposes of simplicity, we describe the land allocation decision in terms of one growing season per year, but could re-specify the framework to accommodate multiple growing seasons per year.

² In the framework, the allocation decision is the dependent variable and the factors are independent variables.

We deemed a factor “important”—i.e., meriting inclusion in the map—if our initial scan of the literature and subsequent validation exercises indicated that it is a primary driver of household-level decisionmaking and hence a potential channel or “mechanism” for creating incentives to reduce opium poppy production.

We developed the map in three partially overlapping and sometimes iterative phases:

- We identified and characterized a list of candidate factors from the literature on farmers’ decisionmaking criteria and motives, including longitudinal studies, household surveys, governmental and non-governmental reports, and academic publications, and from discussions with program implementers and other subject-matter experts in a series of meetings held in Afghanistan, Europe, and the United States.
- We undertook a validation process, during which we sought to cross-check the importance and direction of influence—or “signage”—of each factor against economic theory and empirical evidence, some acquired and considered in the first phase, and through a closer look at expert analysis and opinion.³
- We charted the relationships between the factors and the cultivation decision to produce the factor map and resulting analytical framework.

Our theoretical lens consists of conventional economic reasoning and a formal household model that we developed specifically for this purpose, described in Appendix C. The household model builds on a time-tested approach in agricultural economics that allows for a connection between a household’s decisions on production and consumption.⁴ The model lets farmers choose the allocation of their land to opium poppy or a food crop, namely wheat, subject to concerns

³ We shared the preliminary list with INL and USAID to obtain feedback.

⁴ M. Fafchamps, “Cash Crop Production, Food Price Volatility, and Rural Market Integration in the Third World,” *American Journal of Agricultural Economics*, Vol. 74, No. 1, 1992, pp. 90–99.

about feeding their families, earning cash income, risks of violence and eradication, and other factors, as noted above. In that way, the model focuses on farmers with decisionmaking authority, who we refer to as *landholders*, and it enables us to consider issues of income and food security and potential trade-offs among them on equal footing.⁵

In linking the production and consumption decisions, we recognize the potential for interplay among incentives that might lead to decisions on allocating land to crops that go in different, competing directions. For example, a higher price of wheat might push a household, acting as a producer, to grow more wheat, but it might push the same household, acting as a consumer, to grow more opium poppy to obtain additional income with which to buy wheat for consumption.

As landholders become wealthier, we might expect them to be driven more by concerns about earnings (production) and less by concerns about sustenance (consumption). Although no single model can capture all the dimensions of the decisionmaking process, we have attempted to capture as many important factors as possible.

To draw out expert analysis and opinion, we turned to INL and USAID staff, U.S. and foreign government officials, and representatives of NGOs who have implemented agricultural assistance and non-agricultural alternative livelihood programs in Afghanistan. We also commissioned a set of more formal interviews with Afghans who have implemented agricultural assistance and non-agricultural alternative livelihood programs in southern Afghanistan. The Afghans were either currently working for or had worked for implementing organizations. The interviews took place between February and May of 2014.⁶ We also reviewed the scientific and grey literature, focusing on the writings and perspectives of those who have been active in this area as either analysts or practitioners. Among the latter, we included members of the development and agronomic communities. For example, we looked at

⁵ In taking a broad, multi-factor approach to decisionmaking that elevates concerns about food security to the level of those about earnings and income, we are responsive to at least some of the concerns raised by Byrd and Mansfield (2014) about prior economically based efforts.

⁶ A description of the interviews can be found in Appendix E.

reports and evaluations of agricultural assistance and non-agricultural alternative livelihood programs in Afghanistan. These program reports often contain examples of decisions by Afghan farming households germane to validating the model.

As for empirical evidence, we relied most heavily on four sources of primary data, namely the UNODC; the Afghan Ministry of Counter Narcotics (MCN); the Afghan Ministry of Agriculture, Irrigation, and Livestock (MAIL); and Mansfield's reports from his extensive fieldwork.

- From UNODC and the MCN, we gathered data on the number of hectares cultivated in opium poppy and eradicated,⁷ opium yields, prices, wages, and environmental and security conditions, as well as households' motives and annual income and debt levels. The data on households' motives derive from a series of annual surveys of farmers, by village.⁸ The surveys have been criticized⁹ for requiring that respondents select their "main" reason for growing, ceasing to grow, or never growing opium poppy in most seasons.¹⁰ On the one hand, taking a singular approach could limit the range of issues cited in each survey and could be misinter-

⁷ As noted previously, the eradication data have not been verified uniformly over the years. Based on UNODC reporting (*Afghanistan Opium Survey*, various years), we assume little or no verification through 2003–2004 and partial to complete verification for subsequent years. For 2002–2003, UNODC reported that the eradication data were not verified. UNODC did not present an eradication estimate for 2003–2004. For 2004–2005 through 2006–2007, UNODC reported verification of most of each of the estimates that it presented in the annual surveys. From 2007–2008 onward, UNODC reported full verification of the eradication data.

⁸ See the methodology section in each annual report for a discussion of the sampling method, surveyor training, and data collection, including challenges and changes, by year. For example, see "Village Survey Methodology" in UNODC, *Afghanistan Opium Survey*, December 2013, pp. 93–95.

⁹ See Byrd and Mansfield, 2014, pp. 114–116.

¹⁰ Two seasons, 2006–2007 and 2007–2008, stand out as exceptions. However, although UNODC allowed for multiple responses in 2006–2007, it reported singular responses in the annual survey. Thus, we included the data for that growing season in later figures, as comparable to the data for most other years.

puted as implying that something is of little consequence because it is not the most important factor, even if relevant. On the other hand, it requires prioritization among respondents. Thus, it can enable policy analysts to focus on and track changes in primary concerns. For example, in the 2012–2013 survey, concerns about plant disease emerged as the third-ranking factor.¹¹

- From MAIL, we obtained statistics on agricultural input prices and growing conditions.
- From Mansfield, we used evidence on socio-economic and environmental conditions at the village level in growing regions and on the process by which farmers make decisions about whether to grow opium poppy or other crops. Independent of the UNODC, Mansfield is the only researcher who has been consistently conducting opium poppy fieldwork in Afghanistan for a period spanning two decades. As such, his data arguably constitute a rich available source for policy analysis. However, the data are not without limitations, largely imposed by security considerations. Although intended as a consistent longitudinal data set, security conditions have intervened and data collection has been impossible in some locations in some years. Moreover, the survey results have not yet been published as a standardized, collated body of work, making it challenging for academic researchers and policy-makers to compare findings over time.

We also incorporated primary and secondary data from FAO, the International Center for Agricultural Research in the Dry Areas (ICARDA), the University of California at Davis, the World Food Programme (WFP), the Afghanistan Research and Evaluation Unit (AREU), the Afghan Central Statistics Office, and the World Bank. Some of these data concerned plant yields, nutrient requirements, best practices in soil management and land use, land distribution and

¹¹ “A major change in 2013 was ceasing opium cultivation because of the fear of plant diseases, with only 1% of farmers mentioning that they ceased opium cultivation for that reason in 2012, whereas 12% cited it in 2013.” See UNODC, *Afghanistan Opium Survey*, December 2013, p. 52.

tenure patterns, water management practices, agricultural prices, and regional demographics.

It was our intent to triangulate across independent sources, but note that the community of experts is small and that, unavoidably, self-referencing and circular-referencing are not uncommon. In some instances, evidence might appear to be independent, but draw ultimately from the same, underlying source—oftentimes Mansfield’s fieldwork.

Constituting an additional form of empirical validation, we conducted a detailed analysis of the net returns to opium poppy production and, for comparative purposes, wheat, drawing on data from the sources mentioned above. Appendix B describes the resulting “crop budgets” for each commodity, consisting of the revenues, costs, and net returns associated with the production of opium poppy and wheat. Appendix B also includes a discussion of the parameter estimates that support each element of the budget. In the case of opium poppy, we examined revenues, costs, and returns for land-owning households that either act as owner-operators or “let” land to sharecroppers. We repeated this analysis for sharecroppers, from the perspective of their revenues, costs, and returns. In the case of wheat, we considered only the owner-operator. Given the available data, we were able to produce nearly comprehensive crop budgets for opium poppy and wheat production in the CCA, but not elsewhere.¹² Although we were not able to create separate budgets for the *dasht*,¹³ we were able to collect enough information on desert-specific agricultural practices to highlight some important differences between cultivation decisions in the two areas.

The decisionmaking processes and conditions under which households make those decisions are complex. One of our most important findings is that few factors tilt in only one direction for all households, and many have indeterminate effects. Depending largely on the amount of land under a household’s disposition and, relatedly, its tolerance for risk, the same factor could either encourage or discourage

¹² We discuss some important exceptions in Appendix B.

¹³ Mansfield provides a table of net returns of opium poppy cultivation on one jerib (one-fifth of 1 hectare) of land in that area. See Mansfield, 2014, p. 67.

opium poppy cultivation. Moreover, that so many of the factors have indeterminate effects speaks to the challenges of designing successful CN programs, as we discuss in the chapters that follow.

Our framework also serves to highlight the role of “input intensity” in cultivation decisions; for example, because opium poppy requires substantially more labor than most alternatives, including wheat, decisionmaking can depend crucially on the availability of household, community, and low-cost labor.

In the sections that follow, we describe the factor map (Figure 3.1), provide a glossary of terms (Table 3.1), summarize the evidence for each factor, and draw some conclusions concerning factors’ effects on decisions to grow opium poppy.

We provide further documentation of our background analysis, crop budgets, details of the household model, an annotated list of programs, and other countries’ experiences with counternarcotics and related programs in an online appendix.

The Factor Map and Glossary

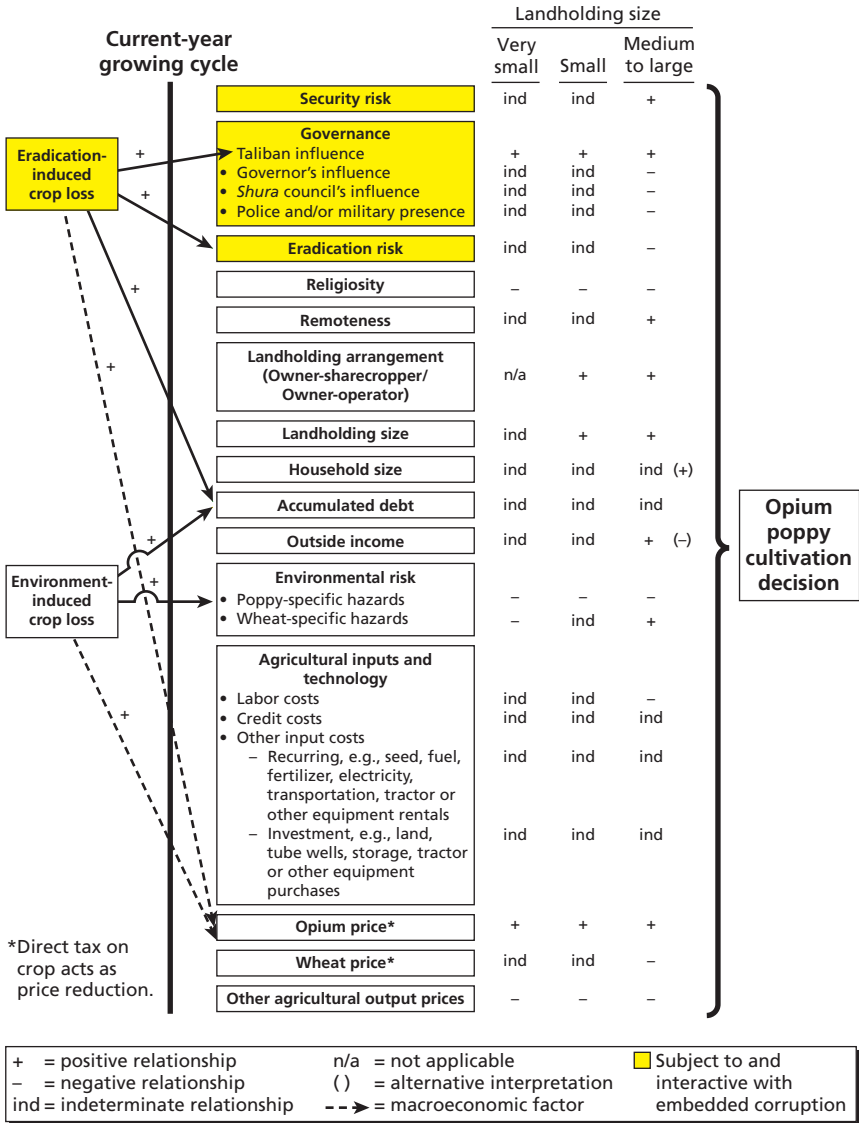
We developed the factor map to trace the direct and indirect influences of important socio-economic and cultural factors on the cultivation decisions of three different types of landholding households.¹⁴ These types are (1) households living at subsistence levels or with very small landholdings (less than one-half to 1 hectare in size), (2) households with small landholdings (1 to 2 hectares), and (3) households with medium to large landholdings (2 or more hectares).¹⁵

We use the terms “subsistence” and “very small” interchangeably in the text to characterize *land-poor* households. These households are highly risk averse, they allocate a large share of income to food con-

¹⁴ We remind the reader that we use *landholding* to connote control over land use decisions, as might be associated most typically with land ownership.

¹⁵ These categories are roughly consistent with those found in Christopher Ward, David Mansfield, Peter Oldham, and William Byrd, *Afghanistan: Economic Incentives and Development Initiatives to Reduce Opium Production*, Department for International Development and World Bank, London and Washington, February 2008 pp. 5–6.

Figure 3.1
Opium Poppy Cultivation Factor Map



NOTE: See Table 3.1 for a glossary of the terms used in this figure.

Table 3.1
Factor Map Glossary

Terms	Definition
General	
Very small landholding	Household possesses insufficient land for a given number of household members to meet the household's minimum dietary needs through agricultural production alone. For an average household with approximately 11 members, each consuming about 180 kilograms of wheat per year and obtaining middling wheat yields, this would imply a landholding size of less than half to 1 hectare.
Small landholding	Household possesses just sufficient land for a given number of household members to meet the household's minimum dietary needs through agricultural production alone. For an average household, as above, this would imply a landholding size of about 1 to 2 hectares.
Medium to large landholding	Household possesses more than sufficient land for a given number of household members to meet the household's minimum dietary needs through agricultural production alone. For an average household, as above, this would imply a landholding size of 2 or more hectares.
Current-year growing season	Season starts with the decision to cultivate opium poppy and the factors affecting that decision (e.g., fall 2013 cultivation for spring 2014 harvest).
Positive/negative relationship	Factor has a positive/negative impact on another factor or on poppy cultivation; that is, it encourages/discourages cultivation.
Indeterminate relationship	Factor could impact poppy cultivation positively or negatively, depending on various conditions, such as extent of risk aversion.
Current-Year Growing Season	
Poppy cultivation decision	Decision to allocate land to poppy cultivation, especially whether to cultivate and how much.
Security risk	Household's perception of the threat of violence, likely to depend on prevailing violence levels and believed to affect the household's ability to bring agricultural goods to market and to otherwise conduct business activities. An improvement in the security environment would imply a "decrease" in this factor.
Governance	The World Bank defines governance broadly as "the traditions and institutions by which authority in a country is exercised. This includes (1) the process by which governments are selected, monitored and replaced, (2) the capacity of the government to effectively formulate and implement sound policies, and (3) the respect of citizens and the state for the institutions that govern economic and social interactions among them." ^a

Table 3.1—Continued

Terms	Definition
Taliban influence	Degree of local Taliban control over the traditions and institutions by which authority is exercised, particularly in relation to the Taliban's willingness and ability to implement policies that may affect a household's decision to grow opium poppy (e.g., collection of taxes/bribes, provision of security guarantees, issuing of coercive "night letters" ^b).
Governor's influence	Degree of provincial governor's control over the traditions and institutions by which authority is exercised, particularly in relation to the governor's willingness and ability to implement policies that may affect a household's decision to grow opium poppy (e.g., commitment to enacting eradication; building public support for sustainable CN goals through persuasive policies, public messaging, and delivery of public goods and services).
<i>Shura</i> council's influence	Degree of local <i>shura</i> council's control over the traditions and institutions by which authority is exercised, particularly in relation to the council's willingness and ability to implement policies that may affect a household's decision to grow opium poppy (e.g., supporting prohibitions on local cultivation, distribution of government-subsidized seed and fertilizer, collection of taxes, provision of loans).
Police and military presence	Distribution of national and local police forces and of international and national military forces, particularly in relation to their willingness and ability to enforce CN laws and policies at the local and regional level (e.g., enforcing eradication, intelligence collection, policing work).
Eradication risk	Household's perception of the risk of experiencing eradication in the current growing season, in relation to the current cultivation decision. This assessment might be based on a combination of past-year eradication and current-year policy, including the implementation of bans.
Religiosity	Adherence to religious beliefs or practices that would preclude or otherwise limit involvement in opium poppy cultivation.
Remoteness	Household's distance from and access to markets.
Landholding arrangement	Household's disposition of landholdings, framed as the ratio of land that it "lets" to sharecroppers to the land that it owns and operates itself.
Landholding size	Number of hectares owned and operated or owned and sharecropped.
Household size	Number of members of household, including head of household and dependents.
Accumulated debt	Household's total debt as carried over from previous growing season(s).

Table 3.1—Continued

Terms	Definition
Outside income	Availability of income from remittances, other off-farm or non-farm work (local or migratory), cash-for-work programs, etc., which might, in turn, be affected by availability of training or other educational opportunities.
Environmental risk	Household's perception of the risk of experiencing crop losses from drought, disease, pests, or other environmental forces in the current growing season, in relation to the current cultivation decision. Some such hazards might be specific to opium poppy; others, to wheat or other important crops.
Agricultural inputs and technology	Factors pertaining to agricultural input costs, including input prices (e.g., agricultural wages, credit rates, fertilizer prices, and fuel prices), access, and efficacy (e.g., effect of input on yield), assessed on the basis of information that is available at the time of planting.
Opium/wheat prices	Household's price expectation at time of planting, based, inter alia, on assessment of opium/wheat prices at planting time, known seasonal pricing patterns, policy conditions, and other environmental factors.
Other agricultural output prices	Price expectation, e.g., based on prevailing prices and known seasonal pricing patterns of other relevant crops and livestock at planting time.
Past-Year Growing Season	
Eradication-induced crop loss	Actual household or local experience of reduced yield in prior growing season from opium poppy crop eradication.
Environment-induced crop loss	Actual household or local experience of reduced yield in prior growing season from environmental forces, such as drought, disease, or pestilence.

SOURCE: RAND staff analysis.

^a Daniel Kaufmann, Aart Kraay, and Pablo Zoido-Lobaton, "Governance Matters," Washington, D.C., World Bank Policy Research Working Paper No. 2196, 1999.

^b Night letters, or *shabnameh*, are a tool that the Taliban has used in the past, although not recently, to coerce poppy cultivation. In November 2005, the Taliban widely circulated leaflets under the cover of night in rural areas of Helmand and Kandahar threatening death to households that did not cultivate opium and promising protection from government eradication. See David Mansfield, *Exploring the Shades of Grey: An Assessment of the Factors Influencing Decisions to Cultivate Opium Poppy in 2005/06*, Report for the Afghan Drugs Inter Departmental Unit of the UK Government, February 2006, p. 13; and Thomas H. Johnson, "The Taliban Insurgency and an Analysis of *Shabnamah* (Night Letters)," *Small Wars and Insurgencies*, Vol. 18, No. 3, September 2007, pp. 317–344.

sumption, their spending habits are highly responsive to changes in income, and they are likely to have insufficient landholdings to meet their household's minimum dietary needs through their own agricultural production. Households with small landholdings are *land sufficient*, having enough land to meet their minimum dietary needs through their own agricultural production. Households with medium to large land holdings are characterized as *land-abundant* households. Households with small landholdings and households with medium to large landholdings have progressively lower degrees of risk aversion, have progressively lower consumption shares in food, make progressively fewer adjustments in spending in response to changes in income, and are likely to be either just able or more-than-able to meet the minimum dietary needs of their households through agricultural production alone.

For each of the three categories of landholders, the factor map indicates whether a relationship between the factor and the opium poppy cultivation decision is positive, negative, or indeterminate, based largely on the results of the household model and with reference to expert analysis and opinion and empirical evidence, as available. For example, an increase in religiosity (as defined in Table 3.1) would point to less poppy cultivation and an increase in the price of opium would point to an increase in poppy cultivation; hence, the assignment of negative and positive signs for each factor, respectively. We explore the basis for each sign or indeterminacy in the discussion that follows. In two instances involving households with larger landholdings, we note alternative interpretations parenthetically. In those cases, the theoretical model indicated indeterminacy as a general result but the data suggested the potential for a positive or negative sign with sufficient clarity to warrant the notation.

The factor map mostly addresses phenomena within a single growing season, but it also considers the effects of eradication- and environment-induced crop losses in the prior growing season. Moreover, it distinguishes between "eradication-induced crop loss" in the prior period and "eradication risk" in the current period. The latter concerns the household's perception of the likelihood of eradication at the start of the growing season, which is the time at which it must

make its land allocation decision, and might be influenced by the former. At least implicitly, the factor map includes borrowing in prior periods inasmuch as it includes “accumulated debt.”

Table 3.1 provides definitions for each term in the factor map, broken out into “general,” “current-year growing season,” and “past-year growing season” terms.

As is apparent from Figure 3.1, many factors influence opium poppy cultivation, but few influence it in either a strictly positive or negative direction. Indeed, for all but the land-abundant households represented in the third column, most of the effects are indeterminate. However, the available evidence on the size and distribution of landholdings in Afghanistan (shown in Tables 2.2 and 2.3) suggests that land-abundant households account for a large majority of the opium poppy hectares in the south. Thus, the relatively clear-cut findings for those households merit special consideration.

Factor-by-Factor Evidence

In this section, we summarize the evidence for the effects of each factor, considering, in combination, the insights of economic theory, expert analysis and opinion, and data. We take the results of our household model as our starting point and then address consistencies and inconsistencies as they emerge from other sources. In the factor map, we report the findings of the household model in each column and then consider alternative interpretations parenthetically, if substantial differences emerge from either expert analysis and opinion or the data.

Security Risk

We find that the effects of security risk are indeterminate for very small and small landholders, but likely positive for medium to large landholders.

Both conventional economic thinking and the household model suggest that an increase in the perceived threat of violence could have an indeterminate effect on decisions by very small and small landholders to grow opium poppy, via a complex set of directionally conflicting

channels. For example, in the household model, increased security risk could increase the appeal of opium poppy as a cash crop, encouraging the cultivation of more opium poppy. In particular, an increased security risk might make opium poppy look more appealing in the production mix because opium is relatively compact and sufficiently profitable for traders to pick up the crop at the farm gate. On the other hand, an increased security risk could discourage the cultivation of opium, as farmers plant more wheat to ensure the household food supply when they find it riskier to engage with public markets to purchase food.

For larger landholders, who are sufficiently risk tolerant, it seems plausible that the increased relative appeal of opium poppy would dominate. These landholders are likely to find opium poppy becoming more attractive compared to other crops, because they are more highly focused on production and returns than on consumption.

Evidence concerning the role that insecurity plays in cultivation decisions confirms some of the ambiguities highlighted above. Mansfield, other experts, and policymakers suggest, either explicitly or by implication, a largely positive relationship between security risk and opium poppy cultivation.¹⁶ Mansfield in particular notes the effects of heightened insecurity and implied immobility on transportation, marketing, and other transactions costs, which could make cultivating opium poppy more attractive.¹⁷ However, it is our assessment, based

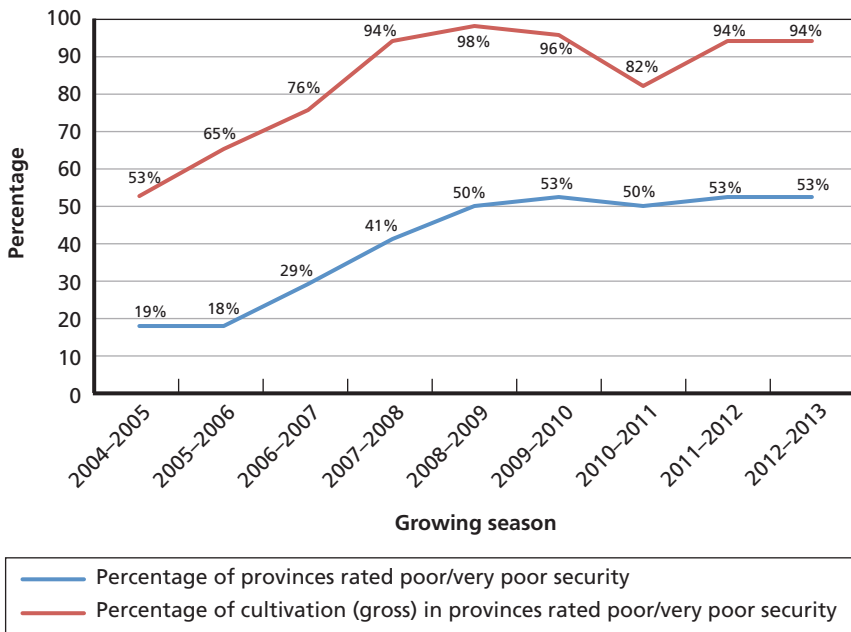
¹⁶ See, for example, David Mansfield, "The 2010/11 Opium Poppy Growing Season: An Initial Brief," internal working paper for the British Embassy Kabul, January 2011a, pp. 1–3; Vanda Felbab-Brown, *U.S. Counternarcotics Strategy in Afghanistan*, *Hearing Before the U.S. Senate Caucus on International Narcotics Control*, October 21, 2009; Vanda Felbab-Brown, "Counterinsurgency, Counternarcotics, and Illicit Economies in Afghanistan: Lessons for State Building," in Michael Miklaucik and Jacqueline Brewer, eds., *Convergence: Illicit Networks and National Security in the Age of Globalization*, Washington, D.C.: National Defense University Press, April 2013, pp. 191–192; U.S. Senate Caucus on International Narcotics Control, *Future of U.S. Counternarcotics Efforts in Afghanistan*, Washington, D.C., December 2014, p. 27; Erin Logan, Principal Director for Counternarcotics and Global Threats, Office of the Secretary of Defense, *U.S. Counternarcotics Efforts in Afghanistan*, *Hearing Before the U.S. Senate Caucus on International Narcotics Control*, January 15, 2014, p. 6.

¹⁷ David Mansfield, "Where Have All the Flowers Gone? Assessing the Sustainability of Current Reductions in Opium Poppy Cultivation," Afghanistan Research and Evaluation Unit, Briefing Paper Series, May 2010, pp. 16–17.

on available evidence, that an increase in the presence of Afghan and international forces in Helmand and the CCA in 2009, coupled with an attendant increase in violence—especially in the capture of the opium trading center of Marjah—might have discouraged cultivation in the immediate vicinity of the violence and, thus, contributed to the shift to the *dasht*.

UNODC data show that opium poppy cultivation in Afghanistan has become increasingly concentrated in provinces with “poor” or “very poor” security environments (Figure 3.2).

Figure 3.2
Percentage of Hectares of Opium Poppy Grown in Insecure Provinces and Percentage of Provinces Considered Insecure



SOURCE: RAND staff calculations and analysis, using data from UNODC, *Afghanistan Opium Survey: Winter Rapid Assessment, 2005–2013*; UNODC, *Afghanistan Opium Survey, 2005–2013*.

NOTES: The annual *Afghanistan Winter Rapid Assessment* reports do not define the criteria used to assess provincial security situation typologies (i.e., “very good,” “good,” “poor,” or “very poor”).

Notably, however, in the time since UNODC began publishing its annual socio-economic motives polling (hereafter referred to as the “motives survey”) in the 2004–2005 edition of the *Afghanistan Opium Survey*, security-related concerns have never registered as a polling response either for growing or for ceasing to grow opium poppy. In this regard, “security risk” is unique among the factors listed in the factor map. All the other factors we assess have registered, at least once, in the survey as a reason to cultivate or not cultivate opium poppy.

Lacking data on transportation, marketing, and other transactions costs, we can use the crop budgets to tease out the effect of an increase in violence through the availability of labor. To do so, we envision a scenario in which hired labor is unavailable at any cost—in effect, workers are unable or unwilling to travel, regardless of the wage rate. If we were to relax some of our assumptions about the proportions in which farmers apply inputs, we could frame this as a case in which a farmer with two or more hectares—implying 1 hectare planted to wheat for food sufficiency and another hectare or more for discretionary planting—can choose to cultivate opium poppy on one-half of a hectare of his “discretionary” land, using only household labor at harvest, and plant something else that might not require any hired labor on the remaining land.¹⁸ In that case, assuming the farmer has access to household labor and traders are still willing to travel, the farmer would almost certainly choose to allocate that one-half hectare of his land to opium poppy and opium poppy would remain in the production mix, albeit at a lower level.

Governance

For the purpose of this report, we have adopted the World Bank’s definition of governance and, on that basis, conceptualize governance writ large as:

the traditions and institutions by which authority in a country is exercised. This includes (1) the process by which governments are

¹⁸ In the fixed-proportion specification that we use in the crop budgets, the farmer is always assumed to use both types of labor—half household and half hired—to harvest the entire hectare.

selected, monitored and replaced, (2) the capacity of the government to effectively formulate and implement sound policies, and (3) the respect of citizens and the state for the institutions that govern economic and social interactions among them.¹⁹

Economic reasoning speaks indirectly and ambiguously to the effects of governance on decisions to cultivate opium poppy. We might expect that an improvement in governance could beget a decline in security risk, an increase in eradication risk, and a decrease in various transaction costs—for example, as lower transportation costs would reduce shipping costs and the farm-gate prices of fertilizers and other agricultural inputs. In light of these different potential effects, the implications of an improvement in governance seem to be indeterminate, at least for very small and small landholders, if not for all landholders.²⁰

Within the larger category of governance, we considered four specific factors that might affect, if not determine, governance:

1. *Taliban's influence*: Degree of local Taliban control over the traditions and institutions by which authority is exercised, particularly in relation to the Taliban's willingness and ability to implement policies that may affect a household's decision to grow opium poppy (e.g., collection of taxes/bribes, provision of security guarantees, issuing of coercive "night letters"²¹). Since 2002, insurgent groups, which in the south primarily fall under the umbrella of the Taliban, have encouraged the cultivation of opium poppy so as to tax it to finance their operations.
2. *Governor's influence*: Degree of provincial governor's control over the traditions and institutions by which authority is exercised, particularly in relation to the governor's willingness and ability

¹⁹ Kaufmann, Kraay, and Zoido-Lobaton, 1999, p. 1.

²⁰ See the preceding discussion of security risk and the later assessments of eradication risk and input costs. For a discussion of the effects of governance on illicit crop cultivation in other contexts, see Paoli, Greenfield, and Reuter, 2009.

²¹ Night letters, or *shabnameh*, are a tool that the Taliban has used in the past, although not recently, to coerce poppy cultivation. See Table 3.1 and accompanying note.

to implement policies that may affect a household's decision to grow opium poppy (e.g., commitment to enacting the ban and other coercive policies set by Kabul, such as eradication; building public support for sustainable CN goals through persuasive policies, public messaging, and delivery of public goods and services).

3. *Shura council's influence*: Degree of local *shura* council's control over the traditions and institutions by which authority is exercised, particularly in relation to the council's willingness and ability to implement policies that may affect a household's decision to grow opium poppy (e.g., supporting the ban and issuing prohibitions on local cultivation, distribution of government-subsidized seed and fertilizer, collection of taxes, provision of loans).
4. *Police and military presence*: Distribution of national and local police forces and of international and national military forces, particularly in relation to their willingness and ability to enforce CN laws and policies at the local and regional level (e.g., enforcing eradication, intelligence collection, policing work).

Logic, expert analysis, and expert opinion might lead us to posit a positive relationship between Taliban influence and opium poppy cultivation and a negative relationship between the other three factors and opium poppy cultivation. However, we cannot overlook the nuances of these relationships, which we explore in the following paragraphs.

Mansfield and others suggest that the effects of an increase in Taliban influence on opium poppy cultivation could emerge through at least two channels:²²

- the implicit or explicit impunity from eradication (i.e., risk reduction) or “protection” provided by the Taliban in areas of southern Afghanistan

²² See, for example, Mansfield, 2013b, pp. 1, 6, 9; Felbab-Brown, 2009; Felbab-Brown, 2013, pp. 191–192; U.S. Senate Caucus on International Narcotics Control, *U.S. Counter-narcotics Strategy in Afghanistan*, Washington, D.C., July 2010, p. 2.

- the encouragement of opium poppy cultivation by those among the Taliban who finance their operations with opium payments or who view the successful defiance of centrally mandated CN policies as valuable in strategic, political-military terms.

Whereas our economic assessment of eradication risk (see next section) suggests indeterminacy vis-à-vis the first channel, the encouragements and mandates in the second channel seem likely, on face logic, to push in only one direction—i.e., positive—and strongly.

However, the responses to UNODC surveys of motives for growing opium poppy could call the strength of encouragement into question. When opium farmers were asked whether they were “encouraged by external influence” to grow opium poppy, they did not list this reason often. In 2007–2008, a year in which farmers were allowed to provide more than one answer to the question of why they grow opium, still only 8 percent of respondents cited external influence as a reason but, in years in which respondents were permitted to provide only one reason for growing opium poppy, less than 2 percent typically cited it as their reason.

Having defined the remaining factors in terms of each protagonist’s willingness and ability to implement or enforce CN policies, one might expect increased influence or increased presence to unambiguously discourage cultivation of opium poppy. However, even in these near-tautological circumstances, the nature of the relationships is not entirely clear. First, we note that a well-enforced eradication policy may yield unintended consequences, e.g., by spurring farmers to grow more opium poppy to mitigate the risk of losing their crop or in response to other dimensions of the risk (see next section). Second, running counter to our definitions, the protagonist’s influence and presence might interact “badly” with embedded corruption, leading to increased demands for bribes in exchange for sparing a farmer from eradication or other reprisals and, hence, a need for farmers to grow more opium poppy to cover the increased costs of bribes. In these instances, the increased influence of the governor or *shura* council or a greater pres-

ence of police or troops would not necessarily result in a reduction in the amount of opium grown.²³

The UNODC polling data provide mixed evidence concerning the direction of effects of the last three factors. They suggest that a combination of fear of government, eradication, and imprisonment, along with respect for—or at least compliance with—the government of Afghanistan’s ban and poppy’s illegality have played a role in discouraging poppy cultivation, at least historically, but that the importance of eradication, per se, has declined in recent years.²⁴ (See Figure 3.3 in the next section.) UNODC polling data also suggest that governors have been less successful at reducing the cultivation of opium poppy through persuasive policies than through punitive policies. Never have even 1 percent of respondents cited “received support from government” or “in anticipation of support from government” as their primary reason for ceasing to grow opium poppy.²⁵

Finally, the effects of the presence of police or military forces cannot be readily disentangled from insecurity and other factors. The increase in the presence of Afghan and international forces in the CCA in 2009–2012 appears to have contributed to a shift in opium poppy cultivation from the CCA to the *dasht* but not to a net reduction in cultivation in the province. At the provincial level, the data indicate a net increase in the number of hectares cultivated.

²³ For discussions and examples of local police corruption and patronage and of recent changes in the attitudes of police toward corruption and side payments or bribes, see David Mansfield, *Responding to Risk and Uncertainty: Understanding the Nature of Change in the Rural Livelihoods of Opium Poppy Growing Households in the 2007/08 Growing Season*, Report for the Afghan Drugs Inter Departmental Unit of the UK Government, July 2008, pp. 41–48; and Mansfield, 2013b, pp. 8, 9, and 13.

²⁴ In this assessment, we consider a combination of “reasons for ceasing”: fear of government, eradication, or imprisonment; elders’ or *shura* council’s decision; and ban by government or illegal crop. In recent years, without explanation the importance of the elders’ or *shura* council’s decision has diminished substantially, measured in terms of its ranking in the polling data.

²⁵ UNODC eradication and cultivation data reveal that, at least in the short term and in discrete geographic areas, aggressive governors’ eradication campaigns have sometimes been correlated with reductions in the level of opium poppy cultivation in subsequent years.

In the factor map, the signage of the governor's influence, the *shura* council's influence, and the presence of police and military forces, reflects the ambiguities noted above and parallels that of eradication risk. If their influence manifests as support for CN policies, such as eradication, which are intended to discourage opium poppy cultivation oftentimes through punitive measures, then the influence of these institutions can also have ambiguous effects, especially among farmers with very small and small landholdings.

Eradication Risk

To simplify the analysis, our household model treats eradication as “all or nothing,” even though we recognize that farmers might lose only part of their opium crop from eradication. We incorporate the possibility of only a partial loss of the crop from eradication into our crop budgets. We find the effects of eradication risk, which the model represents as a change in both the average returns to cultivation and the variability of returns, on decisions to grow opium poppy are indeterminate for farmers with very small or small landholdings and likely negative for farmers with medium to large landholdings. The results for poorer farmers, which depend on a dominant variance effect, are counterintuitive, but they complement those of prior research and we lack a firm empirical basis for dismissing them.²⁶ For households extremely sensitive to risk and for which production and consumption decisions are linked—i.e., very small and small landholders—the prospect of a less variable, albeit bleaker, future could provide an incentive to grow more opium poppy. However, for medium to large landholders, our model suggests that the mean effect will outweigh the variance effect and, for that reason, an increase in the risk of eradication would discourage the cultivation of opium poppy.

In contemplating a more dynamic scenario, one might also argue that the possibility of eradication could lead farmers to grow more opium poppy in a given year, to compensate for the possibility of eradication-induced crop losses in other years.

²⁶ See Appendix C and C. I. M. Andersson, “Counterproductive Counternarcotic Strategies?” *American Journal of Agricultural Economics*, Vol. 95, No. 4, 2013, pp. 917–931.

Moreover, even if eradication takes place in a province or district, the probability of having one's crop eradicated is not uniformly distributed. The probability of eradication is close to zero for some farmers either because the Afghan government does not engage in eradication in those areas or because farmers are able to use affiliations with local or tribal patronage networks, bribes to police or other officials, or invoke Taliban protection to forestall eradication.²⁷ In areas where eradication is taking place, farmers without patronage ties or the resources to bribe officials in charge of eradication face a higher probability of eradication than those who do have close ties to officials or can more easily afford to pay off police or other officials, although farmers who pay bribes do experience a decline in net returns because of these payments as compared to a situation when there is no threat of eradication.

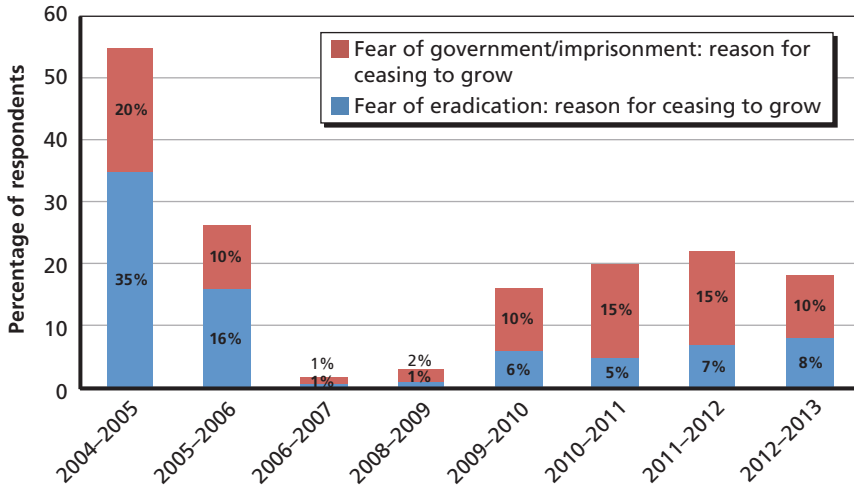
As noted in the prior section, UNODC polling data suggest that the fear of eradication in particular and apprehension of government more broadly can motivate farmers not to grow opium poppy (Figure 3.3). However, the fear of eradication, as expressed in the polling data, has declined substantially in recent years.

Our interviewees stated that eradication, although highly unpopular, has affected decisions by farmers to grow opium poppy. Facing the threat of eradication, in the Helmand CCA, farmers who faced high penalties grew crops other than opium poppy.²⁸ They said that in areas in Helmand under the control of the government, farmers cultivated wheat or other crops rather than opium poppy, but the interviewees spoke in broad terms about general conditions and did not address the interplay among factors.

²⁷ For discussions of bribery, corruption, and factors affecting perceptions of the likelihood of eradication, see David Mansfield and Adam Pain, "Opium Poppy Eradication: How to Raise Risk When There Is Nothing to Lose?" Afghanistan Research and Evaluation Unit, Briefing Paper Series, August 2006, pp. 7–10. Mansfield, 2012c, Annex 1, pp. 7–12, reports on payments to Taliban, police, and mullahs, drawing from fieldwork by different research sites in Helmand. In contrast, Mansfield, 2011a, p. 17, discusses a diminution in corruption in Helmand in the 2010–2011 season, because of which farmers in the CCA were unable to buy protection from eradication with bribes.

²⁸ Interview response from set of interviews with Afghan implementers in Helmand and Kandahar, spring 2014.

Figure 3.3
Fear of Eradication and Government Reprisal in the Opium Poppy Cultivation Decision



SOURCES: UNODC, *Afghanistan Opium Survey*, 2005–2013.

NOTE: This figure does not include data for 2007–2008 because they are non-comparable.

RAND RR1075-3.3

Moreover, in southern Afghanistan, eradication—in combination with technology change—appears to have contributed to a shift rather than a reduction in opium poppy cultivation.²⁹

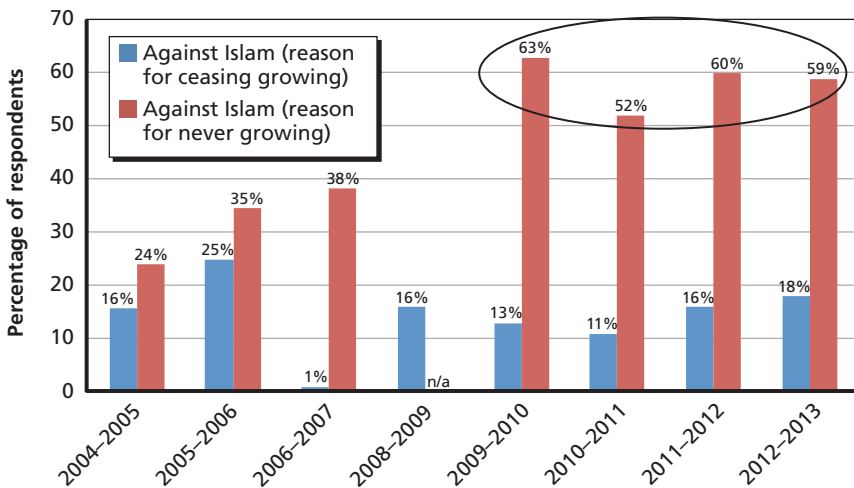
Religiosity

In the factor map, we posit that as a household’s religious commitment increases, holding all else constant, its inclination to cultivate opium poppy is likely to decrease. In drawing this conclusion, we looked outside standard economic reasoning, both in general and specific to our model, for validation of the supposition. Although finding little support in expert analysis or opinion, we found at least modest support in UNODC polling data.

²⁹ See the discussions of the evidence in Chapter Two and Chapter Five.

In each year of the motives polling, the top reason given by Afghan farmers for *never* growing opium poppy has been that it violates Islam (Figure 3.4). In years in which farmers could select only one response to the question of why they *did or did not* grow opium poppy, approximately 50 percent to 60 percent responded “because it is against Islam” as a reason for never growing opium poppy. Typically, reasons tied to government policies or consequences of government policies have placed a distant second to religiosity among Afghan farmers’ rationales for never growing opium poppy.³⁰ In 2007–2008, when farmers were

Figure 3.4
Religiosity in the Opium Poppy Cultivation Decision



SOURCES: UNODC, *Afghanistan Opium Survey*, 2005–2013.

NOTES: This figure does not include data for 2007–2008 because they are non-comparable. n/a = not available.

RAND RR1075-3.4

³⁰ Note further that the response “because it is harmful to human beings,” which might be thought of as a secular analog to “because it is against Islam,” is typically the third most cited reason for never growing opium poppy, garnering an additional 5 percent to 7 percent of top responses.

allowed to list multiple choices, 90 percent indicated “because it is against Islam” as a reason for never growing poppies.

In contrast, “growing opium is ‘against Islam’” has generally constituted the second- or third-most cited reason for *ceasing* opium poppy cultivation, suggesting that religion plays a larger role in a household’s decision never to grow opium poppy than it does in its decision to cease growing opium poppy.³¹ In years in which respondents could only choose one reason for ceasing to grow opium poppy, 10 to 25 percent typically cited “growing opium is ‘against Islam.’” However, in 2007–2008, when farmers were allowed to list multiple choices, the number of respondents who indicated “because it is against Islam” as their reason for ceasing to grow opium poppy was less than 5 percent. This last result, which does not appear in Figure 3.4, was surprising and might speak to the shortcomings of the data. We would have expected a larger share in the anomalous year than in the years in which respondents could choose only one reason for ceasing to grow opium poppy.

Remoteness

At least three forces might be at play in determining the role of an increase in a household’s distance to markets—i.e., *remoteness*—on decisions to cultivate opium poppy as compared to wheat or other legal crops. First, longer distances, especially longer off-road distances, increase transportation costs for all crops, but the cost of transporting opium as a share of total delivered costs to market is much less than for competing crops, because the commodity is relatively dense and has high value by weight. Moreover, traders are willing to go to the farm gate to purchase it, so farmers do not have to transport it to market themselves.³² Second, opium does not rot or bruise, so spoilage and damage are not major factors, as they are with fruits and vegetables. Opium is

³¹ Economically, this suggests that a non-market cost exists that effectively takes opium poppy out of the set of acceptable cultivation choices for some farmers.

³² Kuhn (2010, pp. 6–7) reports farm-gate prices for many commodities, but, in the case of opium, we are aware of a substantial stock of traders willing to collect the product under adverse circumstances. In effect, this suggests some cost-sharing between traders and farmers, with the relative distribution of cost depending on the market power of each. We might expect a trader to exert more power than a farmer, but not to have absolute control.

also less susceptible to pest infestation in storage and transit than other crops. Third, farmers who live farther from a road are less “visible” to government forces than those with fields close to roads. Therefore, they are less likely to face eradication, as eradication operations tend to target opium poppy fields close to roadways and population centers.³³

Focusing on the first and second forces, we frame remoteness in the household model in terms of an effective gap, driven by transportation and other transaction costs, between the prices that a household faces as a consumer and those that it faces as a producer on the “open market”—be it as local as the farm gate or as distant as a city market. Given the advantages of opium poppy, such as farm-gate collection, high value by weight, and non-perishability, an increase in remoteness will tend to widen that gap less for opium than it would for wheat—or for other agricultural products. However, because of the importance of food security for farmers with very small and small landholdings, the increase in the gap between transportation costs as a share of price between opium and wheat does not necessarily lead them to grow more opium poppy. The model suggests that the effect of remoteness is indeterminate for these growers because they face strongly competing incentives between their consumption needs and the widening transportation and transaction cost wedge between opium and wheat and other legal crops. In contrast, in the case of medium to large landholders, we find that increasing remoteness results in an unambiguous increase in opium poppy cultivation.

Regarding the third force, we find that the effects of “visibility”—and therefore increased eradication risk—which are functions of remoteness, are largely indeterminate according to the model. In the model, farmers with medium to large landholdings are the only farmers who face persuasive incentives to reduce opium cultivation because of increased visibility.

³³ For discussion of remoteness in relation to transportation, storage, and other transaction costs, as well as other economic opportunities, and the advantage this confers to opium poppy relative to wheat, see, for example, Mansfield, 2010, pp. 16–17. For discussion of remoteness in relation to corruption and eradication risk, see, for example, Mansfield, 2011a, pp. 6, 16–17.

UNODC survey data suggest that remoteness may affect decisions to grow opium poppy, but not consistently so.

In the 2009–2010 growing season, UNODC started using its surveys to test for the relationship between distance to markets and poppy-cultivating status, but the results have been mixed. In the first three years of testing, UNODC found a statistically significant positive relationship between growing status and average distance to markets, nationally (see Table 3.2). However, in the 2012–2013 survey, UNODC did not find a statistical difference in the distance to market of poppy growers and other farmers. The regional results are less compelling, particularly for the south. For example, in the 2009–2010 survey, poppy farmers in the south were found to live *much closer* to markets than non-poppy farmers; whereas, in the 2011–2012 survey, they were found to live *much farther* from markets than non-poppy farmers.

Landholding Arrangements

In our framing of sharecropping arrangements, sharecroppers provide their labor to landowners in exchange for a pre-specified share of the eventual harvest,³⁴ but have little or no control over the cropping

Table 3.2
Opium Poppy Cultivation and Distance to Nearest Market

Farmer Type	2009–2010	2010–2011	2011–2012	2012–2013
	Kilometers from nearest road			
Opium farmers	26	25	23	27
Non-opium farmers	21	14	19	26
Total	22	16	21	27

SOURCES: UNODC, *Afghanistan Opium Survey*, 2010–2013.

NOTES: Calculations are nationwide, by growing season; UNODC found statistical significance in the results for the 2009–2010 to 2011–2012 growing seasons, but not for the 2012–2013 growing season.

³⁴ Sharecroppers might also obtain room and board and pay a proportional share of some in-kind taxes.

decision.³⁵ In effect, this “land tenure arrangement” might be more appropriately termed a “labor arrangement.” This framing is consistent with the premise that landowners who engage sharecroppers are likely to have landholdings that are larger than needed for subsistence and, thus, to place a higher priority on income-earning opportunities than on concerns about consumption. Coupled with an abundant supply of would-be sharecroppers, the substantially greater returns to opium poppy than to wheat that we found in our crop budget analysis (see Appendix B) would lead such a landholding household to favor opium poppy cultivation in the sharecropping contract.³⁶ This result is consistent with expert analysis and the available empirical evidence. Although sharecroppers need not grow opium poppy exclusively, we find nothing in Mansfield’s—or others’—reports to suggest that sharecropping arrangements favor anything other than opium poppy.

Landholding Size

Although the household model does not directly speak to the issue of landholding size, it can be used to frame the factor as a matter of wealth, which, in turn bears on how a household allocates its income, how it responds to changes in income, and how it views risk.³⁷ With that in mind, the direction of the relationship between landholding size and opium poppy cultivation is embedded in the approach, which delineates very small, small, and medium to large landholding households on those bases.

For farmers with small and medium to large landholdings, the approach suggests a positive relationship between landholding size and opium poppy cultivation; that is, the larger the landholding, the larger the area dedicated to growing opium poppy.

³⁵ As discussed in Chapter Two, other arrangements are possible, but we focus on this one.

³⁶ Further reinforcing this leaning, the model also permits conceptualization of the sharecropping arrangement as analogous to an off-farm income opportunity for the landholding household. In that case, medium to large landholding households would be likely to favor opium poppy in the sharecropping contract while smaller landholding households may not. For insight into this finding, see the discussion of off-farm income in relation to the cultivation decision later in this chapter.

³⁷ In purely technical terms, it is invariant to landholding size.

For farmers with very small or subsistence landholdings, the implications of the approach are less definitive and depend on the existence of a “tipping point”—in effect, the dividing line between the very small and small landholder—below which the household does not have enough land to meet its food consumption needs and above which it does have enough land to meet those needs. Below that tipping point the land-poor household will grow more opium poppy on more land in an effort to generate enough cash to purchase food. However, if enough land becomes available to push the household over the tipping point and, by implication, into the next category of landholder, the household will switch into food production. This finding is consistent with the discussion of monocropping in the *dasht* in Chapter Two.³⁸

Using the crop budgets, we find that for a household that is only concerned with returns to its asset base, as might be the case for those with particularly large landholdings, the choice is obvious: all else being equal, each additional hectare or fraction thereof should be put to opium poppy. Using our benchmark estimates for prices, yields, etc. in the crop budgets, we find that a hectare of land allocated to opium poppy could generate net returns of \$1,448 to \$3,544, depending on the availability of household labor for on-farm use, whereas a hectare of land allocated to wheat could generate net returns of \$144 to \$386 on the same basis. For an average household with an average number of household members, we might expect higher returns on the first hectare put to either crop than to subsequent hectares put to the same crop. At least in the case of poppy, the household would need to bring in additional labor to harvest the crop on additional hectares, as the household labor supply is exhausted.

Household Size

The plausible effects of changes in household size in opium poppy cultivation could push and pull decisionmaking in competing directions.

³⁸ In Chapter Two, we noted that monocropping has been observed among farmers with very small landholdings in the *dasht*, although it was unclear whether those cropping patterns are a function of the number of hectares to which the farmers have access, the nature of their land tenure arrangements, or some of both.

On the one hand, a household with a larger number of household members has more mouths to feed; on the other hand, it also has more hands to work. Having more mouths to feed could imply allocating more land to the production of food, if the farmer is focused on self-sufficiency in food, or it could imply allocating more land to opium poppy to generate cash with which to purchase food. More hands to work could result in allocating more land to opium poppy, which is relatively labor-intensive, or sending more male family members out to earn off-farm income.

We cannot unequivocally predict the balance of effects for any household type, but we offer a simple set of calculations using 2012 prices to suggest a compelling answer. As described above, each household member requires an average of about 180 kilograms of wheat per year, which, at a purchase price of \$0.32 per kilogram, implies an expenditure of \$58 per year per household member for wheat. If the household were to use its own land to feed its members, it would need to allocate about one-tenth of a hectare per household member to do so. The household could allocate that same one-tenth of a hectare to opium poppy, with an expected harvest of about 3.5 kilograms of opium. At a price of \$173 per kilogram, the household would make a net return of about \$390, assuming the additional household member can cover the additional labor required to produce the opium. If hired labor were brought in, say, at harvest, the net would drop considerably. On that basis and all else equal, the household would be well advised to allocate the land to opium poppy rather than to wheat for its own consumption and, for this reason, we caveat the finding in the factor map with a parenthetical positive sign.³⁹

Accumulated Debt

Economic thinking and theory, expert analysis and opinion, and data leave us with indeterminate potential effects of household debt on decisions to cultivate opium poppy. The household model is not well suited to addressing this issue but, to the extent that it can be used to explore the relationship between debt and cultivation, it suggests pushes,

³⁹ See Appendix B for calculations with alternative price scenarios.

pulls, and uncertain outcomes for all types of households, regardless of the extent of their landholdings.⁴⁰ Our remaining tools are no more satisfying.

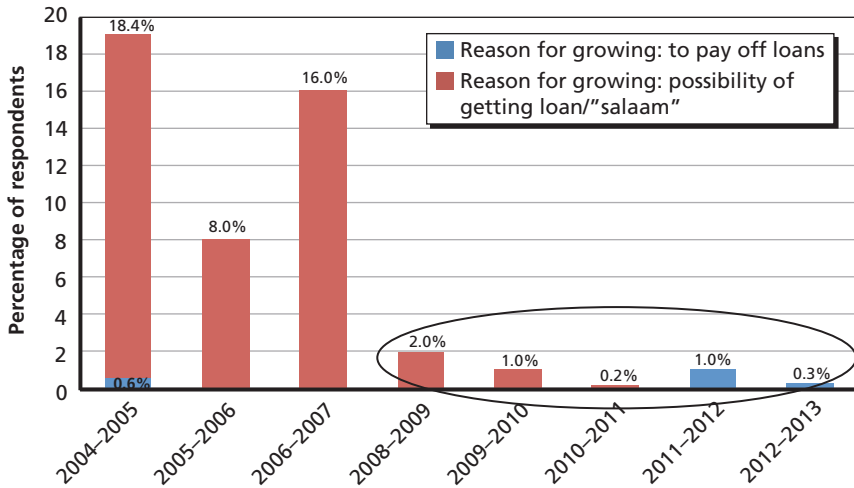
Expert analysis and opinion tend to relate debt accumulation to increased opium poppy production, but the evidence of a relationship between the two is murky. As debt accumulates, opium cultivation might increase because of the greater availability of additional lines of credit for households cultivating opium poppy relative to others. Under this formulation, opium farmers could be perceived as more credit-worthy because of their cash earnings. Moreover, because of the household's heightened need to achieve higher short-term net returns to service its debt, it would be more likely to cultivate opium poppy. This supposition is driven in part by the specificities of Afghanistan's informal credit system.⁴¹

As shown in Figure 3.5, the evidence does not clearly support the supposition. In the first years of the UNODC's annual survey of motivations to grow opium poppy, the "possibility of getting loan/salaam" was consistently the third- or fourth-most cited reason for growing opium, following "high sale price of opium" and "provision of basic food/shelter." When survey respondents were allowed to choose more than one reason for cultivation, the "possibility of getting loan" was the third most popular response behind "high sale price of opium" and "provision of basic food/shelter." However, in the past five years, respondents to the UNODC's survey have been far less likely to identify "possibility of getting loan/salaam" and "to pay off loans" as a top reason for cultivating opium poppy (Figure 3.5).

⁴⁰ We recognize that many land-poor households also take out loans to cover food expenses in the lean winter months, as well as other variable expenses throughout the year, such as for medical bills and weddings. However, modeling these sources of debt is beyond the scope of our current exercise.

⁴¹ For discussion of how accumulated debt can affect cultivation decisions, see Mansfield and Pain, 2006, pp. 2, 7–8; and David Mansfield, *Beyond the Metrics: Understanding the Nature of Change in the Rural Livelihoods of Opium Poppy Growing Households in the 2006/07 Growing Season*, Report for the Afghan Drugs Inter Departmental Unit of the UK Government, May 2007, pp. 25–28.

Figure 3.5
Effect of Accumulated Household Debt on the Decision to Cultivate Opium Poppy



SOURCES: UNODC, *Afghanistan Opium Survey*, 2005–2013.

NOTE: This figure does not include data for 2007–2008 because they are non-comparable.

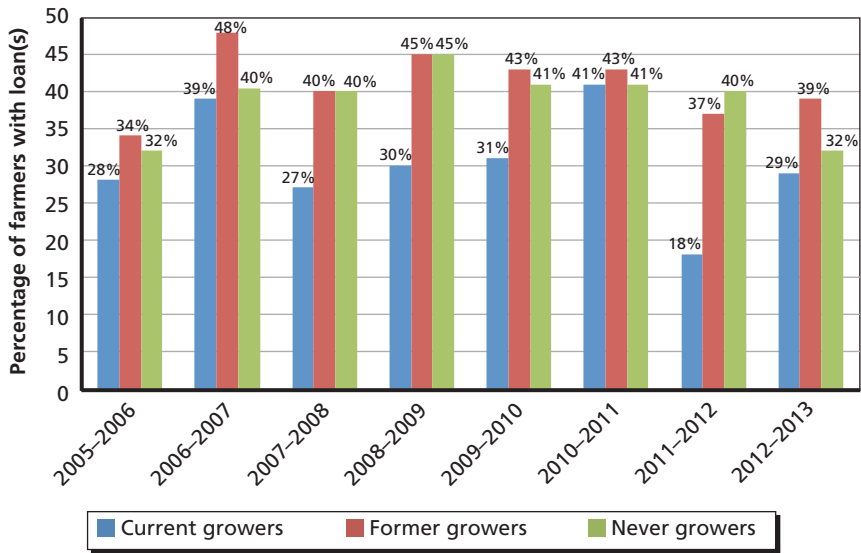
RAND RR1075-3.5

In each of the past eight growing seasons, a higher percentage of non-opium poppy farmers have reported taking on loans than current opium poppy farmers (Figure 3.6). In 2012–2013, only about 30 percent of opium poppy farmers reported having loans, compared with 30 to 40 percent of the non-opium farming community. Although the data are national, not regional, they suggest that farmers who do not cultivate opium poppy can also access credit.

Outside Income

In the household model, the relationship between outside income and opium poppy cultivation is indeterminate for households with very small or small landholdings but possibly positive for wealthier households. For farmers with very small and small landholdings, outside income could provide an opportunity to shift more land into wheat to account for consumption risk, but the balance of effects is unclear; for farmers with medium to large landholdings, the additional income

Figure 3.6
Prevalence of Loans Among Opium Poppy and Non-Opium Poppy Growers



SOURCES: UNODC, *Afghanistan Opium Survey, 2006–2013*.

RAND RR1075–3.6

might enable them to shift more land to production of opium poppy, to take advantage of the higher returns.

These outcomes stem from the structure of the household model, which treats outside income as emerging from activities that do not draw resources from the household’s agricultural activities.⁴² Admittedly, the assumption that the opportunity is entirely “non-competing” is strong, but relaxing it would not reverse the sign for farmers with medium to large landholdings; rather, it would generate indeterminacy.

The result for farmers with medium to large landholdings, albeit laden with caveats, runs contrary to assertions that a lack of alternative income opportunities drives the cultivation of opium poppy—and other illegal commodities.

⁴² For a more detailed discussion of this result, see Appendix C.

In contrast to the modeling results, the 2010 and 2011 UNODC *Afghanistan Opium Surveys* asked respondents about their coping strategies after ceasing to grow opium poppy and “income from off-farm employment” was the top response in both years (Table 3.3). On that basis, we caveat the finding in the factor map with a parenthetical negative sign.

Environmental Risk

As described in Chapter Two, droughts, plant-specific diseases, and other environmental episodes present substantial risks to crop yields, which drive income and in many cases determine the availability of food. The model conceptualizes environmental risk through changes in the variability of crop returns, but not average returns.⁴³ The results

Table 3.3
Coping Strategies of Farmers Ceasing to Cultivate Opium Poppy

Coping Strategy	2009–2010	2010–2011
Income from off-farm employment	41%	33%
Received loan	14%	30%
Cope up with situation	8%	16%
Reduced household expenditures	15%	13%
Income from property	2%	4%
Income from legal crops	4%	2%
Financial support from abroad	8%	2%
Could not cope up with situation	7%	0.4%
Other	1%	0%

SOURCES: UNODC, *Afghanistan Opium Survey*, 2011, p. 62; UNODC, *Afghanistan Opium Survey*, 2010, p. 64

NOTE: UNODC does not define “cope up.”

⁴³ We assume that mean returns do not change—environmental shocks do not have a lasting effect on yields and, on average, yields remain about the same—but the dispersion around the mean increases.

for opium are clear cut, but the results for wheat are more complicated because it is both consumable and marketable. An increase in the variability of opium poppy unambiguously decreases the share of land allocated to opium poppy, as it does not enter the demand side of the model and all households are assumed to be at least somewhat averse to risk. However, an increase in the variability of wheat returns may increase or decrease the share of land allocated to opium poppy, because wheat enters both the supply and demand sides of the model. On balance, subsistence households are most likely to decrease the share going to opium poppy and households with progressively larger landholdings are more likely to increase the share to poppy.

We address the issue of the effects of actual crop losses on future planting decisions later in this chapter, under the heading “Environment-Induced Crop Loss.”

Agricultural Inputs and Technology

Agricultural inputs and technology do not lend themselves to generalization, whether appealing to economic reasoning, expert analysis and opinion, or empirical evidence. Thus, we use the household model to sketch paths of influence from particular inputs to cultivation decisions. We also use UNODC polling data to better understand the role of inputs and technology in decisionmaking and draw insight from our crop budgets.

The household model does not treat inputs explicitly, but the effects of changes in input prices, technologies, and investments are implicit in crop returns and apparent in the attractiveness of opportunities to earn off-farm income. When input prices or the availability of agricultural technologies change, these changes affect both average crop returns and outside income and the variability of crop returns and outside income, which can, in turn, affect poppy and other cultivation decisions. Potential changes in the relationships among returns, outside income, and prices are also relevant. We walk through the interplay of these forces in the household model in Appendix C for each of four subcategories of inputs: labor, credit, other variable inputs, and investment. Here, we limit the discussion to labor.

An increase in labor costs could have two potentially competing effects on poppy cultivation decisions in the household model. First, on the production side, an increase in the wage rate will decrease net returns to agricultural activities, with the impacts disproportionately affecting more labor-intensive crops, such as opium poppy. An increase in labor costs will thus tend to decrease the share of land allocated to opium poppy.⁴⁴ Second, on the consumption side, an increase in the wage rate will tend to increase income if there are off-farm income opportunities, but the net effect will depend strongly on other factors, including the value that a household places on additional income and the relationship, if any, between crop returns and outside income. The overall effect is ambiguous but, on balance, we might expect a relative decline in poppy production, at least among wealthier households.

Similarly, the household model does not treat changes in technology explicitly, but we can envision ways to investigate their effects through changes in prices, outside income opportunities, etc., and through changes in average yields and the variability of yields. Given the plurality of options and the potential for interactions among them, the role and pace of the adoption of new technologies (such as higher yielding wheat seed, solar-panel powered water pumps, etc.) and the diffusion of knowledge through radio, handheld mobile devices, and NGOs introduce a large unknown—and possibly unknowable—variable to this framework. Nevertheless, we would expect that the introduction and diffusion of technologies that have greater importance for opium poppy cultivation would favor that cultivation among wealthier farmers. But if the household is greatly concerned with food security, it might secure the technology gains on the same or less land—to maintain adequate returns for cash purchases—and then use the same or even more land for wheat.

UNODC polling data suggest that input costs are a secondary factor in rural farmers' decisions to plant opium poppy, regardless of the overall importance of crop returns. In nearly a decade of polling,

⁴⁴ As a general matter, conventional economic thinking would suggest that as the price of an input—any input—rises, the output that uses it most intensively will become less desirable relative to other options.

only 1 to 3 percent of respondents have cited “high input costs” as their reason for ceasing to grow opium poppy; even fewer have cited it as their reason for never growing opium poppy. Only occasionally have respondents cited “low cost of inputs” as a reason *for* growing opium poppy. Similarly, “cultivation is more labor intensive” ranks low among reasons for not growing opium poppy. However, Mansfield’s recent fieldwork suggests strong interest in using herbicides to reduce labor costs, which speaks to the significance of labor as a cost factor, if not a decision factor (2014).

Our crop budgets also provide some insight into the absolute and relative importance of input costs in net income for opium poppy and wheat. First, the cost of labor is much higher in the case of opium poppy cultivation than in the case of wheat cultivation, both in absolute and relative terms—e.g., in relation to revenue. The cost of hiring labor could amount to as much as 50 percent of the revenue from opium and no more than 20 percent of the revenue from wheat. Second, all other agricultural input costs, given current agricultural practices, are roughly similar for wheat and opium poppy in absolute terms, but, in total, they amount to a much larger share of wheat’s expected revenue. The costs of non-labor inputs might amount to almost 10 percent of an opium poppy farmer’s expected revenue and upwards of 50 percent of a wheat farmer’s expected revenue, with soil enhancements featuring most prominently. Third, for both crops, the cost of seed is much less than that of fertilizer or manure, and, in the case of opium poppy, the cost might be negligible. Farmers often harvest and set aside opium poppy seed for future use. Wheat seed might amount to about 5 percent of revenues, if purchased.

Notwithstanding the importance of labor in the cultivation costs of opium poppy, an analysis of scenarios using higher wage rates in the crop budgets indicates that the price of labor would need to rise substantially to “force out” opium poppy, even if a household were wholly dependent on hired labor throughout the growing season. If the household depended completely on outside labor, the wage rate would need to rise by over 46 percent for opium poppy to become less attractive than wheat. Even then, opium poppy might still be relatively more attractive, were the landowner able to engage sharecrop-

pers. With access to household labor, the wage rate might need to more than quadruple.⁴⁵

Finally, we can use the crop budgets to explore the effects of new technology through scenarios involving changes in opium poppy or wheat yields. In so doing, we find an increase in wheat yields due to improved seed or other technologies, holding all else constant, is unlikely to be of a scale to induce farmers to plant more wheat than opium. For example, if we consider a case in which wheat yields nearly double,⁴⁶ opium poppy would still dominate, but the difference between the returns to opium poppy and wheat would narrow substantially. At those yields, wheat would be a much closer “second,” especially for farmers lacking access to household labor. In that case, opium poppy would offer an estimated return of \$1,448 per hectare and wheat would offer a return of \$1,120 per hectare.

Technological change has played a dramatic role in enabling the shift of opium poppy cultivation to the *dash*t. The decline in the cost of drilling deep wells was critical for the expansion of cultivation to that region. Absent the introduction of the lower-cost tube wells and pumps, the shift to the *dash*t would have been impossible.

Opium and Wheat Prices⁴⁷

As framed in the household model, changes in average (mean) opium and wheat prices, framed strictly as output prices, enter the model directly through returns. All else equal, an increase in the relative expected profitability of opium will increase the share of land allocated to opium poppy and an increase in the relative expected profitability of wheat will decrease this share. If the seller’s price of opium rises relative

⁴⁵ See the complete analysis in Appendix B.

⁴⁶ In this scenario, we let wheat yields rise to the high end of the range found in Niane et al. (2011), i.e., 7 tons per hectare. See Abdoul Aziz Niane et al., *National Catalogue of Wheat Varieties in Afghanistan*, Rome, Italy: Food and Agriculture Organization of the United Nations; and Aleppo, Syria: International Center for Agricultural Research in Dry Areas, GCP/AFG/045/EC Field Document, 2011.

⁴⁷ We do not address the implications of the variability of opium and wheat prices in this section; for that, we refer the reader to Appendix C, which includes a discussion of price variability.

to that of wheat, farmers will plant more opium poppy; if it falls, they will plant less.

The analysis of output prices is cut-and-dry, but the analysis of consumption prices requires consideration of potentially conflicting incentives. In a typical household model, such as ours, production and consumption are linked, so that households do not simply maximize farm incomes through cropping decisions. Instead, an increase in the price of a good that is both produced and consumed results in competing incentives; namely, the increase in price is “good” for production, providing incentives to increase cultivation, but “bad” for consumption. Furthermore, in developing countries, the consumption price of food—be it wheat or another food the household looks to for sustenance—need not be the same as the production price.⁴⁸ For farmers with scant landholdings, an increase in the consumption price could promote a shift toward opium poppy, with its higher returns, to maintain consumption. For others, the price increase might induce a substitution toward self-supply and increased wheat production.⁴⁹

Given the assumption that opium poppy is a cash crop and does not enter the consumption bundles of most households, the model predicts higher opium prices will favor more opium poppy cultivation for most landholding households.

The UNODC polling data substantiate the importance of opium prices in opium poppy cultivation, if not of wheat prices. Since the UNODC began conducting its motives surveys, “high price of opium” has been cited by farmers as the top reason for growing opium poppy in nearly every year (Figure 3.7).⁵⁰

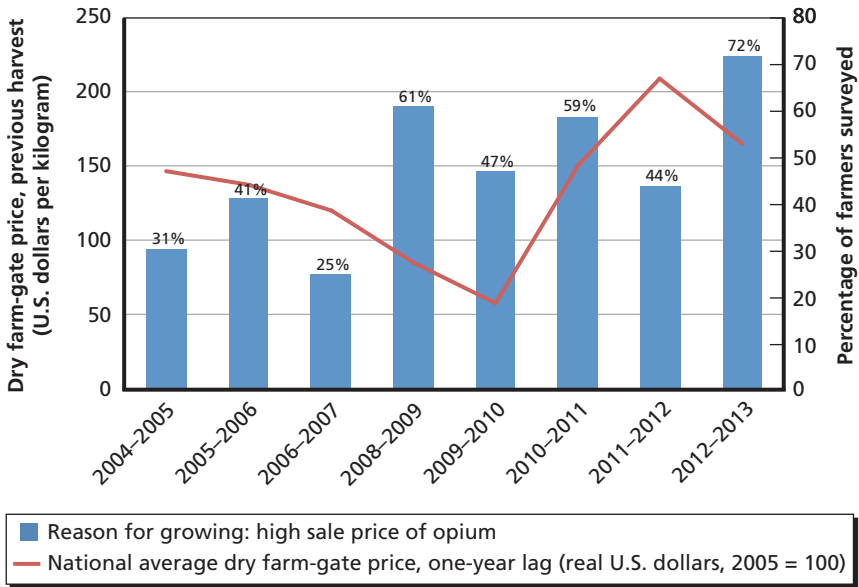
We note that “low price of wheat” has enjoyed few-to-no citations as a reason to grow opium poppy. While the “low sale price of opium

⁴⁸ Transaction costs are the primary reason for the price gap. However, as discussed in Appendix C, other binding constraints may play a role in the household’s perceptions of relevant prices.

⁴⁹ In support of this finding, Mansfield noted in a personal communication (January 21, 2015) that it is consistent with findings that have been reported elsewhere dating back to 1995, including in his reports.

⁵⁰ “Poverty alleviation” is the only other response that has consistently vied with “high price of opium” for top billing year to year.

Figure 3.7
Price of Opium in the Opium Poppy Cultivation Decision



SOURCE: UNODC, *Afghanistan Opium Survey, 2004–2013*.

NOTE: This figure does not include data for 2007–2008 because they are non-comparable.

RAND RR1075-3.7

compared to before” has at least registered as a reason for ceasing to grow opium poppy, the “high price of wheat” has only once appeared as a cited factor in an annual survey. Not surprisingly, it was cited in the 2008–2009 growing season, in which wheat prices reached very high levels.⁵¹ To the extent that land shifted into wheat in that period, one might reasonably argue that the shift had at least as much to with food insecurity as with prices—or policy—*per se*.

Turning to our analysis of crop budgets in Appendix B for additional evidence, we note that the price of wheat would need to quadruple, all else held constant, before wheat would look preferable to

⁵¹ For a discussion of food insecurity, wheat prices in absolute terms and in relation to opium prices, and the exceptional circumstances of the 2008 grain crisis (including Pakistan’s blocking of wheat exports to Afghanistan), see Mansfield, 2010, pp. 1–2, 7–13, 17.

opium poppy as a cash crop—such an increase would imply substantially higher prices than those observed in 2008–2009.

Other Agricultural Output Prices

To the extent that other agricultural activities “look” like wheat in a household’s decision mix, we would expect a household to respond to changes in prices similarly and with at least as much complexity. As the price of the alternative increases, households would face a supply-side incentive to produce more of the alternative crop relative to opium poppy. However, the household could also face competing demand-side incentives if it consumes the other crop. In addition, to the extent that an activity looks like an outside income opportunity, we might expect something quite different and even less predictable.

In the factor map, we trace the effects of an increase in the price of an alternative crop that neither meets the household’s consumption needs nor serves as outside income. Higher prices result in more production of the alternative at the expense of opium, but cannot rule out the possibility of other outcomes. For example, melon, red onion, and cannabis can be grown in spring and summer, sometimes without disruption to opium poppy cultivation, and might look more like outside income opportunities than alternative crops. Moreover, the potential to double or triple crop on some irrigated land in the south suggests additional possibilities for land use that could favor either opium poppy or a replacement.

Comparative data on net returns sheds some light on the viability of other agricultural activities. Kuhn (2010, pp. 6–7), for example, has estimated the net income potential for several field crops and perennials on the basis of farm-gate prices. Among field crops that could compete with opium poppy, only white onions and potatoes offered returns within striking distance of opium poppy. However, most orchard and other perennial crops looked attractive, but the analysis did not account for either the up-front costs of acquiring the perennials or the implications of substantial lags between planting and production. The decision to produce a perennial crop is tantamount to an investment decision in that it requires an initial outlay of capital in exchange for a flow of discounted returns over time, so farmers have to factor in both invest-

ment costs and deferred income when weighing a decision to plant an orchard or vineyard.

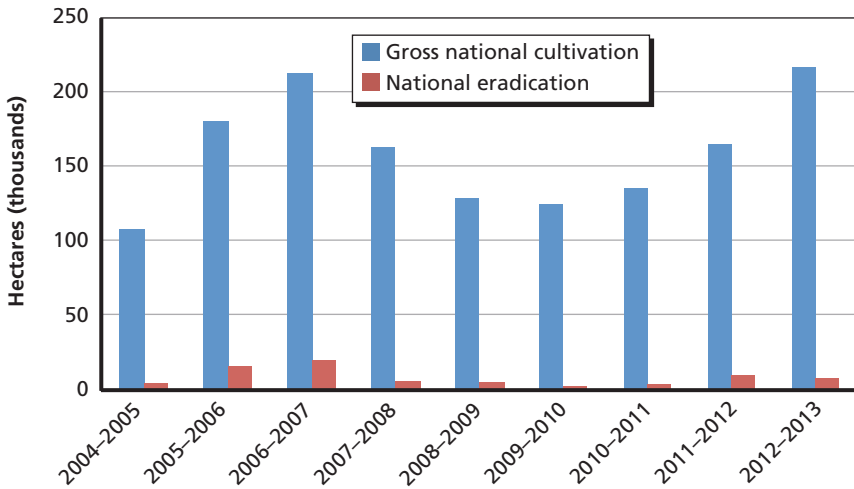
Eradication-Induced Crop Loss

In the factor map, we include eradication-induced crop loss in the prior growing season and view it as potentially affecting the current-season cultivation decision through four channels: (1) perceptions of eradication risk; (2) the accumulation of debt due to the loss of the crop; (3) the influence of the Taliban; and, perhaps least plausibly, (4) expectations regarding the price of opium poppy in the current season. Here, we assume that actual crop losses tend to reinforce or increase concerns about future crop losses. As noted elsewhere in this report, Mansfield and others speak to a mostly positive relationship between eradication and indebtedness and between eradication and Taliban influence. (See the discussion of Taliban influence in the Governance section above.) Regarding the last channel, we would only expect to see an effect on price if eradication were occurring in sufficient volume to have a “macro” effect on the market; that is, if supply were to drop enough, in aggregate, to result in a price increase. Given the modest levels of eradication in relation to aggregate cultivation in most years, that seems unlikely (Figure 3.8).

On the basis of those channels and in view of the findings of the household model on each related factor, the ultimate effect of eradication-induced crop losses on the cultivation decisions of all types of households, be they with very small, small, or medium to large landholdings, appears to be indeterminate. Mansfield and others in various reports depict the push and pull of these factors, but generally suggest a neutral-to-positive relationship in which an increase in prior-year eradication leads to either a continuance of “business as usual” or an outright increase in cultivation.⁵² In one report from the 2004–2005 growing season, Mansfield explained that eradication experiences are different in different areas:

⁵² See, for example, Mansfield and Pain, 2006, pp. 7–8.

Figure 3.8
Opium Poppy Eradication in Relation to Cultivation



SOURCE: UNODC, *Afghanistan Opium Survey*, 2004–2013.

NOTES: Over the years, the eradication data have been verified to varying degrees. Based on UNODC reporting (*Afghanistan Opium Survey*, various years), we assume little or no verification through 2003–2004 and partial to complete verification for subsequent years. For 2002–2003, UNODC reported that the eradication data were not verified. UNODC did not present an eradication estimate for 2003–2004. For 2004–2005 through 2006–2007, UNODC reported verification of the majority of each of the estimates that it presented in the annual surveys. From 2007–2008 onward, UNODC reported full verification of the eradication data.

RAND RR1075–3.8

In the province of Helmand almost half (49%) of those interviewed reported that their crop had been destroyed more than once, nevertheless and undeterred, 83% were cultivating opium poppy this season and two thirds had increased the amount of land they had allocated to the crop.⁵³

Environment-Induced Crop Loss

In the factor map, we include environment-induced crop loss in the prior growing season and view it as potentially affecting the current-

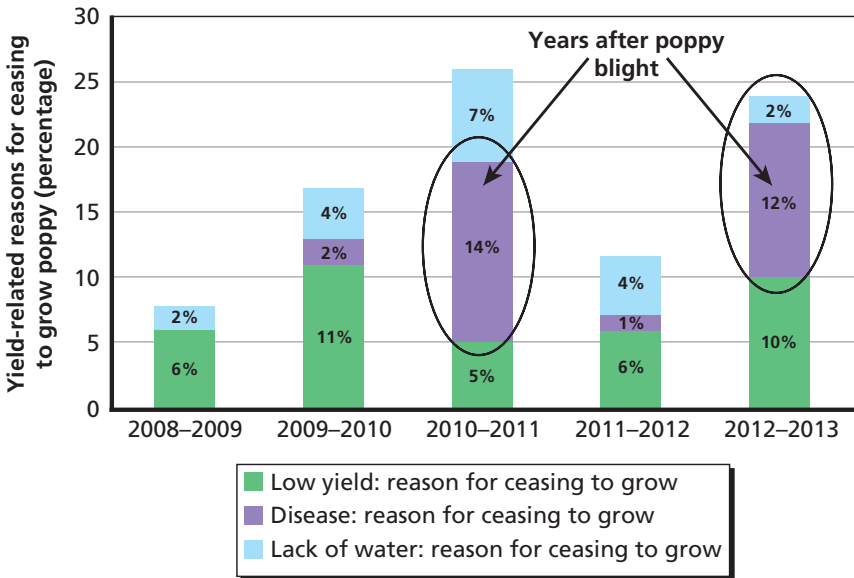
⁵³ See Mansfield, 2006, pp. 15–19.

season cultivation decision through three channels: (1) perceptions of environmental risk; (2) the accumulation of debt due to crop loss; and, perhaps more plausibly than in the case of eradication-induced crop loss, (3) expectations regarding the price of opium poppy in the current season.

UNODC polling results and other data suggest that past environmental shocks and current cultivation decisions are linked.

The UNODC data reveal farmers’ sensitivity to environment-induced yield shocks, particularly opium-specific blight. Figure 3.9 shows environmentally relevant reasons given for ceasing cultivation. Short-term environmental shocks appear to have some bearing on farmers’ risk analysis and cultivation decisions, particularly following years of extensive poppy loss from disease (e.g., the blight years of 2009–2010 and 2011–2012). However, the survey results indicate that

Figure 3.9
Environmental Shocks and the Opium Poppy Cultivation Decision



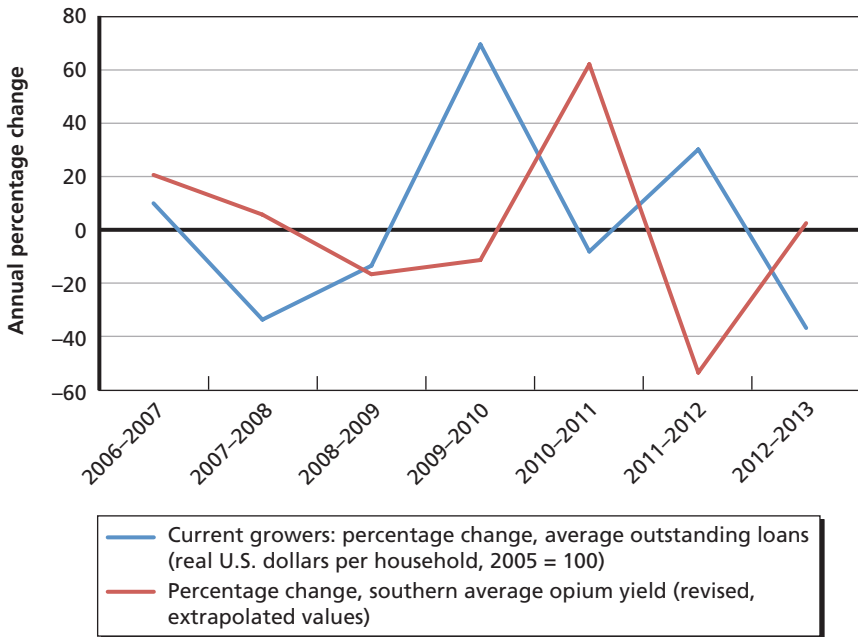
SOURCES: UNODC, *Afghanistan Opium Survey*, 2007–2013.

concerns about environmental risk are not a common reason for never cultivating opium poppy, only a reason for ceasing cultivation.

UNODC data on yields and the indebtedness of households that cultivate opium poppy provide mixed evidence on the nature of the relationship between the two. Following some years when yields have been bad, household debt has risen, but not uniformly so (Figure 3.10).

Regarding the last channel of influence, that of price, we would only expect to see an effect on opium price and, hence, incentives to cultivate opium if environmental shocks are so great that the decline in supply is enough to result in a price increase. Given the striking variations in yields over the past decade (see Figure 2.1) and that Afghanistan produces the vast majority of all illegal opium, environment-induced price effects seem likely.

Figure 3.10
Relationship Between Opium Poppy Yield and Average Debt



SOURCE: UNODC, *Afghanistan Opium Survey*, 2006–2013.

On the basis of these channels and in view of the results of the household model on each related factor, we find that the effects of environment-induced crop losses on the cultivation decisions of all households, regardless of landholding size, are indeterminate.

Concluding Remarks

In this chapter, we introduced the factor map and discussed the directions of change associated with each socio-economic and environmental factor.

On the basis of this analysis, we have demonstrated the complexity of decisionmaking and have shown that many or most factors can be expected to affect different types of landholders in different ways. In particular, farmers with medium to large landholdings might respond more directly to concerns about net returns, while farmers with very small and small landholdings might respond to both those concerns and to concerns about food security—implying a greater degree of indeterminacy for the latter than the former.

Rural Development Programs in Afghanistan

This chapter assesses the effects of seven major rural development programs implemented over the past decade in Afghanistan on farmers' decisions to cultivate opium poppy. Because of the large role played by southern Afghanistan in opium poppy cultivation, most of the programs we examine focus on that region, but some cover other regions of the country.

For each program, we provide

- a description of the program
- a description of the results of the program
- an analysis of the program in relation to the decision to cultivate opium poppy.

Our program descriptions include the name of the funding source, the organizations that implemented the program, the period of performance, the size of the program (in terms of money spent), and the provinces or districts in which the program was implemented. We also describe the intent and design of the program.

We next describe the results of the program's major component projects. For each project, we describe how it was implemented, including the number of participants and how they were selected. We then describe project outputs and, where possible, outcomes, drawing on statistical information, interviews with implementers, discussions with civil servants and other individuals engaged in the programs, and program evaluation reports.

We then use the analytical framework, encapsulated in the factor map presented in Chapter Three, to assess the effects of the program on the decision to cultivate opium poppy. We break each program down in terms of the socio-economic and environmental factors, such as seed and fertilizer prices or wages, that it has targeted, and use the map to trace the paths by which the program might have influenced farmers' cultivation decisions.

We focus on assessing the effects of the programs on decisions by Afghan farmers to cultivate opium poppy, not on the attainment of explicit program goals. Many rural development programs do not explicitly aim to reduce the cultivation of opium poppies. When a program includes an explicit goal to reduce the cultivation of opium poppy, that goal might be just one among several other goals. For these reasons, we would not judge a program as having "failed" if there is no evidence that it resulted in a reduction of opium poppy cultivation.

We based our analysis on a combination of written reports, discussions and interviews, and empirical evidence. We drew on program documents—supplemented by discussions and interviews with U.S. government program officers and personnel from NGOs located in the United States, the United Kingdom, Belgium, and Afghanistan—to obtain information about the programs and conduct the assessments. We also collected information on program outputs, outcomes, and impacts from monitoring and evaluation reports. In addition, we incorporated responses from our interviews with Afghan implementers into our assessments. In some instances, we employed our crop budgets for opium poppy and wheat to estimate the value of the program to farmers in the context of input and other costs facing farmers and to draw inferences about some of the potential effects of the program on the cultivation of opium poppy. We used data on provincial populations, crop output, and other statistics to assess coverage and outcomes.

Sources of Income

The Role of Agriculture

Agriculture is Afghanistan's most important economic sector. It employs about 70 percent of Afghanistan's workforce, and legal agriculture, alone, accounts for about one-third of Afghanistan's reported gross domestic product.¹ Wheat, milk, beef, mutton, and grapes are among the most important agricultural commodities; together, the top 11 commodities have accounted for 75 to 80 percent of the total value of Afghanistan's legal agricultural production over the past decade.² Wheat has accounted for the largest share of legal agricultural output by value, around 20 percent. Between 2002 and 2012, on average, wheat was planted on 30 percent of cultivated land (FAO, 2013).

In southern Afghanistan, agriculture—legal and illegal—is even more important than in the rest of the country. Although sources of income fluctuate from year to year, agriculture provided 71 percent of total household income in southern Afghanistan in 2007–2008, the most recent year for which detailed information is available, compared to just 16.2 percent in the east, which includes Kabul, and 36.2 percent in the central-southeastern part of the country.³ Of this total, 17 percentage points consisted of agricultural production for own use, 28 percentage points were generated by legal cash crops, and 26 percentage points came from growing opium poppies (Figure 4.1).

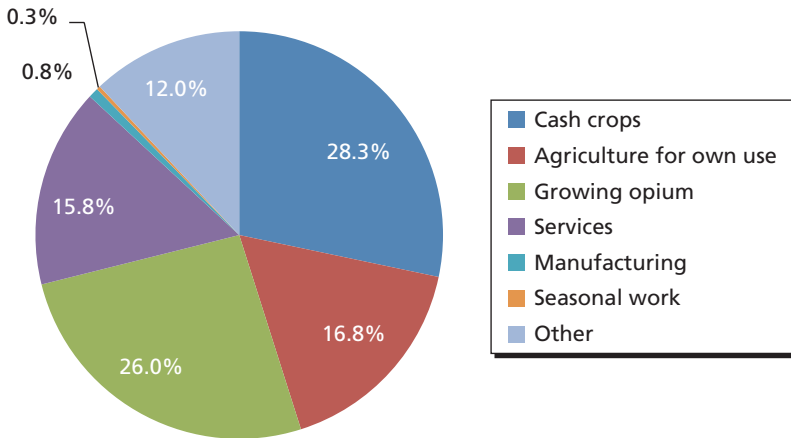
In Helmand province, which dominates Afghanistan's opium market, over 93 percent of the population lives in rural areas. Legal and illegal agriculture account for 75 to 80 percent of economic activ-

¹ World Bank, *Afghanistan Economic Update*, Washington, D.C., May 2011, p. 17; Richard Hogg, Claudia Nassif, Camilo Gomez Osorio, William Byrd, and Andrew Beath, *Afghanistan in Transition: Looking Beyond 2014*, Washington, D.C.: World Bank, 2013. Although the service sector has been more important than legal agriculture in terms of economic output, accounting for a little more than one-half of gross domestic product in recent years, it employs fewer people.

² Wheat, cow milk, beef, mutton, grapes, rice, vegetables, almonds, goats, sheep milk, and berries (FAO, 2013).

³ The more recent *National Risk and Vulnerability Assessment 2011–12: Afghanistan Living Condition Survey* did not report sources of income (Central Statistics Organization of Afghanistan, 2014).

Figure 4.1
Sources of Household Income in Southern Afghanistan, 2007–2008



SOURCE: Central Statistics Organization of Afghanistan, *National Risk and Vulnerability Assessment 2007–08: A Profile of Afghanistan*, Kabul, 2009.

RAND RR1075-4.1

ity and opium poppy is the largest single cash crop. Livestock production accounts for a further 15 to 20 percent of economic activity and services account for another 5 percent. Output from manufacturing is negligible. Helmand is one of the richest provinces in Afghanistan, because of water from the Helmand River, which accounts for 11 percent of Afghanistan's water resources, and because Helmand's irrigation system is in relatively good condition. Earnings from opium poppies are a major factor in Helmand's relative wealth.⁴ Helmand is the largest producer of opium in Afghanistan; it accounted for 43 percent of all Afghan opium produced in 2013.

Kandahar province is more urbanized than Helmand and less reliant on agriculture, but in Kandahar as well, access to irrigated land has raised incomes. Opium poppies are also the most important cash crop: Kandahar produced 12 percent of all the opium produced in Afghanistan in 2013. Together, Helmand and Kandahar accounted for

⁴ Upper Quartile, "Counter Narcotics and Alternative Livelihoods Assessment Helmand," prepared for the Foreign and Commonwealth Office, February 11, 2011, p. 10.

55 percent of Afghanistan's total opium production in that year.⁵ Their combined share of Afghanistan's total output of opium has been even higher: in 2008 it was 80 percent.⁶

Non-Agricultural Sources of Income

There are few opportunities for non-agricultural employment in rural areas in Afghanistan. Service jobs in trucking, communications, finance, wholesale, retail, and government are concentrated in cities or larger towns. In the south, following agriculture, 15.8 percent of incomes come from services, mostly trade and trucking (Figure 4.1). Other sources, which include construction, comprise the next-largest category. Manufacturing, primarily handicrafts and quarrying, generated just 0.8 percent of incomes. In this context, programs to create non-agricultural sources of income have to struggle with the lack of traditional industries and the associated supporting networks, infrastructure, and supply industries. As will be seen, these are key holes that some of the programs we examine have sought to fill.

Program Selection

Because of the importance of agriculture to Afghans, foreign donors and the government of Afghanistan have focused many of their efforts since 2002 on increasing agricultural output to raise rural incomes and increase food security. The United States, for its part, has spent over \$18 billion since 2002 on a broad range of rural development programs in Afghanistan, including some that contain explicit provisions to encourage farmers not to grow opium. All the programs are designed to raise incomes from cultivating legal crops or raising poultry and livestock, potentially making these alternatives more attractive compared to cultivating opium poppies.

The elements of these programs tend to fall into seven broad categories:

⁵ UNODC, *Afghanistan Opium Survey*, 2013.

⁶ UNODC, *Afghanistan Opium Survey*, 2009.

1. subsidizing agricultural inputs such as fertilizer, seeds, saplings, and vines
2. subsidizing or providing grants for farm equipment or facilities
3. repairing, expanding, or constructing new infrastructure, such as irrigation systems or roads
4. introducing or diffusing new technologies
5. providing cash-for-work opportunities
6. promoting links between farmers and markets
7. promoting non-agricultural rural enterprises.

Donors have also designed and implemented non-agricultural rural development programs to increase incomes and expand the range of employment options for Afghans living in rural areas. Some of these programs have focused on expanding opportunities for women, who traditionally have had few options for generating income outside the home. In some cases, the programs have been specifically designed to provide alternatives to the cultivation of opium poppy by inducing farmers who currently cultivate poppies to engage in other activities.

To identify a set of programs for analysis, we first compiled a list of all the programs involving agricultural and non-agricultural development that had been implemented in Afghanistan between 2002 and 2014. The list, provided in Appendix D, was generated from discussions with development professionals and agencies engaged in Afghanistan and searches of the many databases and program documents maintained and posted by the World Bank, USAID, DfID, UNODC, and other foreign-assistance agencies. Subsequently, we selected about two dozen of these programs for review and discussion with our sponsors at INL. Our initial criteria included size, availability of data, ties to CN efforts, and location, with a preference for programs implemented in southern Afghanistan. In consultation with INL, we then selected seven of these programs, each of which was implemented between 2004 and 2014:

1. Agricultural Development Program–Southern Region (ADP South)

2. Afghanistan Vouchers for Increased Production in Agriculture (AVIPA)
3. Afghanistan Vouchers for Increased Production in Agriculture–Plus (AVIPA-Plus)
4. Helmand Agriculture and Rural Development Program (HARDP)
5. Incentives Driving Economic Alternatives for the North, East, and West (IDEA-NEW)
6. Comprehensive Agriculture and Rural Development Facility (CARD-F)
7. Commercial Horticulture and Agricultural Marketing Program (CHAMP).

In this chapter, we assess the effects of each of these seven programs, in turn, on incentives for Afghan farmers to grow opium poppies. For each program, we provide a table that summarizes the potential effects of the program, factor by factor, on the decision to grow opium poppy. The tables employ the same landholding categories and notation as the factor map presented in Chapter Three. In particular, for each of the three categories of landholding (very small, small, and medium to large), the tables indicate whether the relationship between the factor and the poppy cultivation decision is positive, negative, or indeterminate. In Chapter Three, there were two instances involving households with larger landholdings in which we noted alternative interpretations parenthetically. In those cases, the theoretical model indicated one general result but the data suggested the potential for a different positive or negative relationship with sufficient clarity to warrant the additional notation. Here, we introduce a larger number of parenthetical findings to account for greater specificity regarding the terms of each program. For example, the model indicated indeterminacy for “investment” as a general type of agricultural input, but we can sometimes say something more definitive about the effects of a subsidy on a particular class of investments, such as grape trellises and hoop greenhouses.

1. Agricultural Development Program–Southern Region (ADP South)

Program Description

ADP South, a program implemented by Chemonics International, was initiated in 2005 and ran through 2009. Projects under this program were implemented in the provinces of Helmand, Kandahar, and Uruzgan. The vast majority of the projects were located in Helmand, especially in and around the capital of Helmand, Lashkar Gah.⁷ Chemonics spent over \$40 million per year on the program, which included overhead and other expenses.

ADP South had two strategic objectives:

1. Facilitate and accelerate legal economic activities in areas where opium poppy is grown.
2. Provide immediate opportunities for income to poor households whose livelihoods depend on cultivating opium poppy.

Initial planning for ADP South envisioned employing an area-based development approach by which projects would create agro-processing chains. Primarily due to the security situation, ADP South ended up consisting of a combination of agricultural development, infrastructure, cash-for-work, and rural enterprise development projects. The agricultural projects consisted of the subsidization of higher-quality agricultural inputs, primarily through the provision of better seeds, as well as subsidized fertilizer. Infrastructure projects focused on roads and irrigation systems, although they also included a small airport and improvements to the electric power grid. Cash-for-work projects involved mostly road maintenance and the rehabilitation of irrigation systems. ADP South also supported the development of commercial agriculture, including the development of a hatchery operation to support small-scale chicken broiler operations. It also disseminated subsidized plastic coverings for low greenhouses, and the creation of rural businesses.

⁷ USAID, *Evaluation Report for Alternative Development Program (ADP) Southern Region*, 2010, pp. 1–2.

Program Results

Provision of Subsidized Higher-Quality Seeds, Fertilizers, and Feed

One of the largest projects undertaken by ADP South was the subsidization and distribution of higher-quality wheat seed and fertilizer. As part of this effort, ADP South also implemented programs to provide training and information to local farmers through extension agents. Under this project, ADP South reported that 110,500 farmers received seeds and fertilizer; 26,800 of those farmers also received training in properly using these inputs. The provision of subsidized wheat seed and fertilizer contributed to increases in wheat yields. In 2009, average yields on the 15,000 hectares farmed by 19,154 participating farmers were up 30 percent from the previous year. The same project provided subsidized better-quality seed for corn and peanuts; farmers who grew these crops using better-quality seed and higher applications of fertilizer also experienced increased yields, but the number of farmers and the land planted with these crops were smaller compared to wheat.⁸ According to the final evaluation report, the program faced challenges ensuring that suppliers actually provided the higher-quality seed for which they were contracted; some suppliers attempted to substitute lower-grade seed.⁹

The program also gave 10,000 tons of free feed to needy herders and farmers during the harsh winters of 2006–2007 and 2007–2008. The project was not designed to be sustainable, but to help households get through a difficult period.¹⁰ This effort is reported to have helped recipients sustain herd sizes and average carcass weight.

Training

According to the final evaluation report for this program, short training workshops in better cultivation and fertilizer practices did not appear to have had an enduring effect on farmer practices and yields. The evaluation team noted that short-term training courses are easy to conduct and report, but have much less of an impact than extension

⁸ USAID, 2010, pp. 1–2.

⁹ USAID, 2010, p. 3.

¹⁰ USAID, 2010, p. 13.

services that provide continued training needed to convince farmers to change traditional modes of farming.¹¹ Several of the Afghan interviewees from our survey who worked as trainers stated that attendees at their training courses did not absorb or subsequently implement what they had been taught.¹²

Development of Commercial Crops and Livestock Products

The program implemented several projects designed to increase the production of cash crops. One of these projects attempted to expand the production of higher-value vegetables for commercial sale through the provision of 200 hoop greenhouses and 150 drip irrigation units. Although farmers successfully deployed the greenhouses and irrigation units to grow off-season vegetables, the project failed to induce commercial trade in vegetables. Program evaluators traced the failure of this project to the security situation and the costs of transporting the vegetables to urban markets.¹³ CHAMPS and CARD-F, which are discussed later in this chapter, subsequently repeated this effort and had some success in developing commercial markets for vegetables grown under plastic. One reason for the difference in outcomes between ADP South and CHAMPS may have been timing: in these later programs farmers and wholesalers were better able to bring vegetables to urban markets perhaps because the security situation and transportation infrastructure had improved.¹⁴

Another project under ADP South that was designed to expand the cultivation of fruits and nuts as cash crops had more success. The project provided subsidies to plant 500,000 pomegranate saplings, 20,000 grapevines, and 800,000 fruit tree saplings. Losses of pomegranate saplings ran from 15 to 50 percent; dead saplings were usually replaced. Losses of pitted or stone fruit saplings (peaches, plums, etc.) were estimated at 30 percent, which is considered normal. Losses might have been reduced if the program had provided extension ser-

¹¹ USAID, 2010, p. 30.

¹² Survey responses from interviewees who had served as instructors.

¹³ USAID, 2010, p. 3.

¹⁴ Discussions with development professionals in Kabul, September–October 2013.

vices to help farmers care for the trees after planting; orchard care was the farmers' responsibility.

The program also sought to transfer information and newer technologies to farmers. It included a project to demonstrate the use of trellises for vineyards. Trellising using concrete poles on which to train the vines can reduce losses from spoilage and pests that occur when the grapes lie on the ground, as they do under the traditional Afghan practice of cultivating grapes on earth embankments. Trellises also make harvesting easier because the grapes are elevated. Yields from vines that grow on trellises are double or more those from vines grown in the traditional manner. Despite the potential increases in yields, few Afghan farmers adopted trellising after training, even when they were given trellises for free.¹⁵

As in other agricultural assistance programs in Afghanistan, projects to introduce new cash crops were less successful than efforts to reinstate or expand traditional cash crops. A number of our interviewees in Kabul stated that, in light of the transportation costs and absence of links to commercial markets, projects to introduce new cash crops have not been successful. In the case of ADP South, a project to grow chili peppers (a non-traditional crop) for commercial sale failed because there was no domestic demand.¹⁶ Interviewees harshly criticized the project; farmers were unable to sell their crop because there was no existing local market. Farmers had planted the peppers under the expectation that the project would ensure that they could sell their crop.¹⁷

The program also subsidized the creation of feedlot operations for sheep and poultry. Much of the animal feed and some of the wheat and corn did not reach its intended beneficiaries. Beneficiaries who did receive the feed often resold it; a program evaluation found that about one-half of the animal feed distributed to farmers was resold to other farmers. Kuchis, a nomadic people, were the targets of the feedlot operation for sheep. Despite the potential for more profitable

¹⁵ USAID, 2010, p. 10.

¹⁶ USAID, 2010, p. 4.

¹⁷ Survey responses from interviewees who had served as project implementers.

operations from feeding lambs in feedlots with commercial feed, the Kuchis reverted to traditional animal husbandry practices after the project ended.¹⁸

Improving Distribution and Processing

One of the major challenges to increasing farm incomes in Afghanistan has been to provide products demanded by wholesalers serving urban and export markets. One project implemented by ADP South provided assistance to raisin drying operations in Kandahar to improve quality by introducing better drying techniques, including covering raisins to reduce the amount of dust that mixed with the raisins before packaging. According to the program evaluation, this project was not of a scale to lead to appreciable improvements in the quality of the product.¹⁹

ADP South also subsidized transportation costs to support fruit exports. This project did not lead to sustainable exports, as exporters relied on the export subsidy to make their operations profitable: exports fell sharply in 2009 once subsidies were eliminated.²⁰

Discussions with U.S. government officials suggested that the project also entailed some counterproductive effects. Wholesalers tend to ship higher-quality fruit longer distances than lower-quality fruit, because the former commands a price premium that warrants the additional shipping expenditures. Given the transportation cost subsidy, Afghan exporters began to ship lower as well as higher-quality fruit to Dubai and other export markets. The lower-quality fruit reportedly served to hurt Afghanistan's brand image, leading to a reduction in the traditional premium given pomegranates and raisins from Afghanistan.²¹

Another project, the Bolan Poultry Farm, included a hatchery, feed mill, and a training facility for farmers in Lashkar Gah. The hatch-

¹⁸ USAID, 2010, p. 4.

¹⁹ USAID, 2010, p. 10.

²⁰ USAID, 2010, p. 21.

²¹ Discussions with U.S. government officials in Kabul and Kandahar in October 2012 and by telephone to Helmand in September and October 2013.

ery provided chicks, feed, and veterinary services for both broiler and laying operations. By July 2009, the operation was supplying 110,000 chicks on an annual basis to farmers. Hatchery employees visited purchasing farms on a daily basis to provide advice on feeding and care of the chicks. Properly rationing feed is crucial for the profitable management of poultry operations. By January 2010, the operation was supplying 33 farms, which each raised 3,500 to 4,000 chickens. The Helmand Provincial Reconstruction Team continued to work with this hatchery from 2011 to 2013, including providing mentoring for financial management, putting the operation on much sounder footing. By the end of 2013, the hatchery was reportedly producing 50,000 newly hatched chicks per month, or 600,000 per year.²²

The hatchery faces competition from imported chicks from Pakistan; costs of importing chicks from Pakistan were reportedly \$0.50 per chick, whereas Bolan hatchery costs were \$0.60 per chick and might need to be \$0.80 for the operation to be truly profitable. The operation also suffered from the relatively high cost of importing feed from Pakistan, which undercut the competitiveness of eggs and chickens grown in Afghanistan compared with imports from India and Pakistan. On the other hand, the quality and size of eggs and the quality of poultry meat reportedly were superior to the imported Pakistani products and local consumers may have been willing to pay a premium for the better product.²³

ADP South constructed four small feed mills in Kandahar and Helmand to produce high-quality feed for sheep, but the mills were not viable once the project subsidy was removed. ADP South also provided veterinary services, although the 42 field units given to the Afghans quickly became unserviceable.²⁴

Investments in Infrastructure

ADP South implemented initiatives to clean canals, irrigation ditches, and drains. It also funded projects to shore up flood walls and repair

²² Comments supplied by USAID.

²³ USAID, 2010, p. 12; comments supplied by USAID.

²⁴ USAID, 2010, p. 13.

floodgates and other components of the system. ADP South reported that projects to rehabilitate and restore irrigation systems resulted in improved provision of water to 89,500 hectares, of which 56,600 hectares were newly irrigated land.²⁵

Cash-for-Work

On an annualized basis, the project reports that 276,000 full-time equivalent jobs were provided in the three provinces. Because these projects were short term, many more Afghans participated in these programs than the numbers suggest, potentially 750,000 or more. The jobs provided short-term cash infusions into the local economies, raising incomes temporarily.

Rural Enterprise Development

The program also engaged in training Afghan women to work at home making bags, garments, and carpets. The women were also given a tool kit at the end of the training course, but few, if any, of the women who participated continued this work after the end of training.²⁶

Consequences for Farmers' Decisions on Cultivating Opium Poppies

We begin by listing the ADP South projects that might have affected farmers' decisions to cultivate opium poppy because they appeared to have a tangible effect on factors that influence those decisions, as laid out in the factor map. If program evaluators argued that a project had failed to have positive outcomes, we do not include it. For example, if the project did not generate sustained outcomes—i.e., the activities funded by the project ended with the project or the project was so small that it only affected a small group of people—we did not include the project in our assessments of effects on opium poppy cultivation. The projects we identified as potentially affecting decisions to grow opium poppy include:

- subsidization of higher-quality seeds and fertilizers
- development of commercial crops

²⁵ USAID, 2010, p. 7.

²⁶ USAID, 2010, p. 6.

- investments in irrigation systems
- provision of cash-for-work opportunities.

Table 4.1 shows the avenues through which these ADP South projects might have affected farmer decisions to grow opium poppy. Some of these factors have overlapping or offsetting influences. In the rest of this section, we trace out these linkages and their effects.

Provision of Subsidized Higher-Quality Seeds and Fertilizers

Subsidies for higher-quality wheat seed would affect farmers' decisions to grow wheat or opium poppy by reducing costs and increasing yields. For farmers with medium to large landholdings, the provision of higher-quality, subsidized wheat seed with improved yields should increase the appeal of wheat relative to opium poppy. The subsidy reduces the farmer's cost, raising returns by the amount of the subsidy. Planting higher-yielding varieties should also increase returns as the farmer is able to harvest more wheat per hectare.

For farmers with small holdings of land, the story, as captured in the household decisionmaking model, is different and perhaps contrary to intuition. Because these farmers are more concerned about feeding themselves and their families than are farmers with medium to large landholdings, they might be more likely to plant wheat or other food crops, even if returns to opium poppy are much higher, because they want to make sure they have enough to eat. For these farmers, the greater yields from higher-quality wheat seed could relax some of the pressure from dietary concerns and, thus, enable them to plant more opium poppy than previously to take advantage of the higher returns of that crop. Alternatively, a farmer might have so little land that he must monocrop opium poppy for cash income because he cannot possibly grow enough wheat to meet his family's subsistence needs. In that case, the better wheat yields could enable the farmer to reach a tipping point and shift from opium poppy to wheat.²⁷ In addition, to the extent that the seed is more disease-resistant than traditional seed, farmers might have more confidence that they will harvest a substantial crop

²⁷ See the discussions of the tipping point in Chapter Three and Appendix C.

Table 4.1
Implications for Growing Opium Poppy of Factors Affected by ADP South

Project and Associated Factors	Very Small Landholding	Small Landholding	Medium to Large Landholding
Subsidizing agricultural inputs, such as			
Higher-quality wheat seed			
Lower cost of recurring input	Negl. ^a	Negl. ^a	Negl. ^a
Increased yield, returns	Ind.	Ind.	Ind. (-)
Fertilizer			
Lower cost of recurring input	Ind. (-)	Ind. (-)	Ind. (-)
Increased yield, returns	Ind.	Ind.	Ind. (-)
Higher-quality saplings and vines			
Lower cost of investment input	Ind. (-)	Ind. (-)	Ind. (-)
Increased price, returns	-	-	-
Increased yield, returns	Ind. (-)	Ind. (-)	Ind. (-)
Repairing, expanding, or constructing new infrastructure, such as			
Irrigation systems			
Increased yield, returns	Ind.	Ind.	Ind. (-)
Providing cash-for-work opportunities			
Additional outside income	Ind.	Ind.	+ (-)
Increased labor costs	Ind.	Ind.	-

SOURCE: RAND staff analysis based on RAND factor map, framework, and program assessment.

NOTES: + = positive relationship; - = negative relationship; Ind. = indeterminate relationship, given available information; () = case-specific result or alternative interpretation; n/a = not applicable; negl. = negligible.

In each column, we first provide the general result, shown in Figure 3.1; then, in parentheses, we provide the result or interpretation that is specific to the program at hand, if it differs from the general result. In the case of outside income, we provide the results from the household model and an alternative interpretation, based on empirical evidence, both of which are also shown in Figure 3.1.

^a The cost of wheat seed is negligible both in absolute terms and relative to other costs.

and feel less need to plant as much wheat as previously to ensure an adequate food supply.

How large an impact could the provision of higher-quality wheat seed by ADP South have had in terms of narrowing the gap in returns between opium poppy and wheat? Making the strong assumption that the higher-yielding wheat seed was responsible for all of the 30-percent increase in yields farmers experienced in the year following the program, our crop budgets for the CCA in Helmand suggest that these seeds might have lifted net returns of \$386 per hectare for wheat to \$733. Such an increase would have narrowed the gap between the net return of \$3,544 per hectare for farmers who used their own land and labor to grow opium poppy from 11 percent to 21 percent of the net return to opium. However, it is highly doubtful that higher-yielding varieties of seeds alone accounted for this increase, as better weather and increased fertilizer applications both played significant roles. In contrast to subsidized fertilizer, higher-quality seed does carry over into succeeding years, as farmers save the higher-yielding varieties from their harvest to plant the next year's crop, so the project should have served to keep yields higher in the following years.

The cash value of the subsidized seed is unlikely to have played a meaningful role in farmers' decisions to grow wheat rather than opium. In our crop budgets, the cost of wheat seed per hectare is only \$49. Subsidized seed might have reduced the gap between returns to opium and returns to wheat by only 1.6 percent.

In the decision framework, the analysis of the effect of fertilizer subsidies on decisions to grow wheat or opium poppy are even more complicated because fertilizer is an input that can be used to grow wheat, opium poppy, or any other crop. The yield effect of the subsidies might lead some poorer farmers to shift land into opium poppy, given a lesser concern about food security, or reach a tipping point, but the yield effect might also boost returns across crops.

As noted in Chapter Three and Appendix B, farmers in Afghanistan use similar amounts of fertilizer per hectare for both wheat and opium poppy. However, chemical fertilizer composes a much higher share of total input costs for wheat than for opium: 38 percent compared with 15 percent. Subsidies to reduce the cost of chemical fertil-

izer would apply equally whether the fertilizer is used to grow opium poppy or wheat, but in percentage terms it would have a much greater impact on returns from wheat because chemical fertilizer costs make up a much higher share of total costs, possibly making wheat relatively more attractive than it had been prior to the subsidy.²⁸

For wealthier farmers, we might expect the balance of effects to be negative for opium poppy, but the empirical result would come down to issues of relative, marginal returns; for poorer farmers, the effects are indeterminate.

In terms of longer-term goals of increasing household incomes, the provision of subsidized fertilizers increases farm incomes only in the year in which the subsidy is provided. It provides a one-off benefit, but in contrast to higher-yielding wheat seed, farmers do not obtain a recurring benefit because they have to purchase fertilizer in subsequent years.

Provision of Subsidized Saplings

ADP South subsidized saplings and provided farmers training to develop orchards. Applying the factor map, we find that introducing crops that provide net returns closer to those of opium poppy should make farmers less interested in cultivating opium poppy than previously, if the new crops compete directly with opium poppy for land use. The provision of subsidized, higher-quality saplings reduces the cost of this investment. It also increases returns because of the higher prices farmers are likely to get from higher-quality fruit and from higher returns from more-productive varieties. Once a farmer plants an orchard, he might tend it until the trees reach the end of their productive life. If the farmer culls low-yielding trees and replaces them with new saplings, orchards can remain viable for very long periods, remov-

²⁸ We estimate that farmers apply on average 225 kilograms of diammonium phosphate (DAP) and 350 kilograms of urea per hectare of opium poppy and 245 kilograms of DAP and 250 kilograms of urea per hectare of wheat and the same amount of manure for both crops. Excluding the cost of manure, the estimated costs of fertilizer is \$308 per hectare for opium poppy and \$289 per hectare for wheat. However, as a share of total costs of \$2,105 per hectare for opium and \$770 per hectare for wheat, chemical fertilizer runs 15 and 38 percent, respectively (see Appendix B, Tables B.1 and B.2).

ing at least some of this land from growing other crops, including opium poppy. In the case of farmers with very small or small landholdings, the orchards might be most likely to crowd out opium poppy, as the farmers would still grow enough wheat to meet subsistence requirements. But farmers with larger landholdings who plant orchards might also reduce cultivation of other cash crops with lower returns, potentially including wheat grown as a cash crop.

In Afghanistan, mature orchards generate substantial revenues, potentially comparable to opium poppy. A pomegranate orchard can produce as much as 19,500 kilograms of pomegranates per hectare at a potential value of \$7,800. Revenues from peaches are less; assuming 780 trees per hectare, 10 kilograms of peaches per tree, and farm-gate prices of \$0.20 per kilogram, farmers could generate \$2.00 per tree or \$1,560 per hectare in initial revenues. If yields rise to 20–30 kilograms per tree—normal commercial yields for mature Afghan orchards—gross revenues per hectare could rise to \$3,120 to \$4,680 per hectare.²⁹ This contrasts with gross revenues of \$5,649 per hectare from opium, according to our crop budgets.

We were unable to obtain complete data with which to calculate net returns per hectare for pomegranates and peaches. Orchards are substantially more expensive to start than wheat or opium poppy fields. The costs of providing and planting the saplings, which were covered by ADP South, ran to \$2,829 per hectare, which runs \$283 per hectare per year if spread over ten years, the typical life of an orchard.³⁰ Annual costs of irrigation and fertilizer are about \$1,500 per hectare. Picking fruit is labor-intensive, but probably not as labor-intensive as opium poppy because pickers only harvest the tree once. When orchards are first planted, farmers face large financing costs as the orchards do not generate revenue until the trees reach maturity, which can take two to three years. If this land were not planted to opium poppy, farmers who farm their own land would forego annual net income of as much as \$3,544 per hectare, if not planting other crops, including poppy, between the rows of saplings. Farmers also face considerably greater

²⁹ USAID, 2010, p. 81.

³⁰ USAID, 2010, p. 10.

problems in transporting their crop to market compared to opium. They face much greater risks from spoilage and price volatility: fruit prices tend to plummet when large volumes of fruit come to market. That said, assuming similar labor and other costs, returns from mature orchards could be competitive with the returns per hectare for opium.

Investments in Irrigation Systems

Irrigated land in southern Afghanistan is much more productive than rain-fed land. In Helmand and Kandahar provinces, investments in irrigation systems increase yields on land that formerly had very low—or even zero—productivity. In much of Helmand and Kandahar provinces, crops cannot be grown unless they are irrigated.

Expanding and repairing irrigation systems can boost the yields of all crops, including opium poppy. Whereas better irrigation should improve the relative attractiveness of water-intensive crops, improved yields in wheat crops could lessen poorer farmers' concerns about food security and, thus, increase their interest in shifting land to higher-return crops, like opium poppy, or lead them to a tipping point and a shift into wheat. For wealthier farmers, we might expect the balance of effects to be negative for opium poppy, but the empirical result would come down to issues of relative, marginal returns; for poorer farmers, the effects are indeterminate.

Cash-for-Work

A major goal of the cash-for-work projects under ADP South was to increase household incomes of participants. Cash-for-work was a key component of the projects to build and repair irrigation systems. Because these projects depend on continued donor support, they are not self-sustaining, unlike projects that serve to make ongoing activities like farming or fruit processing more productive. The projects were also an important element in the campaign to generate support for the Afghan government and reduce support for the insurgency.

Cash-for-work projects could affect decisions to grow opium poppy by increasing the cost of labor, if serving to promote higher wages, and by increasing external incomes, directly, through new opportunities.

As captured in the household model, for farmers with medium or large landholdings, higher labor costs tend to reduce incentives to grow

opium poppy, but, for farmers with very small and small landholdings, the effects of higher labor costs are indeterminate. For farmers with very small and small landholdings, the increased cost of wage labor would discourage opium poppy cultivation, as it would for wealthier farmers with medium to large landholdings, but the higher wages paid for their own labor might discourage or encourage opium poppy cultivation.

As shown in Table 4.1, additional outside income could favor opium poppy cultivation among farmers with medium to large landholdings by enabling them to shift more land into opium poppy to take advantage of the higher returns.³¹ For farmers with very small and small landholdings, the outside income opportunity could also provide an opportunity to shift more land to wheat to account for consumption risk—the balance of effects is unclear. Poorer families with especially small landholdings—insufficient to meet household food requirements—might no longer feel compelled to grow opium poppy to purchase food. These farmers might choose to grow more wheat, substituting the additional income for revenues that they might have earned from growing opium poppy.

Cash-for-work programs might, in the short-run, put upward pressure on rural wages, as the projects increase demand for rural labor. An increase in labor costs reduces incentives to grow opium for farmers with medium to large landholdings. According to our crop budget, if a farmer hires all the labor to grow and harvest opium, rather than drawing on labor from his own household, it costs him \$3,076 per hectare (\$1,960 for harvest labor and \$1,116 for non-harvest labor), or 54 percent of total revenues. In 2012, average daily wages at harvest were \$9.80; wages averaged \$6.20 a day for non-harvest labor. Providing higher wages for labor through cash-for-work programs during harvest could push up these costs, making opium production less profitable. For farmers who hire all their labor, a 10-percent increase in wages would cut net returns by \$308.

For poorer households, the effects of increased wage rates are more complicated. As a supplier of labor, male members of the household are

³¹ As reported in Chapter Three, the household model suggests a positive effect on opium poppy cultivation, but other evidence suggests the possibility of a net-negative effect.

able to earn more income from paid labor off the farm. As noted earlier, the balance of effects of outside income for farmers with very small and small landholdings is indeterminate and might favor opium poppy or wheat. On the other hand, these poorer households also have to hire labor at harvest, so the increased costs of harvest labor makes opium poppy relatively less attractive.

We were informed that cash-for-work projects induced some men in Helmand, Ghor, and other provinces who traditionally worked the opium harvest not to do so.³² Although we found evidence of increases in wages paid at harvest (see Table B.6), farmers in the south have located enough labor on balance to substantially increase the opium harvest in recent years. Moreover, as wages for unskilled labor rose in urban areas in Afghanistan over the course of the past decade, drawing unskilled labor away from farms, opium farmers have continued to attract migrant labor from Pakistan and poorer provinces in Afghanistan to the harvest.³³

A major goal of ADP South was to provide alternatives to growing opium poppy. In fact, Afghan participants had to promise that they would not cultivate opium if they were to participate in the program. A number of Afghan implementers whom we interviewed stated that the program and the farmers took these promises seriously and that the incidence of farmers taking part in programs like ADP South and continuing to grow opium poppy was small, in part because farmers believed that they would be barred from future participation in such programs.

Data from UNODC show that the number of hectares of opium poppy under cultivation in the three southern provinces of Helmand, Kandahar, and Uruzgan rose between 2004 and 2007 and stagnated in 2008, when the program was underway. They fell sharply in 2009, and then gradually recovered, surpassing their previous peaks in 2013 (Table 4.2). Tonnage of opium rose sharply over the course of the project; fell in 2009; and then, due to poor yields primarily from blight,

³² Discussions with U.S. government officials in Kabul and Kandahar in October 2012 and by telephone to Helmand in September and October 2013.

³³ Mansfield, 2006.

failed to recover to previous peaks through 2012. In short, these data do not suggest that ADP South had a tangible, lasting effect on overall opium cultivation. Components of the program, such as the provision of subsidized saplings and training in caring for orchards, did introduce crops competitive with opium poppy on a revenue basis. Investments in irrigation systems increased yields of irrigated crops, raising household incomes. However, in the context of the overall environment for cultivating opium poppy in southern Afghanistan, including the security situation, ADP South was not followed by a decline in cultivation.

2. Afghanistan Vouchers for Increased Production in Agriculture (AVIPA)

Program Description

AVIPA was a relief program initiated in September 2008, funded by USAID, and implemented by International Relief and Development, Inc. (IRD).³⁴ It was designed to help farmers in the north and west of Afghanistan who had suffered from a severe drought in 2008 to get back on their feet. It was not explicitly designed to reduce the cultivation of opium poppy. The initial program was confined to nine provinces but, after the first two months, in November 2008 the program was extended to an additional five provinces in the north.³⁵ The program extension that added these provinces was referred to as AVIPA Phase 2. AVIPA Phase 3 began in May 2009, when an additional four provinces surrounding Kabul were added to the program.³⁶

The primary program component consisted of providing selected farmers with packages of higher-quality wheat seed and fertilizer at

³⁴ Among other documents, the program description and discussion in this section draws heavily on USAID and IRD, *Afghanistan Vouchers for Increased Production in Agriculture (AVIPA) Plus: Final Report September 1, 2008–November 15, 2011, 2012*.

³⁵ The initial nine provinces were Farah, Herat, Ghor, Badghis, Faryab, Sari Pul, Jawz-jan, Balkh, and Samangan; the additional five provinces were Bamiyan, Baghlan, Kunduz, Takhar, and Badakhshan.

³⁶ Panjshir, Parwan, Kapisa, and Kabul provinces.

Table 4.2
Opium Poppy Cultivation and Opium Production, by Provinces Participating in ADP South

	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Net Hectares of Poppies Cultivated in Provinces Participating in ADP South												
Helmand	29,950	15,371	29,353	26,500	69,324	102,770	103,590	69,833	65,045	63,307	75,176	100,693
Kandahar	3,970	3,055	4,959	12,989	12,619	16,615	14,623	19,811	25,835	27,213	24,341	28,335
Uruzgan	5,100	4,698	7,365	2,024	9,703	9,204	9,939	9,224	7,337	10,620	10,508	9,880
Total	39,020	23,124	41,677	41,513	91,646	128,589	128,152	98,868	98,217	101,140	110,025	138,908
Tons of Opium Produced in Provinces Participating in ADP South												
Helmand	NA	NA	NA	1,004	2,801	4,399	5,397	4,085	1,933	3,044	1,699	3,293
Kandahar	NA	NA	NA	492	405	739	762	1,159	768	1,308	550	658
Uruzgan	NA	NA	NA	77	236	411	518	540	218	511	237	229
Total	NA	NA	NA	1,573	3,442	5,549	6,677	5,784	2,919	4,863	2,486	4,180

SOURCE: UNODC, *Afghanistan Opium Survey*, various years.

NOTE: Net hectares equal hectares planted minus eradication. Over the years, the eradication data have been verified to varying degrees. Based on UNODC reporting (*Afghanistan Opium Survey*, various years), we assume little or no verification through 2003–2004 and partial to complete verification for subsequent years. For 2002–2003, UNODC reported that the eradication data were not verified. UNODC did not present an eradication estimate for 2003–2004. For 2004–2005 through 2006–2007, UNODC reported verification of most of each of the estimates that it presented in the annual surveys. From 2007–2008 onward, UNODC reported full verification of the eradication data.

reduced cost to help them plant the next crop following the drought. The packages of seed and fertilizer differed depending on whether the seed was to be planted on irrigated or rain-fed land. The packages included seed, one 50-kilogram bag of DAP fertilizer, and two 50-kilogram bags of urea fertilizer for farmers with irrigated land. Farmers planting wheat on rain-fed land did not receive the bags of urea fertilizer. Farmers were asked to make a copayment of 15 percent of the value of the package to discourage expectations that seeds and fertilizer were likely to be distributed for free in the future. Copayments also lessen the likelihood that individuals who did not intend to plant wheat would enroll in the program to receive a free hand-out.³⁷ The combined package of higher-quality wheat seed and fertilizer for irrigated land had a market value of 1,350 afghanis (\$28 at the time); the combined package for rain-fed land had a market value of 1,000 afghanis (\$20.70). In general, most of the seed was procured from Afghan suppliers who had been certified by FAO in the context of another development assistance program. When certified seed was not available from these companies, the program purchased local seed.

The program was implemented in conjunction with MAIL. MAIL selected the provinces that were to participate. Provincial governors, district councils, and local Directorates of Agriculture, Irrigation, and Livestock participated in choosing districts. Within the districts, AVIPA committees selected participating villages. These committees were set up by the program specifically for this task. They consisted of representatives from a variety of local organizations and the contractor.³⁸ Beneficiaries within the participating villages were selected by community development councils and village *shuras*.

In addition to providing these subsidized packages, the program provided some farmers with training in better practices for growing wheat.³⁹

³⁷ USAID and IRD, 2012, p. 10.

³⁸ USAID and IRD, 2012, p. 24.

³⁹ USAID and IRD, 2012, p. 24.

Program Results

The one-year program provided 296,922 farmers and their families with packages of fertilizer and higher-quality seed. The total program cost of purchasing, packaging, and distributing these packages was \$60 million.⁴⁰ Due to shortages of certified seed, 90,000 farmers, 30 percent of the total, received fertilizer only.

There has been some dispute about the extent to which the program improved yields. According to one assessment of the AVIPA Endline Survey, the program did not lead to increased yields. With USAID's approval, IRD reassessed the results of the survey and found that on irrigated land, farmers who participated in the program grew 43 kilograms more wheat per hectare, or 7 percent more than the control group.⁴¹ They found no difference in yields on rain-fed land.

One of the distinguishing features of AVIPA was the scale of the program. According to the Central Statistics Organization of Afghanistan, the settled rural population of the 18 provinces in which packages were distributed was 10.3 million in 2008.⁴² Assuming an average household size of 11, about 3.3 million people living in the 296,922 households benefited from the program, implying that the program benefited one-third of settled rural households in those provinces and about 18 percent of all rural households in Afghanistan.

In light of the size of the program, we would have expected most poor rural households in selected villages to have participated in the program. Some individuals were able to benefit from the program by creating "phantom" farmers; they were able to receive additional packages for fictitious individuals. Some better-off farmers who did not qualify for the program received packages as well, as the program did not have the means to independently verify who within a village was

⁴⁰ USAID and IRD, 2012, p. 117.

⁴¹ The data in the report appear to have been reversed, as the report cites an additional 8.6 kilograms of wheat per hectare, but 43 kilograms of wheat per jerib. As a jerib is much smaller than a hectare and the ratio between the yields and between the size of a hectare and a jerib are identical, we have revised the number quoted in the text (USAID and IRD, 2012, p. 25).

⁴² Central Statistics Organization of Afghanistan, "Settled Population by Civil Division, Urban and Rural and Sex 2008–09," Excel dataset, undated.

poor and who was better off.⁴³ As wheat seed and especially fertilizer have value, it is not surprising that some farmers sold all or part of their voucher packages to other farmers. Although the farmer benefited from the transaction, the packages were reportedly sold at a discount to their purchase cost.⁴⁴ The failure to detect an increase in yields might very well be because sales of discounted packages made fertilizers and higher-quality seed widely available to all farmers, even if some paid for these inputs out of pocket.

Consequences for Farmers' Decisions on Cultivating Opium Poppies

AVIPA might have affected decisions to cultivate opium poppy through two channels: (1) by lowering the costs of both wheat seed and fertilizer, which are two recurring inputs to cultivating wheat, and (2) by increasing wheat yields by providing higher-quality wheat seed and fertilizer. Drawing on the factor map, Table 4.3 traces out the potential consequences for decisions to grow opium poppy.

For farmers with medium to large landholdings, the provision of subsidized higher-yielding wheat seed could favor wheat cultivation, but for farmers with very small and small landholdings, the effects are indeterminate. For poorer farmers, the better yields could serve to relax some of the pressure to make sure they grow enough food. If these farmers are less worried about food security, they may plant opium poppy to take advantage of its higher returns. Alternatively, the higher yields could enable farmers with small landholdings, who currently monocrop opium poppy, to shift to wheat, if they reach a tipping point.

To investigate the importance of the seed subsidy in the farmer's cultivation decision, we provide rough estimates of the potential value of the subsidy to farmers. Using the value of wheat seed from the crop budget—\$0.34 per kilogram (Appendix B)—and 50 kilograms of wheat seed per package, the value of the reduced cost of wheat seed to each farmer was \$17.00. The estimate of increased yields on irrigated land—43 kilograms of wheat per hectare and valuing wheat at \$0.32 per kilogram—yields an additional \$13.80 in value per hectare.

⁴³ USAID and IRD, 2012, p. 64.

⁴⁴ Interview with U.S. government official in Kabul, October 2013.

Table 4.3
Implications for Growing Opium Poppy of Factors Affected by AVIPA

Project and Associated Factors	Very Small Landholding	Small Landholding	Medium to Large Landholding
Subsidizing agricultural inputs, such as			
Higher-quality wheat seed			
Lower cost of recurring input	Negl. ^a	Negl. ^a	Negl. ^a
Increased yield, returns	Ind.	Ind.	Ind. (-)
Fertilizer			
Lower cost of recurring input	Ind. (-)	Ind. (-)	Ind. (-)
Increased yield, returns	Ind.	Ind.	Ind. (-)

SOURCE: RAND analysis based on factor map, framework, and program assessment.

NOTES: + = positive relationship; - = negative relationship; Ind. = indeterminate relationship, given available information; () = case-specific result or alternative interpretation; negl. = negligible. In each column, we first provide the general result, shown in Figure 3.1; then, in parentheses, we provide the result or interpretation that is specific to the program at hand, if it differs from the general result.

^a The cost of wheat seed is negligible both in absolute terms and relative to other costs.

However, this amount of seed is only sufficient to plant one-third of a hectare, so taking one-third of \$13.80 yields an additional \$5.90 for the farmer for a total value generated by the program of about \$19.70 per package received. Although yields on opium poppy in the north and west were not as great as yields in the CCA, even at \$19.70 per hectare, the program only narrowed the gap between the estimated return of \$3,544 per hectare for farmers who use their own land and labor to cultivate opium poppy and the return of \$386 per hectare for wheat by 0.6 percent

Following a drought year, the financial benefit from AVIPA was consequential for poor farmers, making it possible for them to plant wheat and fertilize their crops without going more heavily into debt or, in some instances, going hungry to preserve wheat seed for planting. By lessening financial stress, AVIPA may have reduced the incentive for farmers to plant opium poppy to generate cash income. On the

other hand, by reducing food insecurity, the incentive to grow wheat to ensure that the household did not go hungry may have lessened.

As noted in our discussion of ADP South, the subsidies AVIPA provided on fertilizer had a much greater impact in percentage terms on returns from wheat than returns on opium poppy because chemical fertilizer costs represent a much higher share of total costs of growing wheat than opium. Thus, the subsidies might favor wheat, at least among wealthier farmers, who have less concern about issues of food security, but, for those farmers, the empirical result would still come down to issues of relative, marginal returns.

Although fertilizer could be used for either crop, program design appears to have steered farmers toward using it on wheat. Beneficiaries of the project had to commit to planting the seeds. Surveys of beneficiaries, interviews with implementers, changes in wheat cultivation, and the relative absence of increases in opium poppy cultivation suggest that farmers primarily used the fertilizer for wheat. However, because the subsidy was given for one year only, it did not have a long-term effect on decisions to grow one crop or the other.

AVIPA was targeted at western, northern, and central Afghanistan but, by the time the program was introduced in 2009, most opium poppy production had long since concentrated in the south. As of 2008, before the program took effect, of the 18 provinces cited above, ten were designated by UNODC as “poppy-free” (Table 4.4). Of the eight provinces not so designated, only in one, Farah, did farmers cultivate a substantial number of hectares of poppy: 15,010 hectares in 2008, amounting to 10 percent of Afghanistan’s total opium poppy hectares in that year. The number of hectares of opium poppy cultivated in the other seven provinces ran from 200 to 600 hectares, and the total (minus Farah) was 2,565 hectares, less than 2 percent of total land devoted to opium cultivation in Afghanistan in that year. In short, outside of Farah, AVIPA was not implemented in provinces where farmers cultivated a significant number of hectares of opium poppy. However, with the exception of Panjshir, some farmers in all of the provinces had grown opium poppies at some point over the previous decade.

After the introduction of AVIPA, cultivation of opium poppy declined in Badghis in the 2010 growing season; this decline contin-

Table 4.4—Continued

	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Parwan	0	0	1,310	0	124	0	0	0	0	0	0	0
Kapisa	207	326	522	115	282	835	436	0	0	181	290	583
Kabul	58	237	282	0	80	500	310	132	152	220	120	298
Total	12,786	25,032	42,912	51,984	52,954	33,182	17,575	18,771	19,122	22,267	33,861	33,268

SOURCE: UNODC, *Afghanistan Opium Survey*, various years.

NOTE: Net hectares equal hectares planted minus eradication. Over the years, the eradication data have been verified to varying degrees. Based on UNODC reporting (*Afghanistan Opium Survey*, various years), we assume little or no verification through 2003–2004 and partial to complete verification for subsequent years. For 2002–2003, UNODC reported that the eradication data were not verified. UNODC did not present an eradication estimate for 2003–2004. For 2004–2005 through 2006–2007, UNODC reported verification of most of each of the estimates that it presented in the annual surveys. From 2007–2008 onward, UNODC reported full verification of the eradication data.

ued into 2011. Opium cultivation did not become more widely distributed as the total number of poppy-free provinces remained the same in 2010 as in 2009. However, the number of hectares planted to poppy in 2010 rose substantially in Farah, and, in percentage terms, cultivation increased sharply in Herat and Badakhshan as well. Production in these provinces continued to rise through 2013. As of 2013, eight of the participating provinces remained poppy-free, down from thirteen in 2009.

Looking at the numbers of hectares planted to poppy, we find no indication that farmers reduced opium cultivation after the introduction of AVIPA. On the other hand, the program may have forestalled a return to poppy cultivation on the part of some farmers after the harsh winter of 2008 through the provision of subsidized wheat seed and fertilizer.

3. Afghanistan Vouchers for Increased Production in Agriculture–Plus (AVIPA-Plus)

Program Description

In 2009, USAID authorized a one-year extension of AVIPA, which was named AVIPA-Plus. The extended program differed from AVIPA in several ways. First, funding was raised from \$60 million to \$360 million. Of the additional \$300 million, \$50 million was dedicated to the continuation of AVIPA in the northern provinces. This part of the program was termed AVIPA-Plus North. AVIPA-Plus North duplicated the distribution of subsidized packages of higher-quality wheat seed and fertilizer for an additional year in the same 18 provinces as in AVIPA.⁴⁵ From 2010 to 2011, AVIPA-Plus funded the Afghanistan government's National Seed Distribution Program (NSDP) in an additional 14 provinces. This program was run by MAIL.

The bulk of the additional \$300 million was allocated to stabilization projects, primarily targeted at southern Afghanistan. The years 2009–2011 were the period of the surge of allied forces into

⁴⁵ This section draws on USAID and IRD, 2012, p. 8.

southern and eastern Afghanistan to push back insurgent forces and re-establish Afghan government control in contested areas, especially in the south. As part of the surge, ISAF was looking for assistance programs that could quickly provide benefits for local populations in the south. USAID reconfigured the AVIPA program to provide this assistance. This part of the program was termed AVIPA-Plus South. AVIPA-Plus South was part of ISAF's counterinsurgency strategy and was directed at districts in Helmand and Kandahar provinces targeted by ISAF. These districts also happened to cultivate large amounts of opium poppy. AVIPA-Plus South consisted of four programs: agricultural vouchers, agricultural training and capacity building, cash-for-work projects, and small grants to facilitate the establishment of businesses, primarily sole proprietorships.

The agricultural vouchers program was, by and large, the same as in AVIPA, but was implemented through the three separate subprograms: AVIPA-Plus North, the NSDP, and AVIPA-Plus South. All three subprograms contained the same core component of distributing packages of higher-quality wheat seed and fertilizers to large numbers of Afghan farmers. However, the goals of the subprograms differed, even though the instruments were similar. The goals of AVIPA-Plus North shifted from food security, as the drought had broken in northern and western Afghanistan, to improving farm incomes by improving yields through the continued distribution of subsidized wheat seed and fertilizer. The NSDP focused on improving yields by distributing higher-yielding varieties of wheat seed to farmers throughout Afghanistan. The focus here was on periodically replacing the use of wheat seed held over from the previous year's crop with seed that had been treated to withstand fungi and insect pests and that produced higher yields. Ultimately, the Afghan government and donors are striving toward a more widespread market for wheat seed in Afghanistan that generates higher yields on a sustained basis. The voucher component of AVIPA-Plus South used the same design as AVIPA, but the goal of the subprogram was to contribute to stabilizing Helmand and Kandahar by convincing local populations that they would be better served by supporting the Afghan national government than collaborating with the Taliban or acquiescing to Taliban pressure. The relatively high rate of

subsidization of seed and fertilizer in the south reflected a desire to provide a more substantial economic benefit to farmers.

In addition to the provision of subsidized wheat seed and fertilizers through vouchers, AVIPA-Plus South included a cash-for-work program that employed local labor to clean irrigation canals, participate in building roads, and other similar projects. It also provided small grants to farmers to purchase equipment or to build structures, the most popular of which was the subsidization of purchases of rolls of translucent plastic for greenhouses used to grow vegetables in the winter. Grants were also provided for the purchase of tractors. A fourth component consisted of training programs for farmers in agricultural technologies.⁴⁶

Program Results

Provision of Subsidized Fertilizers, Higher-Quality Seeds, and Saplings

The voucher component of AVIPA-Plus was a large program by almost any standards. AVIPA-Plus North reached 366,420 households representing about 4 million people, or 39 percent of the people living in rural areas in the provinces which it served.⁴⁷ The NSDP targeted an additional 267,020 households representing an estimated 2.9 million people, or 48 percent of the additional rural areas served. AVIPA-Plus South covered close to 45 percent of farming households in Helmand and Kandahar provinces.⁴⁸ AVIPA-Plus South also provided seed packages and fertilizers for growing corn, beans, okra, melon, spices, and forage crops to some farmers, as well as saplings for orchards. Over

⁴⁶ USAID and IRD, 2012.

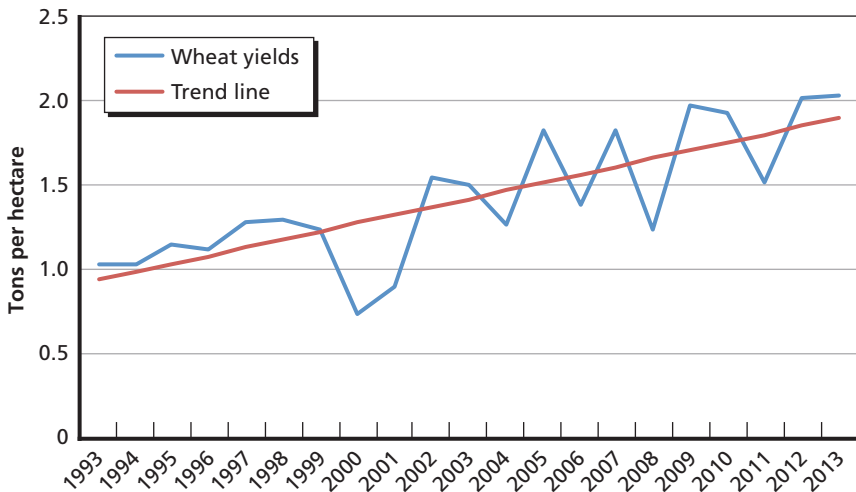
⁴⁷ In addition to the 18 provinces covered under AVIPA (Farah, Herat, Ghor, Badghis, Faryab, Sari Pul, Jawzjan, Balkh, Samangan, Bamiyan, Baghlan, Kunduz, Takhar, Badakhshan, Panjshir, Parwan, Kapisa, and Kabul), 14 provinces were added to the program under NSDP (Parwan, Wardak, Day Kundi, Nangarhar, Nuristan, Ghazni, Paktika, Paktia, Khost, Logar, Nimroz, Kandahar, Zabul, and Uruzgan). Helmand was added under AVIPA-Plus South.

⁴⁸ Calculations based on data from USAID and IRD, 2012, p. 2.

the course of the program, 46,600 farmers in Helmand and 45,000 in Kandahar received vouchers for wheat, vegetables, or other crops.⁴⁹

As shown in Figure 4.2, Afghanistan registered substantial improvements in wheat yields beginning in 2001 that continued into the 2009–2011 period when AVIPA and AVIPA-Plus were being implemented. The benefits of the higher-quality wheat seed provided during this period should have continued into subsequent years as farmers saved seed from their previous year’s crop for planting. This said, improvements in yields also stem from the expansion of irrigated land area due to the reconstruction or expansion of irrigation systems, not just access to subsidized fertilizer and better seed. Several agricultural development programs in Afghanistan have focused on expanding irrigation. Higher farm incomes due to better yields, better access to markets for wheat and cash crops, and repatriated earnings from work in Afghan cities or abroad have made it possible for more households to

Figure 4.2
Average National Wheat Yields in Afghanistan, 1993–2013



SOURCE: FAO, 2013.

RAND RR1075-4.2

⁴⁹ USAID and IRD, 2012, p. 49.

purchase more fertilizer, so the subsidized provision of fertilizer was not the only reason for higher applications and yields.

As noted, assessments of AVIPA indicate that, at least on irrigated land, AVIPA and AVIPA-Plus contributed to higher yields on the order of 7 percent. However, the program has been criticized for its costs and for diversion of subsidized seed and fertilizer.⁵⁰ According to IRD, the program was successful in how the seed was used: 75 percent of the wheat seed was planted for the growing season for which it was distributed and 22 percent was stored to be planted the following year, as a crop had already been sowed; 1 percent of recipients resold the wheat seed and 2 percent used it for flour.⁵¹ Because the wheat seed had been treated with fungicide, it was unsuitable for human consumption; nevertheless, some people consumed bread made from flour that was made with this wheat seed.⁵²

Based on responses from interviews with Afghan project implementers, some of the seed was of poor quality: seeds were disease-prone, not resistant to extreme weather, and needed a substantial amount of water. One Afghan interviewee stated that IRD did not hire specialists to verify the quality of the seed. Another claimed that community leaders “were bribed to accept bad quality seeds.”

Although distribution of subsidized fertilizer and wheat seed was to be targeted to poorer households, according to interviewees, program implementers were unable to differentiate between wealthier and poorer farmers. The broad distribution of vouchers resulted in almost all households, rich and poor, receiving these subsidies. In light of the high cost of attempting to differentiate recipients based on income and the high likelihood of fraud if a targeted approach had been adopted,

⁵⁰ Office of the Inspector General, USAID, *Audit of USAID/Afghanistan's Vouchers for Increased Production in Agriculture (AVIPA) Program*, Manila, Philippines, Audit Report No. 5-306-10-008-P, April 20, 2010 (although the report title states this is an audit of AVIPA, the audit covered both AVIPA and AVIPA-Plus); discussions with U.S. government officials in Kabul, October 2013; interviews with project implementers.

⁵¹ USAID and IRD, 2012, p. 65.

⁵² Discussions with U.S. government officials in Kabul, October 2013.

the more universal approach to distribution was thought to have been more cost-effective.

Another criticism of the program was that the relatively high rate of subsidization was unnecessary to achieve program goals of raising yields. The same goals could have been achieved at less cost, as after the recovery from the 2008 drought farmers should have been able to make copayments to cover some of the costs of seed and fertilizer. Prior to the program, farmers had covered these costs themselves.

According to the Special Investigator General for Afghanistan Reconstruction, the project to distribute saplings to farmers interested in starting or expanding orchards was flawed. AVIPA-Plus distributed more than 300,000 saplings in Arghandab district in 2011, after distributing 600,000 saplings in 2010; the local market became saturated. The large demand for saplings led to the provision of poor-quality trees that had a mortality rate of about 75 percent.⁵³

Subsidies or Grants for Farm Machinery or Structures

AVIPA-Plus distributed more than 4,000 farm mechanization voucher packages. These packages included a two-wheel tractor and implements to farmers in the north, west, and central regions. Farmers had to make a 35 percent copay (approximately \$1,420) of the \$4,054 value of each package. The total value of the program was \$16.6 million.⁵⁴ AVIPA-Plus South distributed 658 in-kind grants worth \$23 million to some 60,300 farm association members. The grants consisted of four-wheel tractors, related implements, and other agricultural machinery and tools. AVIPA-Plus South also distributed free plastic coverings for hoop greenhouses. In addition, the program provided 1,993 water pumps to farmers in Helmand.⁵⁵ In contrast to subsidies for wheat seed and fertilizer, which were extended to most farmers in the recipient areas, subsidies for the purchase of equipment were extended to a small

⁵³ Letter to Ambassador James B. Cunningham, Dr. Rajiv Shah, and Sarah W. Wines from Office of the Special Investigator General for Afghanistan Reconstruction, June 27, 2013, p. 4.

⁵⁴ USAID and IRD, 2012, p. 2.

⁵⁵ USAID and IRD, 2012, p. 50.

fraction of all the farmers in recipient areas. As the value of tractors compared to average household incomes was large, the beneficiaries of that equipment enjoyed a substantial windfall.

Institutional circumstances and inherent design flaws presented challenges during implementation. Not surprisingly, the distribution of equipment packages was subject to corruption and political pressure.⁵⁶ Where tractors were given to collectives, often-cited problems of collective ownership and incentives to use and maintain farm equipment emerged.⁵⁷ Many of the tractors were resold, often in Pakistan, either by members of the collectives or other individuals. Of those tractors that were not resold, many broke down because farmers did not have the technical skills to maintain them and, under the terms of the collective, there was little incentive for individuals to take responsibility for getting the tractor repaired or ensuring efficient use. Irrigation pumps and power units experienced similar fates, although more of the equipment remained in Afghanistan.⁵⁸

Projects to provide and install hoop greenhouses faced fewer challenges than projects to provide tractors. First, the value of the plastic sheeting and hence the subsidy was substantially less than for tractors and other farm equipment, reducing incentives for corruption and politicization of distribution. Second, the sheeting was owned by a single household, not a collective of beneficiaries, potentially resulting in its more-efficient use. Third, the provision of sheeting was often accompanied by other programs focused on helping farmers market winter vegetables produced in the greenhouses to markets in Kabul,

⁵⁶ Letter to Ambassador James B. Cunningham, Dr. Rajiv Shah, and Sarah W. Wines from Office of the Special Investigator General for Afghanistan Reconstruction, 2013, p. 2.

⁵⁷ Evsey Domar, "The Soviet Collective Farm as a Producer Cooperative," in David Prychitko and Jaroslav Vanek, eds., *Producer Cooperatives and Labor-Managed Systems, Volume 1: Theory*, Cheltenham, United Kingdom: Elgar, 1996, pp. 38–61; and David Prychitko and Jaroslav Vanek, *Producer Cooperatives and Labor-Managed Systems, Volume 2: Case Studies*, Cheltenham, United Kingdom: Elgar, 1996.

⁵⁸ See Letter to Ambassador James B. Cunningham, Dr. Rajiv Shah, and Sarah W. Wines from Office of the Special Investigator General for Afghanistan Reconstruction, 2013, pp. 2, 4; discussions with U.S. government officials in Kabul and by telephone to Helmand and Kandahar in September and October 2013.

Kandahar, and other urban areas. The creation of these marketing channels was a key element in making the use of sheeting for winter vegetables profitable.⁵⁹

Cash-for-Work

AVIPA-Plus implemented 1,167 cash-for-work projects in Helmand and Kandahar. The projects provided short-term employment to clean irrigation ditches, repair and construct gravel roads, and work on other infrastructure projects to 171,500 workers for an average of 39 work-days each, for an equivalent of 33,800 full-time jobs paid at approximately market rates. Workers were also given the hand tools needed to undertake these jobs. These projects injected \$42 million in wages and \$15 million in tools into the local economies.⁶⁰ As average household size is about 11 in these provinces, the additional income may have benefited 1.9 million people, a number roughly equivalent to the total population of the two provinces. However, because members of the same household worked on the same projects and some household members worked on more than one project, these numbers do not indicate that every household in Helmand and Kandahar benefited from these projects.

The uptake and interest in the program suggests that participants found it attractive. However, according to our interviewees, participants did not always accomplish the work for which they were contracted. The program has also been criticized for changing expectations about social obligations: In the past, local communities were accustomed to keeping irrigation ditches clean and the system operating effectively, using labor donated by the community. Payment for what had previously been a social obligation may lead to less communal effort in the future, potentially leading to deterioration in the system.⁶¹

⁵⁹ Discussions with U.S. government officials in Kabul and by telephone to Helmand and Kandahar in September and October 2013.

⁶⁰ USAID and IRD, 2012, p. 2.

⁶¹ Discussions with U.S. government officials in Kabul and by telephone to Helmand and Kandahar in September and October 2013.

Training

AVIPA-Plus engaged in a variety of training projects. The largest such effort consisted of short training courses for wheat farmers to improve practices. The project provided training to 252,300 wheat farmers from the 18 northern, western, and central provinces in one to three modules that taught better wheat production practices and pest, disease, weed management, and marketing practices. The training was implemented in coordination with MAIL. AVIPA-Plus South engaged in similar training programs. Training was relatively short, usually lasting a week or less. An additional 208,500 trainees, including 1,700 women and 290 Afghan government employees, graduated from at least one of over 30 courses offered on horticulture, farm mechanization, animal husbandry, cooperative development, and other topics.⁶²

Program documents, assessments, and interview data shed some light on the training associated with AVIPA-Plus. Farmers who attended training appeared to value it. Surveys of farmers who participated in training in Kandahar and Helmand found that large majorities (95.5 percent in Kandahar in 2011 and 70.9 percent in Helmand) reported adopting new farming practices.⁶³ However, responses from interviewees who had been instructors in these types of programs suggested that retention of information and implementation was poor.⁶⁴

Consequences for Farmers' Decisions on Cultivating Opium Poppies

AVIPA-Plus implemented a number of projects that were continuations of or similar to projects under AVIPA and ADP South. For those projects, we summarize the main points of our previous analyses from these two programs. This section assesses the effects of projects under AVIPA-Plus that differed from AVIPA and ADP South.

As with the other assessments of the effects of programs on decisions to grow opium poppy, we begin by listing the projects that may have affected farmers' decisions to cultivate opium poppy because they appeared to have a tangible impact on factors affecting those decisions,

⁶² USAID and IRD, 2012, pp. 27, 42.

⁶³ USAID and IRD, 2012, p. 71.

⁶⁴ Survey responses from interviewees who had served as instructors.

as laid out in the factor map. The projects that we identify as potentially affecting decisions to grow opium poppy are

1. provision of subsidized fertilizers and higher-quality seeds
2. subsidies or grants for farm machinery or structures
3. training for wheat farmers to improve practices
4. cash-for-work projects.

Drawing on the factor map, Table 4.5 shows the avenues through which these projects might have affected decisions to grow opium poppy.

Table 4.5
Implications for Growing Opium Poppy of Factors Affected by AVIPA-Plus

Project and Associated Factors	Very Small Landholding	Small Landholding	Medium to Large Landholding
Subsidizing agricultural inputs, such as			
Higher-quality wheat seed			
Lower cost of recurring input	Negl. ^a	Negl. ^a	Negl. ^a
Increased yield, returns	Ind.	Ind.	Ind. (-)
Fertilizer			
Lower cost of recurring input	Ind. (-)	Ind. (-)	Ind. (-)
Increased yield, returns	Ind.	Ind.	Ind. (-)
Subsidizing or providing grants for farm equipment or facilities, such as			
Farm equipment, such as tractors and water pumps			
Lower cost of investment input	Ind. (-)	Ind. (-)	Ind. (-)
Increased yield, returns	Ind.	Ind.	Ind. (-)
Facilities, such as plastic hoop greenhouses			
Lower cost of investment input	Ind. (-)	Ind. (-)	Ind. (-)
Increased prices, returns (if competing for land use)	-	-	-

Table 4.5—Continued

Project and Associated Factors	Very Small Landholding	Small Landholding	Medium to Large Landholding
Introducing or diffusing new technologies			
Training			
Increased yield, returns (wheat)	Ind.	Ind.	Ind. (-)
Providing cash-for-work opportunities			
Additional outside income	Ind.	Ind.	+ (-)
Increased labor costs	Ind.	Ind.	-

SOURCE: RAND analysis based on RAND factor map, framework, and program assessment.

NOTES: + = positive relationship; - = negative relationship; Ind. = indeterminate relationship, given available information; () = case-specific result or alternative interpretation; negl. = negligible. In each column, we first provide the general result, shown in Figure 3.1; then, in parentheses, we provide the result or interpretation that is specific to the program at hand, if it differs from the general result. In the case of outside income, we provide the results from the household model and an alternative interpretation, based on empirical evidence, both of which are also shown in Figure 3.1.

^a The cost of wheat seed is negligible both in absolute terms and relative to other costs.

Provision of Subsidized Fertilizers and Higher-Quality Seeds

As with AVIPA, providing subsidized higher-quality seeds to farmers under AVIPA-Plus reduced the cost of wheat seed and increased wheat yields, raising returns to wheat. Farmers with medium to large landholdings would have found wheat more attractive than they did previously. But for farmers with small landholdings, the greater yields from subsidized wheat seed might have eased worries about food security, potentially enabling them to grow a cash crop like opium poppy with higher returns than wheat. Alternatively, the higher yields could enable farmers with especially small landholdings who currently monocrop opium poppy to shift to wheat, if they reached a tipping point.

As noted in our analysis of AVIPA, according to our crop budgets, the value of subsidized higher-yielding wheat seed was small compared with relative returns from growing opium poppy rather than wheat. It

is unlikely that the size of the subsidy was sufficient to have had a tangible effect on decisions to grow wheat rather than opium poppy.

The subsidies on fertilizer had a greater impact in percentage terms on returns from wheat than returns on opium poppy, so the subsidies may have served to make wheat relatively more attractive than previously—at least for wealthier farmers, who have less concern about issues of food security. Thus, as noted above, subsidies might favor wheat for those farmers, but the empirical result would still come down to issues of relative, marginal returns.

Farmers appeared to have responded to pressure on program participants to grow wheat and refrain from growing opium poppy, based on surveys of beneficiaries, interviews with implementers, and changes in wheat cultivation.

Subsidies or Grants for Farm Machinery or Facilities

According to the factor map, the effect on decisions to grow opium poppy from reducing the costs of capital goods, like tractors, is indeterminate. Tractors are used to plow poppy fields as well as wheat fields, but they can also be used to thresh and harvest wheat. Opium needs to be harvested by hand. Consequently, it seems likely that tractor subsidies would favor wheat production, particularly on larger-scale operations, but the net effects on poppy cultivation might still be indeterminate because of interrelated issues of food security for farmers with smaller landholdings.

In contrast, plastic sheeting is used to grow winter vegetables and is not used to grow opium poppy. Consequently, subsidies to construct hoop greenhouses raise relative returns for winter vegetables compared with both wheat and opium poppy. Greenhouses do result in land being used to cultivate vegetables, rather than other crops, be those wheat or opium poppies. According to the MCN, revenues from tomatoes and potatoes can run \$4,800 per hectare or more.⁶⁵ Although the MCN does not provide cost data, these revenues are comparable with those from opium poppy, making them potential competitor crops.

⁶⁵ Ministry of Counter Narcotics, Islamic Republic of Afghanistan, *Afghanistan Drug Report, 2012*, November 2013, p. 62.

Cash-for-Work

Cash-for-work projects potentially affect decisions to grow opium poppy by increasing the cost of labor, if serving to promote higher wages, and by increasing external incomes, directly, through new opportunities.

As noted previously, for farmers with medium to large landholdings, higher labor costs tend to reduce incentives to grow opium poppy, but, for farmers with very small and small landholdings, the effects of higher labor costs are indeterminate. For farmers with very small and small landholdings, the increased cost of wage labor would discourage opium poppy cultivation, as it would for wealthier farmers, but the higher wages paid for their own labor might discourage or encourage opium poppy cultivation.

However, cash-for-work projects also provide male household members with opportunities to earn more income off the farm through new opportunities. A landowner with medium to large landholdings might choose to take advantage of the higher returns for opium poppy and cultivate more opium poppy than before, but the additional income might also enable a poorer household to reduce opium poppy cultivation and shift to more wheat for the household's own consumption. For those households, the net effect is indeterminate.

In our crop budgets, we distinguish between labor at harvest and non-harvest labor. Harvest labor is the single largest component of costs both because daily wages are more expensive than for non-harvest labor and because more labor is used to harvest opium than for planting, weeding, and other non-harvest activities. Farmers are willing to pay a premium for this labor because of the skill needed to cut the opium poppy stalks and scrape the dried sap and because the harvest needs to be completed within a brief window of time. In our crop budgets, we use \$9.80 per day as our benchmark for harvest labor, whereas non-harvest labor costs \$6.20 per day. AVIPA-Plus paid \$6 per day for manual labors.⁶⁶

To raise costs for opium farmers to the point where wheat would be an attractive alternative, wages would have to rise to \$16.32, or by about 67 percent, for landowners with no access to household labor.

⁶⁶ USAID and IRD, 2012, p. 43.

For households with land and where the household works in the opium fields, wage rates would have to rise to \$41.40, or by about 322 percent, for landowners to prefer wheat.⁶⁷ In short, AVIPA-Plus would have had to pay far higher wages than it did through its cash-for-work projects and would have had to time those projects during the opium harvest, for opium poppy farmers to have found it more profitable to plant wheat than opium. In light of the availability of migrant labor from other parts of Afghanistan or from Pakistan to Helmand and Kandahar provinces, it would have been almost impossible through cash-for-work projects alone to induce landowners to stop growing opium poppy.

Although program planners attempted to time these programs to coincide with the opium harvest, the overlap is not perfect, so beneficiaries may work the harvest and benefit from the program. In these instances, the program would have little if any effect on decisions to grow opium. Moreover, these projects depend on continued donor support. Consequently, they are not a long-term solution to inducing Afghan farmers to stop growing opium poppy.

4. Helmand Agriculture and Rural Development Program (HARDP)

Program Description

HARDP was a program designed and financed by DfID and implemented in conjunction with Afghanistan's Ministry of Rural Rehabilitation and Development. HARDP began on November 9, 2009, and ended March 31, 2011. Total funding was £19.3 million, or roughly \$30.2 million, using the average dollar-to-pound exchange rate for those years.⁶⁸

HARDP had three goals:

⁶⁷ See Appendix B for the data, explanations of the data, and detailed calculations of these results.

⁶⁸ DfID, "Helmand Agriculture and Rural Development Programme (HARDP): MRRD [GB-1-107171]," undated.

1. Reduce poverty and expand legal economic activity through the more visible delivery of national and provincial government services to local populations.
2. Reduce the amount of agricultural land under poppy cultivation in Helmand.
3. Increase economic opportunities for the rural poor in Helmand, including those making a living from growing opium poppy.⁶⁹

It pursued these goals by engaging in projects focused on rural development, building and repairing roads and other infrastructure projects, and improving drinking water supplies. The shares of total program spending on these projects were 40 percent for rural development projects, 30 percent for roads and other infrastructure projects, and 30 percent for improving drinking water supplies.⁷⁰

Program Results

Rural Development

HARDP provided support for Mercy Corps to run a program called Helmand Agricultural Solutions for Improved Livelihoods (HASIL). This program focused on increasing farm output by providing farmers with training, constructing agricultural infrastructure, and helping to link farmers to local and global markets. Mercy Corps also provided training and work opportunities in areas ranging from road-building to poultry farming. It also educated farmers and government officials about sustainable water development.⁷¹ Under HARDP, Mercy Corps contributed to increased agricultural productivity in the Lashkar Gah district through support for agribusiness development, training in vocational and business skills, and in improved agricultural techniques. Mercy Corps had provided training to 4,159 people as of March 2010. In addition, as of June 2010, 64,000 beneficiaries received subsidized seeds and other assistance.⁷²

⁶⁹ DfID, "Final HARDP Evaluation," Excel spreadsheet, August 2010.

⁷⁰ DfID, undated.

⁷¹ See Mercy Corps, "Afghanistan," web page, undated.

⁷² DfID, 2010.

HARDP also provided funding for the Agricultural High School in Lashkar Gah. It financed the construction of a new building, which was completed in October 2009 and opened in December 2009. It also provided salary support to the faculty. The school enrolled 270 students and graduated 80 students per year by the end of project.⁷³

After HARDP ended, Mercy Corps continued to work with the Deputy Ministry for Technical Vocational Education and Training, People in Need, and Purdue University to develop a nationwide Agricultural High School curriculum through a trilateral Memorandum of Understanding signed by Mercy Corps, the Deputy Ministry for Technical Vocational Education and Training, and People in Need to continue to cooperate on the development of a national curriculum.⁷⁴

Microcredit

HARDP supported existing microcredit programs under the National Rural Access Program and the Microfinance Investment Support Facility Afghanistan (MISFA). These programs are designed to improve access to credit markets and improve the efficiency of agricultural infrastructure. According to DfID, MISFA loans funded by HARDP led to the creation of 190 jobs by the end of the program. Of these, 66 were credited to the operations of BRAC, an NGO headquartered in Bangladesh that is engaged in microfinance operations, and the remaining 124 to the operations of the World Council of Credit Unions in Afghanistan. Of the 3,157 loans disbursed (387 by BRAC, 2,770 by the World Council of Credit Unions) to 4,397 clients, the repayment rate was 89.7 percent overall, with rates of 96.1 percent on BRAC loans and 85.6 percent on loans provided by the World Council of Credit Unions. The latter continued to use repayments from past credits to make new loans. Repayment levels continued to be higher than 70 percent. The total loan amounts totaled 142 million afghanis (\$2.92 million).⁷⁵

⁷³ DfID, 2010.

⁷⁴ DfID, 2010.

⁷⁵ DfID, 2010.

Microfinance has come under some criticism in Afghanistan. One analysis found that local economies were often not sufficiently vibrant for clients to generate expected returns from their investments. In fact, in none of the villages studied were economic activities profitable enough for most clients to easily repay their microcredits, in part because some of the loan proceeds were needed for consumption. The study found clients often gave higher priority to repaying microfinance loans rather than informal credits so as to avoid both shame and fines. Although the microfinance facilities appeared to be successful, this success came at considerable cost to borrowers. Moreover, microcredit programs tended to ignore the vibrant informal credit system in Afghanistan that provides both substantial amounts of free credit and expensive, exploitative credit. Some borrowers used informal credit to repay microcredit, masking a build-up of informal debt.⁷⁶

Roads and Irrigation Systems

HARDP funded projects that were selected by Community Development Councils (CDCs) under Afghanistan's National Solidarity Program. CDCs were established in almost every district in Afghanistan to develop a Community Development Plan and decide what local issues or problems should be prioritized and addressed. In most instances, CDCs asked for roads, irrigation systems, or schools, although some asked for assistance with flood walls, soccer fields, or other projects. CDC members are supposed to be elected by the local community by secret ballot.⁷⁷ HARDP provided 284 CDCs with funding out of a target of 564. The failure to provide funding to all CDCs stemmed from the suspension of the National Solidarity Program in Helmand for a period of 18 months from 2007 to 2009 and because a number of CDCs remained outside government oversight throughout the life of the project.

⁷⁶ Paula Kantor, "From Access to Impact: Microcredit and Rural Livelihoods in Afghanistan," Afghanistan Research and Evaluation Unit, June 2009, pp. xi–xii.

⁷⁷ National Solidarity Programme, "CDC Background," Ministry of Rural Rehabilitation and Development, Islamic Republic of Afghanistan, undated.

HARDP also funded 197 projects within the National Area-Based Development Programme (NABDP), a program run by the United Nations Development Programme. The NABDP was designed to strengthen institutions at the district level to address local priorities and to improve access to key services for the rural poor, primarily by supporting the construction and improvement of rural infrastructure projects chosen by the local community, such as retaining walls, irrigation canals, bridges, and roads. It has also implemented micro-hydro and biogas projects to generate electricity and cooking fuel for villages that are not connected to the national grid.⁷⁸ HARDP funding was used to successfully complete 197 projects in Helmand. Most of these projects consisted of roads, as HARDP financed the rehabilitation or construction of 97 kilometers of road. Because of problems with contracting and security, this number was substantially less than the 180 kilometers targeted by the program. Delays were also due to contractors using sub-standard materials.⁷⁹ HARDP also provided funding for road construction and repair under the National Rural Access Program run by Afghanistan's Ministry of Rural Rehabilitation and Development. In contrast to road construction under the NABDP, the National Rural Access Program exceeded the targeted length of roads to be built and rehabilitated, reaching 87 kilometers of roads, most of which were paved with asphalt. However, because of weak budget and management control, DfID and the Ministry of Rural Rehabilitation and Development incurred significant transaction costs. Because of these problems, DfID decided not to support the Ministry of Rural Rehabilitation and Development with on-budget funding under a follow-on program.⁸⁰

In addition, HARDP provided funding for the construction, cleaning, and repair of 1.4 million cubic meters of irrigation canals

⁷⁸ United Nations Development Programme in Afghanistan, "National Area-Based Development Programme (NABDP)," web page, undated.

⁷⁹ DfID, 2010.

⁸⁰ DfID, 2010.

under Afghanistan's National Priority Programs, which fall under Afghanistan's Ministry of Finance.⁸¹

Under Mercy Corps activities, HARDP also funded a number of medium- and small-scale agricultural infrastructure projects. The target was 100 projects by the end of program but, due to increased insecurity, Mercy Corps reported that only 37 projects were completed.⁸²

Improving the Supply of Drinking Water

HARDP set a target to provide 60,000 people with better drinking water and improved sanitation. It managed to exceed that target substantially, reaching 620,114 people under Afghanistan's Water Supply and Irrigation Program, which was implemented by Afghanistan's Ministry of Rural Rehabilitation and Development. By March 30, 2011, the Ministry of Rural Rehabilitation and Development had drilled or improved 4,325 wells for drinking water and had installed two major water pumps on the Helmand River for irrigation.⁸³

Consequences for Farmers' Decisions on Cultivating Opium Poppies

The projects that we identify as potentially affecting decisions to grow opium poppy under HARDP are

1. increasing agricultural production through training
2. provision of microcredit to farmers
3. investments in roads and irrigation systems.

Table 4.6 shows the ways by which these projects might affect decisions to grow opium poppy. We did not find a direct link between improving the supply of drinking water and decisions to grow opium poppy, so we did not include these projects in the table.

Increasing Agricultural Production Through Training

Part of Mercy Corps' focus was to create a high school in Helmand focused on training agricultural experts. This and other training pro-

⁸¹ DfID, 2010.

⁸² DfID, 2010.

⁸³ DfID, 2010.

Table 4.6
Implications for Growing Opium Poppy of Factors Affected by HARDP

Project and Associated Factors	Very Small Landholding	Small Landholding	Medium to Large Landholding
Introducing or diffusing new technologies			
Training			
Increased yield, returns (wheat)	Ind.	Ind.	Ind. (-)
Increased yield, returns (not wheat)	Ind. (-)	Ind. (-)	Ind. (-)
Increased price, returns (not wheat)	-	-	-
Microcredit for poor farmers			
Lower costs for investment inputs	Ind.	Ind.	Ind.
Accumulated debt	Ind.	Ind.	Ind.
Additional outside income	Ind.	Ind.	+ (-)
Repairing, expanding, or constructing new infrastructure, such as			
Irrigation systems			
Increased yield, returns	Ind.	Ind.	Ind. (-)
Roads			
Decreased remoteness	Ind.	Ind.	-
Providing cash-for-work opportunities			
Additional outside income	Ind.	Ind.	+ (-)
Increased labor costs	Ind.	Ind.	-

SOURCE: RAND analysis based on RAND factor map, framework, and program assessment.

NOTES: + = positive relationship; - = negative relationship; Ind. = indeterminate relationship, given available information; () = case-specific result or alternative interpretation. In each column, we first provide the general result, shown in Figure 3.1; then, in parentheses, we provide the result or interpretation that is specific to the program at hand, if it differs from the general result. In the case of outside income, we provide the results from the household model and an alternative interpretation, based on empirical evidence, both of which are also shown in Figure 3.1.

grams in the province should have led to the dissemination of more productive ways of growing traditional and commercial crops, some of which might compete directly with opium poppy, and eliciting better quality.

In the context of the factor map, the net effects of training might be to discourage opium poppy cultivation among farmers with medium to large landholdings, if making alternative cash crops more attractive than previously, but could be indeterminate for poorer farmers, especially if affecting traditional crops and the farmers' concerns about food security.

Microcredit

The MISFA supports a range of small on-farm and off-farm investments in villages. Some of these investments include financing for projects like purchasing saplings for orchards, trellising grape vines, or purchasing farm tools for specific crops. Because interest rates on microloans can be lower (although not always) than loans from the informal credit market, these investments may cost less than they would without the microfinance program. If these investments are specific to a crop, like grape trellises, the lower input costs should make that crop relatively more attractive than alternatives, like opium poppy. However, if the investment is not specific, such as to purchase a plow, the effect of the microfinance program on decisions to grow opium poppy would be indeterminate.

Microfinance programs make it possible for households to acquire more debt; however, on the basis of the household model, the effects of accumulated debt are indeterminate for all farmers, regardless of the size of their landholdings.

Anecdotal evidence provided by microfinance institutions suggest that, outside of consumption, most microfinance loans are used to develop opportunities for additional outside income either from agricultural activities, such as beekeeping or raising chickens, that do not compete much—if at all—for agricultural land or from non-agricultural activities like trading or handicrafts. According to our household model, in these cases the provision of microcredit would not lead to a reduction in opium poppy cultivation. Rather, the increased income could serve to enable wealthier households to shift more land to opium poppy.

Investments in Infrastructure

Building roads serves to reduce “remoteness,” which involves the effects of distance, perishability of the agricultural product, and the ease with which government forces can reach a field for eradication. A reduction in remoteness reduces the costs of transporting farm products and agricultural inputs; the reduction in these costs increases net returns. For farmers with medium to large landholdings, reducing remoteness should improve the relative attractiveness of perishable crops and, thus, create incentives to shift out of opium poppy. For farmers with very small or small landholdings, these crops also become more attractive than previously. However, the decrease in remoteness could also make these farmers less concerned about food security and therefore better able to grow crops other than wheat, including opium poppy. For poorer farmers, the net effect is indeterminate.

We note that, as reported in Chapter Three, the empirical evidence that *remoteness*, referring to the distance from a road, is positively correlated with a higher likelihood of growing opium poppy is mixed: some studies find a correlation, others do not.

HARDP-funded projects to clean and repair irrigation systems improved access to irrigation, which could increase yields of all crops, including opium. Irrigation may favor water-intensive crops, but all crops depend on irrigation water in Helmand. For wealthier farmers, we might expect the balance of effects to be negative for opium poppy, but the empirical result would come down to issues of relative, marginal returns. Moreover, the improved wheat yields could lessen poorer farmers’ concerns about food security and, thus, increase their interest in shifting land to higher-return crops, like opium poppy, or lead them to a tipping point and a shift from opium poppy into wheat.

Cash-for-Work Opportunities

HARDP did not have a specific cash-for-work component. However, road construction, irrigation, and other water projects used local unskilled labor. These projects might have provided households with additional income-earning opportunities and increased the demand for local labor, potentially driving up local wage rates and implying the differences in effects for wealthier and poorer farmers, addressed previously.

5. Incentives Driving Economic Alternatives for the North, East, and West (IDEA-NEW)

Program Description

The purpose of IDEA-NEW was to support the stabilization and transition of Afghanistan and to dissuade Afghans from growing poppies by promoting income generation and job creation through increased commercial agricultural opportunities for Afghan farmers in poppy-prone areas. It was also designed to support ISAF's counterinsurgency campaign by fostering agricultural and private-sector development at the local level in areas where ISAF was active.⁸⁴ The program was to last five years, from March 3, 2009, to its scheduled end on March 2, 2014. It was funded by USAID at \$150 million. It followed an earlier program funded by USAID, Alternative Development Program—Eastern Region.

The program was confined to the northern, eastern, and western regions of the country.⁸⁵ Because one of its goals was to reduce the cultivation of opium poppy, assessing the program provides insights into what may or may not have influenced decisions to grow opium poppy. When initiated, the program focused on those districts in the north, east, and west where opium poppies were being grown or had been cultivated in the recent past. Subsequently, IDEA-NEW expanded coverage to other districts. The program was implemented by three partners: ACIDI/VOCA in the north/central region; Development Alternatives, Inc. (DAI) in the east and west; and Mercy Corps in the northeast. DAI was the overall lead. Most activity was centered in the eastern region.

⁸⁴ Development Alternatives, Inc., "Incentives Driving Economic Alternatives for the North, East, and West (IDEA-NEW)," annual reports 2009–2012; and Office of the Inspector General, Afghanistan, USAID, *Audit of USAID/Afghanistan's Incentives Driving Economic Alternatives for the North, East, and West Program*, Report No. F-306-12-004-P, June 29, 2012.

⁸⁵ Provinces covered by IDEA-NEW were Badghis, Faryah, Balkh, Jawzjan, Sari Pul, Samangan, Kunduz, Baglan, Takhar, Badakhshan, Nangarhar, Nuristan, Kunar, Laghman, and Kabul.

IDEA-NEW consisted of five major rural development efforts: (1) increasing agricultural production and sales; (2) improving agricultural and rural infrastructure; (3) improving access to finance, (4) helping to establish agribusinesses and links between producers, traders, and buyers; and (5) rural enterprise development. IDEA-NEW provided some subsidized agricultural inputs, primarily higher-quality seeds for vegetables and saplings for orchards. It also funded technology transfer through training and demonstrations. The program implemented small-scale local infrastructure projects such as roads, boundary walls for schools, and irrigation systems built by local unskilled labor, mostly men. It engaged in a project to help women pool funds for purchasing common inputs. It funded activities to assist entrepreneurs to start new businesses or expand them, such as traditional textiles, modern textiles, and value-added food processing. Projects targeted toward women included, among others, dairy processing centers, greenhouses, and training in para-veterinary and other skills.⁸⁶ Projects varied by region and by contractor.

Program Results

Increasing Agricultural Production and Sales

The program implemented several projects introducing better production practices for eight cash crops or animal products: grapes, orchard crops, vegetables, poultry, wheat, silk, honey, and Astrakhan or Persian lamb. These crops or animal products were chosen because traditional yields were low compared to those in nearby countries, products were of high value, and technologies that could be readily adopted in Afghanistan already existed to improve the quality and quantity of products.

Grapes. IDEA-NEW introduced farmers to trellising through demonstration projects and provided training on pruning, fertilizer and herbicide applications, and harvesting. IDEA-NEW provided training in grape trellising to 106 farmers in Samangan and 82 in Faryab provinces; in vineyard management for 31 farmers in Faryab and 17 in Samangan; and in vineyard pruning to 86 farmers in Faryab

⁸⁶ Office of the Inspector General, Afghanistan, USAID, 2012, p. 2.

and 32 in Samangan provinces. In October 2011, IDEA-NEW collected data from six farmers in Samangan and six farmers in Faryab to ascertain the potential for increasing grape yields.⁸⁷ In the first year after trellising, yields in these 12 vineyards—the largest of which was 0.2 hectare—rose 78 percent on average, but with a substantial amount of variation in increases.⁸⁸

Orchard crops. Yields from Afghan orchards suffer from poor management and irrigation practices, poor pruning practices, pests, and diseases. IDEA-NEW implemented projects to establish new commercial orchards and provide farmers with high-quality saplings by supporting local nurseries with grafting stock and training. IDEA-NEW also provided training to 1,175 pruners and vouchers to farmers for discounted pruning services from master pruners. In addition, 3,433 farmers obtained training in orchard management. Some farmers participated in more than one course. Some trainees participated for informational purposes; for these trainees, the course did not lead to a direct transfer of better techniques that would be implemented in a working orchard. Outside of farmers who received training, the total number of farmers receiving direct subsidies or support was on a smaller scale than some other programs, like CHAMP: 200 orchards in Faryab received subsidized saplings and 32 orchards in Nangarhar received flexi flume pipes.⁸⁹

Vegetables. IDEA-NEW's project to provide high-quality, subsidized vegetable seeds to farmers was much more extensive than its efforts with vineyards or orchards, reaching more than 232,000 farmers. The project provided participating farmers with vouchers that could be exchanged for seeds of better quality and better-yielding varieties from designated vendors. The project also provided subsidized fertilizer and pesticides in some locales. Participating farmers were given training in growing vegetables, including through the use of 44 vegetable demonstration plots. Farmers' shares of costs averaged 30 percent

⁸⁷ DAI, 2012, p. 8.

⁸⁸ Calculated from data from DAI, 2012, p. 8.

⁸⁹ DAI, 2012, pp. 10–11.

of total costs. Yields and incomes from growing vegetables reportedly rose sharply.⁹⁰

Chicken. In 2009, IDEA-NEW attempted to introduce commercial laying and broiler operations through in-kind grants of chickens and feed to encourage new farmers to enter the sector. The broiler operations became infected with disease; yields and profitability fell. IDEA-NEW tried again in 2011, selecting 79 farmers in the eastern region to receive 1,000 to 1,500 chicks and feed for layer and broiler operations.⁹¹ IDEA-NEW has also supported smaller household chicken operations though the provision of training and in-kind grants of chicks, feed, and materials for constructing coops. As the number of commercial broiler operations in the east increased from ten in 2009 to 1,500 in 2012, IDEA-NEW has supported the development of two privately owned hatcheries in Nangarhar to partially replace chicks imported from Pakistan for these operations. The value of the IDEA-NEW provision of equipment and chicks was 32 percent of the value of the total investment, with the private investor investing 68 percent. The two new hatcheries were expected to supply 5 percent of demand for chicks once operations reached full capacity. The chicks are healthier and have lower morbidity rates than chicks from Pakistan.⁹²

In light of the size of the eastern Afghanistan market for chicks, the hatcheries have a large internal market. However, according to a report by USAID's Inspector General, U.S. Department of Agriculture employees stationed in eastern Afghanistan noted that the hatcheries need electricity to operate. Once assistance projects no longer cover the costs of generating electricity from diesel fuel, the hatchery will face substantially higher costs and may no longer be able to compete with chicks imported from Pakistan, despite the lower quality of imported chicks.⁹³ The project illustrates the importance of ensuring that proj-

⁹⁰ DAI, 2012, pp. 11, 26.

⁹¹ DAI, 2012, p. 14.

⁹² DAI, 2011, p. 27.

⁹³ Office of the Inspector General, Afghanistan, USAID, 2012, p. 12.

ects use technologies that do not require ongoing assistance to function in the future.

Wheat. At the same time that AVIPA-Plus was providing farmers in the north and east with subsidized seed and fertilizer, IDEA-NEW launched a two-year demonstration and improved agronomy training for northern farmers at 65 training sites. Attendance at several demonstrations of equipment and techniques averaged 2,000 to 3,000 farmers. This project appears to support the AVIPA-Plus endeavor, although there also appears to have been some overlap.

Silk. To foster the development of the traditional household silk industry in northern Afghanistan, IDEA-NEW provided 1,000 women with an intensive, five-day course on how to rear silkworm eggs to the cocoon stage. Each trainee received a box of silkworm eggs. Average revenue per recipient was \$86, which represents a tangible contribution to farm household incomes in Afghanistan.⁹⁴

Honey. Beekeeping is another traditional industry in Afghanistan, especially in the northeast. In fiscal year 2010, IDEA-NEW encouraged farmers, male and female, to enter the industry by providing current or prospective beekeepers with subsidized sets of hives and tools and access to honey processing machines, as well as training in bee care and honey marketing.⁹⁵ The subsidy equaled 36 percent of the total cost of the sets. Each beneficiary invested 4,850 afghani (\$86) plus labor; IDEA-NEW provided 2,500 afghani in support (\$48). The new beekeepers averaged \$120 in revenue for the summer, so total investment costs (\$132) slightly exceeded first-year revenues.⁹⁶ In fiscal year 2012, IDEA-NEW provided additional training for 760 current or prospective beekeepers.⁹⁷

Astrakhan fur or Persian lamb. Northern Afghanistan is an important source of pelts from Persian lambs, or *karakul*, as the animals are called in Afghanistan, for the world market. As with a number

⁹⁴ DAI, 2012, p. 17.

⁹⁵ DAI, 2011, pp. 47–48.

⁹⁶ RAND calculations based on figures from DAI, 2011, pp. 47–48.

⁹⁷ DAI, 2012, p. 18.

of Afghan products, pelts from Afghanistan trade at a discount to competing products from other countries—in this case, pelts from Namibia—because Afghan breeders do not breed animals for quality pelts and because pelts are handled poorly and not graded before shipment. IDEA-NEW arranged for regular veterinary care for two pure-bred karakul farms maintained by the District Agriculture, Irrigation, and Livestock (DAIL) office in Balkh and Jawzjan provinces, instituted a breeding program to improve the quality of pelts, and subsidized higher-quality feed. Fifteen men and women were given veterinary training for these animals. Upon graduation, they were linked with 109 veterinary field units set up by IDEA-NEW.⁹⁸

Investments in Infrastructure

IDEA-NEW's infrastructure component had two goals: to restore or build infrastructure and to provide cash for work to reduce communities' reliance on illegal activities, including narcotics and insurgency. The component built or repaired secondary or tertiary roads, irrigation systems, and microhydro projects, as well as village projects such as repairing flood walls and school boundary walls. Projects were selected by working closely with communities and local authorities. They were smaller in scale than development projects focused on constructing and repairing roads or irrigation systems only. Through 2012, IDEA-NEW spent the largest share of its funds on this, the infrastructural component (52 percent).⁹⁹

The USAID Inspector General criticized this component for cost overruns, missed deadlines, and failure to ensure the projects would be maintained after completion. The contractors pointed to the security environment and the overall difficulties of operating in Afghanistan as reasons for cost overruns and failure to meet deadlines. All three contractors stated that they had arranged for maintenance with local communities, district governors, and relevant line ministries. The USAID Inspector General countered that these arrangements identified who

⁹⁸ DAI, 2012, p. 19; DAI, 2011, p. 28.

⁹⁹ DAI, 2011, p. 13; Office of the Inspector General, Afghanistan, USAID, 2012, p. 27.

was responsible, but did not ensure that the projects would be maintained over the long term.¹⁰⁰

Improving Grading, Sorting, and Processing

One of the major challenges to increasing farm incomes in Afghanistan has been to link farms to major markets and to improve the quality of farm products to meet standards demanded by wholesalers serving Afghan urban and export markets. In addition to the projects described above that were designed to improve yields and the quality of produce, IDEA-NEW supported activities to improve marketing links and processing. IDEA-NEW provided funding to agricultural associations, like fruit growers' and poultry producers' associations in Nangarhar, and supported processing operations. It implemented a project creating ten village milk collection and processing centers that used hand-operated equipment to process milk into cheese, butter, and yogurt for sale. IDEA-NEW also helped privatize a vegetable packing house in eastern Afghanistan that had been set up by the U.S. military to provide produce for ISAF.¹⁰¹

The USAID Inspector General was concerned that these activities were not sustainable. Associations had dissolved after previous projects once funding disappeared. Some of the milk-collection centers did not receive adequate volumes to justify their continued operation. The equipment was moved to other sites.¹⁰²

Non-Agricultural Rural Enterprise Development

IDEA-NEW supported a number of small manufacturing operations with in-kind grants of packing materials and other inputs and machinery. Industries included traditional textiles, carpets, soap, and food processing companies in confectionary, juices, and preserved foods. The grants of machinery made it possible for factory owners to expand their operations and undertake more steps in the manufacturing pro-

¹⁰⁰ Office of the Inspector General, Afghanistan, USAID, 2012, p. 13.

¹⁰¹ DAI, 2011, pp. 27, 48.

¹⁰² DAI, 2012, p. 20; Office of the Inspector General, Afghanistan, USAID, 2012, p. 12.

cess, like professionally finishing textiles, increasing the competitiveness of local weavers.

IDEA-NEW targeted traditional industries where some of the population already had necessary skills.¹⁰³ The projects have been subject to concern about sustainability, as some entrepreneurs have not been able to continue operations once the project support ended.¹⁰⁴ We have no information about the outcomes of projects funded by IDEA-NEW. These types of projects that involve capital grants also face inherent problems of selection of beneficiaries and distortion of the industry. In an existing industry, capital grants to new entrants may lead to the creation of overcapacity, as existing businesses have to contend with an influx of new competitors into a market for which there is already sufficient supply.

Consequences for Farmers' Decisions on Cultivating Opium Poppies

We found substantial similarities between IDEA-NEW projects and projects under other programs in this chapter. In some instances, like those involving orchard crops, the IDEA-NEW projects built on or contributed to similar projects that have been funded by USAID or other donors, providing continuity. In the evaluation of IDEA-NEW's implications for opium poppy cultivation, we draw on the analysis of similar programs discussed previously.

As with the other assessments of the effects of programs on decisions to grow opium poppy, we begin by listing the projects that may have affected farmers' decisions to cultivate opium poppy because they appeared to have a tangible impact on factors affecting those decisions, as laid out in the factor map. We identified the following such projects:

1. increasing agricultural production and sale of vegetables, fruits, other crops, and livestock products through subsidies, training, and other means

¹⁰³ DAI, 2012, pp. 19–20.

¹⁰⁴ Discussions with U.S. government officials in Kabul and by telephone to Helmand and Kandahar in September and October 2013.

2. investments in infrastructure, including roads and irrigation systems
3. subsidizing or providing grants for facilities for fruit, milk, and vegetables
4. non-agricultural rural enterprise development.

Drawing on the factor map, Table 4.7 shows the avenues through which these projects might have affected decisions to grow opium poppy.

Table 4.7
Implications for Growing Opium Poppy of Factors Affected by IDEA-NEW

Project and Associated Factors	Very Small Landholding	Small Landholding	Medium to Large Landholding
Subsidizing agricultural inputs, such as			
Vegetable seed			
Lower cost of recurring input	Negl. ^a	Negl. ^a	Negl. ^a
Increased price, returns	–	–	–
Increased yield, returns	Ind. (–)	Ind. (–)	Ind. (–)
Higher quality saplings and vines			
Lower cost of investment input	Ind. (–)	Ind. (–)	Ind. (–)
Increased price, returns	–	–	–
Increased yields, returns	Ind. (–)	Ind. (–)	Ind. (–)
Introducing or diffusing new technologies			
Training			
Increased yield, returns (not wheat)	Ind. (–)	Ind. (–)	Ind. (–)
Increased price, returns (not wheat)	–	–	–
Repairing, expanding, or constructing new infrastructure, such as			
Irrigation systems			
Increased yield, returns	Ind.	Ind.	Ind. (–)
Roads			
Decreased remoteness	Ind.	Ind.	–

Table 4.7—Continued

Project and Associated Factors	Very Small Landholding	Small Landholding	Medium to Large Landholding
Providing cash-for-work opportunities			
Additional outside income	Ind.	Ind.	+ (-)
Increased labor costs	Ind.	Ind.	-
Subsidizing or providing grants for facilities, such as plastic hoop greenhouses, cool rooms, beehives, drying sheds, chicken coops			
Lower cost of investment input	Ind. (-)	Ind. (-)	Ind. (-)
Increased prices, returns (e.g., if competing for land use)	-	-	-
Increased prices, returns (if not competing for land use, etc., akin to "additional outside income")	Ind.	Ind.	+ (-)
Promoting non-agricultural rural enterprises			
Additional outside income	Ind.	Ind.	+ (-)
Increased labor costs	Ind.	Ind.	-

SOURCE: RAND analysis based on RAND factor map, framework, and program assessment.

NOTES: + = positive relationship; - = negative relationship; Ind. = indeterminate relationship, given available information; () = case-specific result or case-specific interpretation; Negl. = negligible. In each column, we first provide the general result, shown in Figure 3.1; then, in parentheses, we provide the result or interpretation that is specific to the program at hand, if it differs from the general result. In the case of outside income, we provide the results from the household model and an alternative interpretation, based on empirical evidence, both of which are also shown in Figure 3.1.

^a The cost of vegetable seed is negligible both in absolute terms and relative to other costs.

Subsidies for Vegetable Seed and Saplings and Related Training

IDEA-NEW provided farmers with superior seeds for vegetables and other crops, subsidized saplings and training to grow orchard crops, and implemented a small project to trellis grapes. These projects were

designed to increase yields from traditional crops or encourage farmers to grow new crops that generate higher revenues than traditional alternatives. The subsidy component for the seeds, saplings, grapevines, and trellises reduced costs, thereby increasing net returns. The provision of higher-quality saplings, vegetable and other seeds, and the trellising of vines increased yields, also increasing net returns. However, if these yields were to be sustained, the provision of these inputs had to have been transferred to Afghan providers.

As with similar projects, the improvement in returns for alternative cash crops that compete directly with opium poppy would, as per the household model, tend to make opium poppy relatively less attractive than previously, regardless of landholding size.

We provided some figures on potential revenues from orchard crops under our assessment of ADP South and on vegetables in our assessment of AVIPA-Plus. In both cases, revenues from well-run orchards and vegetable fields were close to or similar to those from opium, but the data were insufficient to compare costs and, hence, net returns. Raising revenues and net returns from cultivating alternative legal cash crops to levels approaching those of opium poppy suggests the possibility of substituting these crops for opium poppy—or other cash crops. Because of concerns about food security, only in the case where wheat is grown as a cash crop would farmers be likely to substitute orchard crops for wheat.

From the perspective of sustainable reductions in opium poppy cultivation, land once planted with fruit trees, grapevines, or other perennial crops has the added advantage of locking up the land for the life of the orchard or vineyard, which could be many years. This land is less available for opium poppy (or other crops), although some farmers may engage in intercropping between the vines or trees with an annual crop like vegetables or potentially opium.¹⁰⁵ Yields are likely to be lower for these crops than from fields dedicated to their cultivation.

IDEA-NEW and several other agricultural assistance programs in Afghanistan have sought to increase the area cultivated to grape-

¹⁰⁵ Roots of Peace, *2013 Annual Report: Commercial Horticulture and Agricultural Marketing Program (CHAMP)*, February 2014, p. 15.

vines and orchard crops as well as to increase yields. According to statistics on area planted to crops, crop production, and yields collected by MAIL, the area planted to fruit trees rose 60 percent between 2004 and 2012 and the area planted to grapes rose 23 percent. Production also rose sharply; it went up 63 percent in aggregate. Changes in yields varied: grape yields rose 37 percent; peaches, apricots, and pears also registered double-digit increases.¹⁰⁶ Projects funded by foreign assistance have played an important role in these increases.

Some of the projects involved a small number of recipients. Only two state-run farms were involved in the Astrakhan fur or Persian lamb project. Small numbers of recipients, absent demonstrable results and programmed follow-up, limit the rate of diffusion.

Investments in Infrastructure

As noted above, building roads serves to reduce remoteness. For farmers with medium to large landholdings, reducing remoteness should improve the relative attractiveness of perishable crops and, thus, create incentives to shift out of opium poppy cultivation. For farmers with very small or small landholdings, these crops also become more attractive than previously. However, the decrease in remoteness could also make these farmers less concerned about food security and therefore more able to grow crops other than wheat, including opium poppy. For poorer farmers, the net effect is indeterminate.

In practice, the manner in which IDEA-NEW implemented road-building projects might have limited their returns. USAID's Office of the Inspector General for Afghanistan stated that IDEA-NEW had not assured that the community or the Afghan government were prepared to continue to maintain and repair roads or facilities built under the program.¹⁰⁷

Expanding and repairing irrigation systems can boost the yields of all crops, including opium poppy. However, better irrigation should improve the relative attractiveness of water-intensive crops. Thus, because opium is relatively drought-tolerant, investments in irriga-

¹⁰⁶ FAO, 2013.

¹⁰⁷ Office of the Inspector General, Afghanistan, USAID, 2012, p. 13.

tion may make opium less attractive relative to other crops, at least among wealthier farmers who are less concerned about food security. Although improving the relative attractiveness of water-intensive cash crops, the empirical result would come down to issues of relative, marginal returns. Moreover, the improved wheat yields could lessen poorer farmers' concerns about food security and thus increase their interest in shifting land to higher-return crops, like opium poppy—though it could engender tipping-point effects for some farmers with especially small landholdings. And, for these investments to have long-term effects, local communities have to take responsibility for keeping the systems in working order.

IDEA-NEW's infrastructure projects, on both roads and irrigation systems, hired unskilled local labor. These cash-for-work activities boosted incomes and may have raised agricultural wages, with the aforementioned mixed effects on farmers with smaller and larger landholdings.

The cash-for-work component of IDEA-NEW's infrastructure projects injected cash into local economies and helped to support households in fringe areas in the short run.¹⁰⁸ However, we found no empirical evidence that the projects discouraged farmers from cultivating opium poppy. As discussed above, opium farmers can offer substantially higher wages than those provided by the program and still make a profit. Moreover, cash-for-work projects are not sustainable; they depend on continued foreign assistance.

Subsidizing or Providing Grants for Facilities

Projects that support operations to encourage better sorting, grading, and packaging of agricultural products for transport to markets can raise returns to farmers and make alternative crops to opium poppy more attractive. However, business operations are not sustainable if they rely on technologies, like sophisticated machinery, or inputs, like electricity, that cannot be easily supported or provided after the project ends. USAID's Office of the Inspector General for Afghanistan was

¹⁰⁸ DAI, 2012, p. 22.

concerned about the sustainability of the hatchery project, milk collection centers, and some of the support for small-scale manufacturing.

Non-Agricultural Rural Enterprise Development

Non-agricultural rural enterprises, such as carpet weaving, can provide households with additional income, with all the attendant mixed effects discussed previously. For example, if the activities serve to boost wages, they could make opium cultivation less attractive for wealthier farmers, but not necessarily for poorer farmers. However, as currently practiced, these are part-time activities. During the opium harvest, this labor could be drawn into the harvest. The audit of USAID's Office of the Inspector General for Afghanistan criticized IDEA-NEW for focusing on increasing opportunities for earning income from legal activities, as increased income did not necessarily discourage farmers from cultivating opium.¹⁰⁹

Evidence from Patterns of Poppy Cultivation

Although the purpose of IDEA-NEW was to design and implement projects to reduce the cultivation of opium poppy, the area in which it operated was no longer a major producer of opium poppy when the program began. USAID's Office of the Inspector General for Afghanistan criticized the program for not focusing solely on communities where opium poppy was or had been grown.¹¹⁰ As shown in Table 4.1, four of the 15 provinces in which the program was implemented were poppy-free when the program started. Two provinces in which IDEA-NEW conducted projects lost their poppy-free status and five provinces increased opium cultivation between 2010 and 2011. Mansfield noted in his evaluation of IDEA-NEW that in Nangarhar, a province where opium poppy has historically been an important crop, cultivation in the southern part of the province has resurged. Mansfield traced the resurgence in part to loss of territorial control by the Afghan government,

¹⁰⁹ Office of the Inspector General, Afghanistan, USAID, 2012, p. 5.

¹¹⁰ Office of the Inspector General, Afghanistan, USAID, 2012, p. 5.

but also noted that investments in irrigation systems have contributed to increased cultivation of opium poppy and also higher yields.¹¹¹

6. Comprehensive Agriculture and Rural Development Facility (CARD-F)

Program Description

Established in late 2009, CARD-F is an Afghan entity—in contrast to programs assessed previously—even though it has been funded by foreign donors, most notably DfID and Denmark’s Danish Fund (DANIDA). It is headed by an Afghan Executive Director accountable to and governed by an inter-ministerial committee comprising the Ministry of Rural Rehabilitation and Development, MAIL, and the Ministry of Finance under the chairmanship of the MCN. It is organized as an independent management unit within Afghanistan’s government.¹¹²

The purpose of CARD-F is to facilitate growth in rural incomes and employment by strengthening markets for legal agricultural products and to reduce incentives to grow opium poppy. It has operated in four provinces: Badakhshan, Balk, Helmand, and Nangarhar. Within those provinces, the program targets selected rural districts where opium poppy is grown or has been grown in the recent past, but where assistance projects could be implemented despite the security problems of Afghanistan.

Similar to IDEA-NEW, the program has focused on projects to foster the development of selected agricultural value chains and repair and build rural infrastructure, especially projects that eliminate bottlenecks. Within the value chains, projects range from improving agricultural production, processing, and distribution to market development. CARD-F has set up integrated Economic Development Packages (EDPs) for each targeted district to coordinate its projects. EDPs are a

¹¹¹ David Mansfield, “Examining the Impact of IDEA-NEW on Opium Production: Nangarhar: A Case Study,” Development Alternatives, Inc., January 11, 2015, pp. 71–72.

¹¹² MAIL, *CARD-F Annual Report 2013*, 2013, pp. 4–6.

way to design, coordinate, and fund interventions in the expectation that the integrated intervention will have a higher impact. EDPs build on and utilize past as well as other existing programs and projects.¹¹³

Program Results

Subsidizing or Providing Grants for Facilities

CARD-F has attempted to foster the development of commercial farming operations and systems by providing subsidized farm inputs. Similar to ADP South and IDEA-NEW, CARD-F has supported the construction and development of broiler and laying operations and hatcheries through financial and in-kind support. It has also provided training and hives for beekeeping and has financed the construction of hoop greenhouses covered with plastic foil.

Similar to IDEA-NEW and AVIPA-Plus, CARD-F asked recipients of grants for investments to contribute to the cost of the project. For commercial chicken operations, recipients generally paid one-half of the costs; for most greenhouses, the contribution was 30 percent. For milk collection centers and beekeeping operations, contributions were much smaller, ranging from zero to 20 percent.¹¹⁴

According to an interview with an Afghan implementer, as designed, the project attracted farmers who had the financial resources to cover their share of the costs of the investments. Thus, recipients tended to be somewhat better off than the average farmer. The implementer's projects included support for greenhouse construction, beekeeping, and household chicken operations. The primary crop raised in the greenhouses was cucumber. The interviewee estimated revenues from greenhouse operations at \$135 a month (7,500 afghanis) during the winter months, but averaged \$120 (6,670 afghanis) a month over the course of the year.

For some activities, CARD-F reached more participants than did IDEA-NEW. For example, CARD-F established 708 household laying operations in just one district in Nangarhar. Given the large number of households involved, the failure of a few households would not jeopardize

¹¹³ MAIL, 2013.

¹¹⁴ MAIL, 2013, p. 9.

dize the entire project. In the case of some of the IDEA-NEW projects, the number of participants was so small that a setback involving disease or weather could have led to the failure of the entire project. Engaging more farmers in the project resulted in broader diffusion of the activity. More participants also provided an opportunity for more individuals to share information about better practices. However, the 135 beekeepers CARD-F supported were substantially smaller in number than the 760 beekeepers supported by IDEA-NEW.

In the selection and implementation of projects to develop value chains, we did not detect notable differences between CARD-F and traditional assistance programs. Similar to IDEA-NEW, CARD-F's focus on fostering the growth of commercial broiler and layer operations and hatcheries appears to have contributed to the development of an industry that will be able to stand on its own. CARD-F also had some success in expanding the use of greenhouses. Several more commercially minded (and wealthier) farmers are now at a point where they purchase and install hoop greenhouses without subsidies. However, poorer farmers—who tend to be less educated and less entrepreneurial—have not yet reached a point where they could purchase and install hoop greenhouses without subsidies and other support.¹¹⁵

Project selection criteria, as with the other programs, did not always appear well thought-out. Some of the sites for beekeeping were poorly chosen. In our survey of project implementers, an Afghan implementer of this project noted that because of the long, hot summers in Helmand, the season for flowers is very short, so bees lack flowers in both summer and winter. Consequently, beekeeping is unprofitable in Helmand whereas it is profitable in northern provinces. The beekeeping project was designed so that farmers would be able to increase the number of bee colonies, if they were successful at tending bees, but the interviewee argued that the project did not last long enough to achieve this goal.

¹¹⁵ Discussions by telephone with U.S. agricultural specialists in Helmand and Kandahar in September and October 2013.

CARD-F helped to establish marketing links for winter vegetables between growing areas and Kandahar, Kabul, and other large cities. Substantial quantities of vegetables are now grown in greenhouses for sale in these urban areas. One interviewee noted that the commercial vegetable operations depended on sufficient security so that wholesalers could safely transport the products to urban areas.

CARD-F also supported the development of processing industries, such as milk collection operations. The five milk collection centers in Nangarhar were similar in size and coverage to the project supported by IDEA-NEW.

The program also attempted to resuscitate cotton growing in Afghanistan by providing technical support to existing cotton gins.¹¹⁶ Two agricultural development specialists with whom we spoke in Kabul were skeptical of projects to resuscitate cotton.¹¹⁷ Cotton consumes substantial amounts of water and needs an integrated ginning industry to be viable, as raw bales cannot be economically transported long distances. In the 1960s and 1970s, the Afghan government dictated the prices paid to farmers and ran state-owned ginning operations, which generally operated at a loss.

Investments in Infrastructure

CARD-F has implemented projects to construct and repair secondary and tertiary roads and to clean and repair irrigation systems. One advantage of CARD-F should be that the Ministry of Rural Rehabilitation and Development sits on the Inter-Ministerial Committee. This arrangement should flag needs for repair and maintenance of roads and irrigation projects under the program. The selection of road and irrigation projects should also have been better integrated into national plans for this infrastructure. However, as with other projects, design was a challenge. According to a British employee of an American assistance contractor, "People did not want gravel roads; [they] preferred

¹¹⁶ MAIL, 2013, pp. 5–7.

¹¹⁷ Discussions with U.S. government officials in Kabul and by telephone to Helmand and Kandahar in September and October 2013.

long-term projects such as asphalt roads [as] gravel roads only lasted for three months.”

Consequences for Farmers’ Decisions on Cultivating Opium Poppies

The projects that we identify as potentially affecting decisions to grow opium poppy under CARD-F are

1. subsidizing or providing grants for facilities
2. investments in infrastructure, such as roads and irrigation systems.

Table 4.8 shows the ways in which these projects might affect farmers’ decisions to grow opium poppy.

Subsidizing or Providing Grants for Facilities

Similar to projects undertaken under ADP South and IDEA-New, CARD-F has undertaken several projects that have increased agricultural productivity or fostered the development of agricultural value chains, most notably commercial broiler and laying operations and the cultivation of winter vegetables in greenhouses. These projects have increased incomes, either by raising yields or expanding the production of commercial agricultural products. CARD-F support for broiler operations appears to have contributed to the expansion of this industry. As with similar projects, support for operations to grow winter vegetables appeared to have resulted in a notable expansion in this area. Higher prices for legal cash crops and agricultural products made possible by these programs would tend to make opium poppy relatively less attractive, if the crops that the facilities support compete directly with opium poppy.

Investments in Infrastructure

CARD-F has financed the construction of secondary and tertiary roads and, as discussed in the evaluation of IDEA-NEW transportation projects, better roads can reduce remoteness. Reducing remoteness would tend to increase the relative appeal of opium poppy for farmers with medium to large landholdings, but have mixed effects for others.

Table 4.8
Implications for Growing Opium Poppy of Factors Affected by CARD-F

Project and Associated Factors	Very Small Landholding	Small Landholding	Medium to Large Landholding
Subsidizing or providing grants for facilities, such as plastic hoop greenhouses, cool rooms, beehives, drying sheds, chicken coops			
Lower cost of investment input	Ind. (-)	Ind. (-)	Ind. (-)
Increased prices, returns (e.g., if competing for land use)	-	-	-
Increased prices, returns (if not competing for land use, etc., akin to "additional outside income")	Ind.	Ind.	+ (-)
Repairing, expanding, or constructing new infrastructure, such as			
Irrigation systems			
Increased yield, returns	Ind.	Ind.	Ind. (-)
Roads			
Decreased remoteness	Ind.	Ind.	-
Cash-for-work opportunities			
Additional outside income	Ind.	Ind.	+ (-)
Increased labor costs	Ind.	Ind.	-

SOURCE: RAND analysis based on RAND factor map, framework, and program assessment.

NOTES: + = positive relationship; - = negative relationship; Ind. = indeterminate relationship, given available information; () = case-specific result or case-specific interpretation. In each column, we first provide the general result, shown in Figure 3.1; then, in parentheses, we provide the result or interpretation that is specific to the program at hand, if it differs from the general result. In the case of outside income, we provide the results from the household model and an alternative interpretation, based on empirical evidence, both of which are also shown in Figure 3.1.

Cleaned and repaired irrigation systems under CARD-F improved access to water and, as addressed elsewhere, could favor water-intensive crops but might not imply reductions in opium poppy among poorer farmers.

Irrigation projects employ local men, who benefit from the cash paid for work on these projects, although the benefit only lasts as long as the project.

Two interviewees stated that farmers who participated in these projects did not grow opium poppy as that was a precondition for participation. One also noted that in the areas of Helmand where he worked, opium poppy was not being cultivated. However, CARD-F, like other programs, has no mechanism to ensure that farmers will continue to refrain from growing opium poppy in years after participation in projects. The household model, UNODC survey data, and other evidence suggest that the projects implemented under CARD-F did not serve to reduce incentives for farmers to cultivate opium poppy after they ended.

7. Commercial Horticulture and Agricultural Marketing Program (CHAMP)

Program Description

The purpose of CHAMP is to assist poorer Afghan farmers to shift from cultivating opium poppy and lower-value annual crops such as wheat to higher-value perennial crops, such as apples, apricots, almonds, pomegranates, and grapes, by developing orchards, trellising vineyards, and linking producers to merchants for in-country sales and exports. Funded by USAID, CHAMP was launched in February 2010. It was to be a four-year, \$34.9 million program, but was extended in January 2012 to December 31, 2014, and total funding was increased to \$40.3 million. The lead contractor was Roots of Peace. CHAMP coordinates with MAIL and provincial Directorates of Agriculture, Irrigation, and Livestock.¹¹⁸

¹¹⁸ Checchi and Company Consulting, Inc., "Final Report: USAID Office of Agriculture: Commercial Horticulture and Agricultural Marketing Program (CHAMP), Mid-Term

CHAMP targets poorer farmers with small landholdings in south, south central, and eastern Afghanistan.¹¹⁹ It provides these farmers with subsidized saplings for orchards and subsidizes the construction of trellises for vineyards. It also provides them training in more-productive agricultural practices and technologies for orchard crops that result in increased yields and higher-quality fruit. CHAMP also invests in facilities and provides training to improve fruit quality, reduce spoilage, and to sort and grade fruit. CHAMP supports the development of links between farmers and urban and export markets by arranging and financing meetings between the two groups.

Program Results

Expanding Orchards and Vineyards

USAID and other donors have made concerted efforts to re-establish orchards in Afghanistan by providing high-quality saplings at subsidized prices and training to Afghan farmers in better orchard management techniques. ADP South and IDEA-NEW have implemented such projects. The European Community's Perennial Horticultural Development Project has engaged in a companion effort to set up nurseries throughout Afghanistan to provide high-quality fruit saplings. CHAMP has built on these programs. Orchard development and trellising are by far its largest components. It has distributed 2.8 million saplings to 19,000 farmers, who are required to make a 30-percent copayment. On a larger scale than IDEA-NEW, it has subsidized the construction of trellises, reaching 920 farmers and trellising 450 hectares. As part of this effort, CHAMP has provided short courses in better vineyard management practices to over 90,000 Afghans. CHAMP has also run a series of farmer field schools to teach these and other skills, wherein a lead farmer is chosen to arrange classes for groups of ten to 15 people from his or her village. If respected, knowledgeable local farmers are tapped to lead these groups, they can be

Evaluation," March 31, 2012, p. 1; and Roots of Peace, 2014, pp. 7–10.

¹¹⁹ CHAMP has projects in Bamiyan, Ghazni, Helmand, Kabul, Kandahar, Kapisa, Khost, Kunar, Laghman, Logar, Maidan, Wardak, Nangarhar, Paktya, Paktika, Parwan, Uruzgan, and Zabul.

quite effective in diffusing new practices and skills to the community. In 2013, CHAMP tapped 872 lead farmers for this project who taught over 11,000 of their neighbors. Much of this training consisted of demonstrations in an orchard or vineyard. CHAMP has also drawn upon Afghan government extension agents to provide training.¹²⁰

Foreign assistance programs, like CHAMP, have contributed to higher output. As noted previously, land planted to orchards and vineyards has grown 60 and 23 percent, respectively, between 2004 and 2012. Output is also up sharply, with pitted or stone fruit up 64 percent and grapes up 69 percent; yields from fruit trees have varied, yields from grapevines are up 37 percent.¹²¹ It is hard to believe that these increases would have occurred in the absence of programs to subsidize planting trees and vines and to train growers.

Both the orchard and trellising projects have been popular among Afghan farmers, especially trellising. Participant surveys and focus groups found that farmers who participated in trellising projects typically enjoyed a 50-percent or more increase in grape production after one year. Some farmers reported harvesting four times more grapes, which were less moldy and easier to harvest. These factors led to strong demand to participate in the trellising program. However, program evaluators were concerned that without more training, trellising would not yield its full potential, as some farmers have failed to properly tie the vines to the posts. In the south, the orchard project faced competition from AVIPA-Plus and a follow-on program that provided saplings for free; CHAMP demands a copay.¹²² In our discussions with U.S. government officials and foreign aid specialists in Kabul, we found a general consensus that a copay is superior to receiving saplings for free. If participants put their own money into the project, they take better care of the saplings and also are more parsimonious with orders.¹²³

¹²⁰ Roots of Peace, 2014, pp. 1–4.

¹²¹ FAO, 2013.

¹²² Checchi and Company Consulting, Inc., 2012, p. 14.

¹²³ Discussions with U.S. government officials and foreign assistance specialists in Kabul and by telephone to Helmand and Kandahar in September and October 2013.

Training in orchard and vineyard care has had shortcomings. Interviews suggest that the instructors and courses were of uneven quality.¹²⁴ Moreover, most farmers wanted additional more formal, longer-term training where they would have the opportunity to discuss ideas with other farmers. The establishment of farmer field schools under CHAMP in 2012 and 2013 was designed to address this desire for longer-term training.¹²⁵ Many farmers are illiterate, so visual as opposed to written materials are needed. Although visual as well as written materials were created, not all lead farmers were able to be supplied with these materials because of the security situation.¹²⁶ The number of individuals who have gone through training courses also appears to be higher than the number of farmers who have planted or expanded orchards, although this may be due to farmers taking more than one class.¹²⁷

Improving Distribution and Processing of Agricultural Products

Many farmers in Afghanistan have not paid much attention to the types or quality of fruit grown in their orchards. One of our interlocutors in Kabul noted that the orchards of most farmers who grow pomegranates consist of a hodgepodge of trees, some produce fruit for eating, others for juice, and some for dyes made from pomegranate juice. Wholesalers serving Kabul or export markets demand fruit of consistent types and quality. Currently, most Afghan fruit does not meet the specifications required by international markets for appearance and size. Wholesalers also have to contend with limitations on volumes, as fruit in Afghanistan is produced by many small farms that do not coordinate harvests.

CHAMP has implemented projects to improve distribution and processing of fruit, especially grapes, almonds, pomegranates, apricots, apples, and melons. Farmers and wholesalers have been taught and

¹²⁴ Interview response from set of interviews with Afghan implementers in Helmand and Kandahar, spring 2014.

¹²⁵ Communication from USAID.

¹²⁶ Communication from USAID.

¹²⁷ Checchi and Company Consulting, Inc., 2012, p. 16.

encouraged to sort fruit by type and quality. CHAMP has invested in cool storage. Thirty to 40 percent of fruit stored in uncooled facilities, the norm in Afghanistan, is often spoiled. With the farmer paying 20 percent of the total cost, CHAMP has co-financed the construction of cool rooms (underground cellars) where crops like onions, potatoes, and apples can be stored for an extended period. Cool storage relies on the cooler temperatures below ground to keep produce from spoiling, unlike cold rooms, which require electricity for refrigeration. Cool storage reduces losses due to spoilage to less than 5 percent. Building on past successes with potato storage units, CHAMP financed 68 similar units to store apples.¹²⁸

CHAMP has also financed 121 raisin-drying facilities. Exports of raisins and fresh grapes account for the largest share of Afghanistan's exports of fruit. These drying facilities are designed to yield more green raisins and fewer sun-dried black raisins, as the former are worth 33 to 44 percent more than the latter, despite coming from the same grapes. CHAMP has also helped 2,462 farmers improve the quality of dried apricots by providing training in the use of sulfur to create a better-quality product with a higher market value. As part of the training, farmers learn to sort, grade, and clean the apricots. CHAMP has also implemented projects to improve packing and packaging.¹²⁹

These projects appear to have increased margins on these crops. They also appear to be sustainable, in contrast to some other projects. None of these projects need electricity to operate, unlike cold storage and some packaging facilities in which other programs have invested. The costs and challenges of running diesel-powered generators are often such that those projects are not financially viable. In contrast, CHAMP has generally chosen technologies that are sustainable in the context of Afghanistan.¹³⁰

¹²⁸ Roots of Peace, 2014, pp. 23–24.

¹²⁹ Roots of Peace, 2014, pp. 22–23.

¹³⁰ Discussions with U.S. government officials in Kabul and by telephone to Helmand and Kandahar in September and October 2013.

Linking Farmers to Urban and Export Markets

CHAMP has sought to link exporters and wholesalers to farmers and to new markets by subsidizing marketing trips and attendance at international trade fairs, providing marketing information, and setting up and maintaining trade offices in New Delhi and Dubai to act as go-betweens for traders trying to navigate import laws. It has also provided a 50-percent subsidy for packing materials and freight.

According to an evaluation by Checchi and Company Consulting, Inc., “The Marketing team has been unfocused but successful.”¹³¹ CHAMP worked with 32 Afghan companies to export 9,515 metric tons of fruit, almonds, and pomegranate juice to several countries, including India, Pakistan, and the United Arab Emirates. In 2010, while 122 tons of grape exports were subsidized by CHAMP, traders exported an additional 342 tons without a subsidy, although they utilized technical advice provided by CHAMP.¹³² Although exports vary from year to year, exports have continued even after the subsidies ended, indicating that exports are a sustainable activity.

According to some of our interlocutors, the subsidy for shipping led some Afghan exporters to ship lower-quality fruit to export markets than would otherwise have been the case. As was the case with ADP South, the lower-quality fruit harmed Afghanistan’s reputation for producing high-quality fruit.¹³³ However, once CHAMP detected this irregularity, the exporter lost the subsidy.¹³⁴

Consequences for Farmers’ Decisions on Cultivating Opium Poppies

The projects that we identify as potentially affecting decisions to grow opium poppy under CHAMP are

1. expanding orchards and vineyards
2. improving processing of agricultural products

¹³¹ Checchi and Company Consulting, Inc., 2012, p. 2.

¹³² Checchi and Company Consulting, Inc., 2012, p. 24.

¹³³ Discussions with U.S. government officials in Kabul and Kandahar in October 2012 and by telephone to Helmand in September and October 2013.

¹³⁴ Communication from USAID.

3. linking farmers to urban and export markets.

Drawing on the factor map, Table 4.9 shows the avenues through which these projects might have affected farmers' decisions to grow opium poppy. In the section that follows, we elaborate on how these projects affected decisions to grow opium poppy.

Expanding Orchards and Vineyards

As with similar projects, the improvement in returns for alternative cash crops that compete directly with opium poppy tend to make opium poppy relatively less attractive than previously, regardless of landholding size. Orchards and vines offer the additional potential benefit of removing land from opium poppy cultivation over a period of many years.

Both the evaluation by Checchi and Company Consulting, Inc., and our discussions with development specialists in Kabul and by telephone in Kandahar and Helmand provide strong evidence that CHAMP has contributed to higher yields, higher prices, and higher incomes for participating farmers. Interest by Afghan farmers in participating in the program, even with a copay, shows that several of the projects, especially trellising, are profitable. CHAMP's focus on improving yields and quality and reducing spoilage and damage in transit for Afghan fruit growers has also generated higher incomes.

As noted, the decision to plant an orchard removes land available for other cash crops like opium poppy. Once planted, fruit trees and other perennial crops can lock up land for the life of the orchard, making the land unavailable for other crops, except inasmuch as other crops can be planted between rows of vines or trees.

Improving Processing of Agricultural Products with Training and Facility Subsidies

CHAMP has supported several projects to help develop agricultural value chains, most notably through training and support for cool rooms and raisin-drying facilities. The facilities can improve product quality and reduce spoilage, resulting in higher prices for the marketed product and higher yields due to reduced losses. The combination of lower investment costs in facilities and higher prices would improve the

Table 4.9
Implications for Growing Opium Poppy of Factors Affected by CHAMP

Project and Associated Factors	Very Small Landholding	Small Landholding	Medium to Large Landholding
Subsidizing agricultural inputs, such as higher-quality saplings and vines			
Lower cost of investment input	Ind. (-)	Ind. (-)	Ind. (-)
Increased price, returns	-	-	-
Increased yield, returns	Ind. (-)	Ind. (-)	Ind. (-)
Introducing or diffusing new technologies			
Training			
Increased yield, returns (not wheat)	Ind. (-)	Ind. (-)	Ind. (-)
Increased price, returns (not wheat)	-	-	-
Subsidizing or providing grants for facilities, such as cool rooms and drying sheds			
Lower cost of investment input	Ind. (-)	Ind. (-)	Ind. (-)
Increased prices, returns (if competing for land use)	-	-	-
Promoting market links between farmers and urban or export markets			
Decreased remoteness	Ind. (-)	Ind. (-)	-
Increased prices, returns (e.g., if competing for land use)	-	-	-
Increased prices, returns (if not competing for land use, etc., akin to "additional outside income")	Ind.	Ind.	+ (-)

SOURCE: RAND analysis based on RAND factor map, framework, and program assessment.

NOTES: + = positive relationship; - = negative relationship; Ind. = indeterminate relationship, given available information; () = case-specific result or alternative interpretation. In each column, we first provide the general result, shown in Figure 3.1; then, in parentheses, we provide the result or interpretation that is specific to the program at hand, if it differs from the general result. In the case of outside income, we provide the results from the household model and an alternative interpretation, based on empirical evidence, both of which are also shown in Figure 3.1.

relative attractiveness of these legal crops, which compete directly with opium poppy, and reduce incentives to grow opium poppy.

Linking Farmers to Urban and Export Markets

CHAMP has supported efforts to link farmers or rural wholesalers to urban wholesalers or exporters. Linking farmers to urban wholesale and export markets can reduce remoteness for producers of commercial crops and result in higher effective prices. The reduction in remoteness and higher prices for the commercial crops, if competing directly with opium poppy, would tend to reduce incentives for growing opium poppy for all types of farmers.

Programs with Crop-Eradication Features

In this chapter, we assess the likely effects of three programs that include crop-eradication features to varying degrees: (1) the Governor-Led Eradication program, (2) the Good Performers Initiative, and (3) the Helmand Food Zone program. All are funded by the U.S. government, among other donors. These programs present alternative approaches to reducing opium poppy cultivation. The first is the primary program in Afghanistan involving eradication. The second provides community-level inducements to reduce opium poppy cultivation and to encourage governors to try to reduce opium poppy cultivation through a variety of means, including eradication. The third is a program no longer in existence, which combined eradication and public information campaigns with rural development projects to encourage farmers to stop growing opium poppies.

As in Chapter Four, for each program we provide a table that summarizes the potential effects of the program, factor by factor, on the decision to grow opium poppy and employs the same landholding categories and notation as the factor map presented in Chapter Three. In particular, for each of the three landholding categories—very small, small, and medium to large—the tables indicate whether the relationship between the factor and the poppy cultivation decision is positive, negative, or indeterminate. In some instances, the factor map indicated indeterminacy because the range of possible outcomes for a general type of factor was too broad to pin down. As in Chapter Four, we introduce a larger number of parenthetical findings in this analysis to account for greater specificity regarding the terms of each program.

Governor-Led Eradication

Program Description

GLE is the primary eradication program currently being implemented in Afghanistan; it has been funded by the U.S. government through INL as well as other donors, including the government of the United Kingdom.¹ GLE is an Afghan-led program under the MCN. Under GLE, provincial governors create teams drawn from the Counternarcotics Police that are ordered to eradicate fields of opium poppy. The fields are selected at the provincial or district level by small groups within the Counternarcotics Police. The eradication teams may ask the farmer to eradicate the field himself. Alternatively, the team may do the job itself, usually by plowing up the field using a tractor. After receiving proof that the fields have been eradicated, the MCN reimburses governors for any expenses incurred from eradication.² After the plot that has been eradicated is verified by UNODC and others, funds are transferred to the MCN to reimburse costs.³

Program Results

Figure 5.1 shows eradication by region since 2005. As can be seen even in more recent years, eradication has waxed and waned. Eradication appears to have surged through 2007, as the U.S. government emphasized its importance as part of Afghanistan's counternarcotic policies, though the lack of verification in those years probably overstates the extent of that surge.⁴ As U.S. policy shifted to put less emphasis on forc-

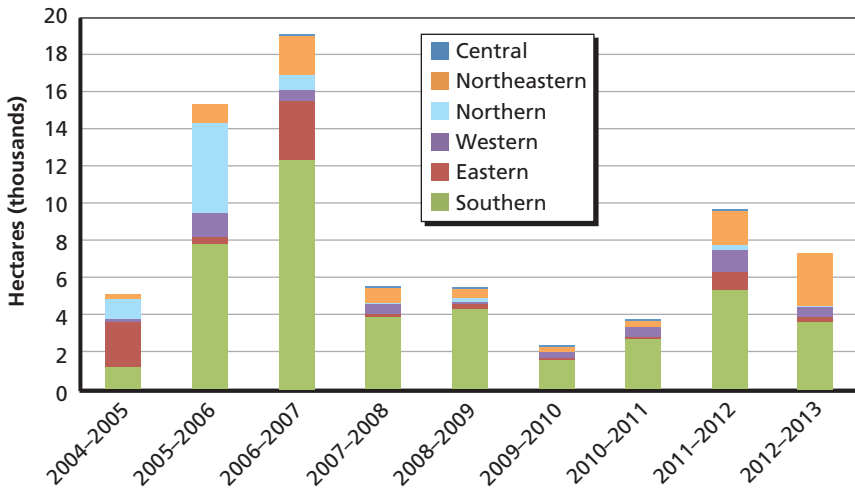
¹ Bureau of International Narcotics and Law Enforcement Affairs, "Afghanistan," *2014 International Narcotics Control Strategy Report (INCSR)*, Washington, D.C.: U.S. Department of State, 2014; Government Accountability Office (GAO), *Afghanistan Drug Control: Strategy Evolving and Progress Reported, but Interim Performance Targets and Evaluation of Justice Reform Efforts Needed*, Washington, D.C., GAO-10-291, March 2010, p. 14.

² Bureau of International Narcotics and Law Enforcement Affairs, 2014.

³ At one time, the MCN had been reimbursing governors at the rate of \$135 per hectare eradicated. GAO, 2010, p. 14.

⁴ Over the years, the eradication data have been verified to varying degrees. Based on UNODC reporting (*Afghanistan Opium Survey*, various years), we assume little or no verification through 2003–2004 and partial to complete verification for subsequent years. For

Figure 5.1
Number of Opium Poppy Hectares Eradicated by Region, 2004 to 2013



SOURCE: UNODC, *Afghanistan Opium Survey*, various years.

NOTES: Over the years, the eradication data have been verified to varying degrees. Based on UNODC reporting (*Afghanistan Opium Survey*, various years), we assume little or no verification through 2003–2004 and partial to complete verification for subsequent years. For 2002–2003, UNODC reported that the eradication data were not verified. UNODC did not present an eradication estimate for 2003–2004. For 2004–2005 through 2006–2007, UNODC reported verification of most of each of the estimates that it presented in the annual surveys. From 2007–2008 onward, UNODC reported full verification of the eradication data.

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ible eradication, the number of hectares eradicated likely fell, even after accounting for the improvement in verification. Under a new Minister of Counternarcotics, eradication was given renewed emphasis in 2011 and 2012. The reductions in ISAF forces in southern Afghanistan since 2012 and the subsequent increase in the role of Afghan security forces combatting the insurgency and the ensuing casualties have been followed by a decline in the number of hectares eradicated in 2013.

2002–2003, UNODC reported that the eradication data were not verified. UNODC did not present an eradication estimate for 2003–2004. For 2004–2005 through 2006–2007, UNODC reported verification of the majority of each of the estimates that it presented in the annual surveys. From 2007–2008 onward, UNODC reported full verification of the eradication data.

There has been widespread acknowledgement that the selection of fields to be eradicated can be swayed by bribes or influence. According to one interviewee, “Eradication takes place only in some areas for the TV. In other areas they don’t do it; they take money from the villages.”⁵ Former Afghan officials engaged in counternarcotics at the Ministry of Interior stated that some fields were selected for eradication because they belonged to political opponents or business competitors of the local officials in charge, who were engaged in the opium trade. They also said that farmers could persuade eradication teams to select another field in exchange for bribes. In some instances, all the growers in the village chip in and compensate one farmer, who agrees to have his fields eradicated.⁶

Our interviewees stated that although highly unpopular, eradication has affected decisions by farmers to grow opium poppy. Facing the threat of eradication, farmers in the Helmand CCA who faced high penalties are now growing crops other than opium poppy. They said that in areas in Helmand under the control of the government, farmers now cultivate wheat or other crops rather than opium poppy, but the interviewees spoke in broad terms about general conditions and did not address the interplay among factors.

Moreover, in southern Afghanistan, eradication—in combination with technology change—appears to have resulted in a shift rather than a reduction in opium poppy cultivation. As noted later in this chapter, the Helmand Food Zone program, which had an eradication component, did contribute to a drop in opium poppy cultivation in the CCA, but cultivation shifted to the *dasht*. Eradication teams have been less willing to go into the *dasht* than to operate in the CCA for security reasons, as eradication campaigns have been met with violence from farmers and, in some cases, insurgents. Consequently, opium poppy grown in the *dasht* has faced less risk of eradication.

⁵ Interview response from set of interviews with Afghan implementers in Helmand and Kandahar, spring 2014.

⁶ Author interviews with current and former U.S. and Afghan government personnel, summer and fall 2010.

One factor that has driven up the costs of GLE has been damage to tractors and plows used to destroy crops. Opium poppy farmers and local Taliban forces that draw on revenues from opium poppy become irate when opium crops are being destroyed. Insurgents and farmers have responded by shooting at the Afghan government employees who are plowing up their fields. Tractor drivers respond by driving the tractors at high speeds, which damages the equipment and results in roll-overs, injuring and sometimes even killing the tractor drivers.⁷ Tractors have also been diverted from the program.⁸

Some have argued that alternative means of eradication, such as cutting off the opium plants using scythes or weed trimmers, would be more cost-effective than using tractors to plow under the plants in light of the problems of procuring and maintaining tractors in Afghanistan for eradication forces.⁹ Such an approach would involve destroying the plants early enough in the growing season so that farmers could not salvage the harvest by extracting sap from the plants that have been cut down, but late enough in the season so that they could not replant their fields with opium poppy. Such an approach would be more labor-intensive and take more time; in insecure areas, it would also expose more people for longer periods to attack from farmers or others that seek to stop eradication.

Consequences for Farmers' Decisions on Cultivating Opium Poppies

GLE was designed to inject a credible risk of crop loss into the decisions made by farmers. However, as shown in Table 5.1, GLE can affect decisionmaking through more than one channel. Drawing from the factor map, we note that eradication-induced crop losses can affect perceptions of eradication risks, Taliban influence, and accumulated debt; if large scale, it can also affect prices.

⁷ Interview with U.S. civil servant with detailed knowledge of the program, Kabul, October 2013.

⁸ Interview with U.S. civil servant with detailed knowledge of the program, Kabul, October 2013.

⁹ Interview with U.S. civil servant with detailed knowledge of the program, Kabul, October 2013.

Table 5.1
Implications for Growing Opium Poppy of Factors Affected by Governor-Led Eradication

Project and Associated Factors	Very Small Landholding	Small Landholding	Medium to Large Landholding
Eradicating opium poppy			
Eradication risk	Ind.	Ind.	–
Taliban influence	+	+	+
Accumulated debt	Ind.	Ind.	Ind.

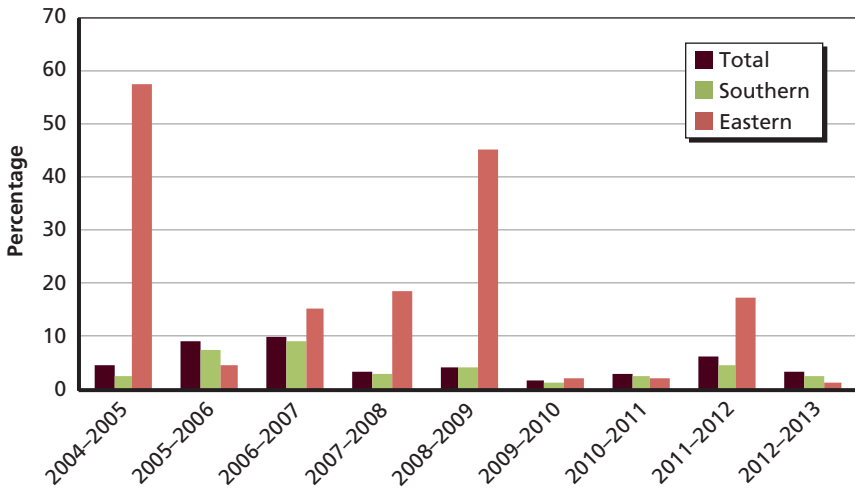
SOURCE: RAND analysis based on RAND factor map, framework, and program assessment.

NOTES: + = positive relationship; – = negative relationship; Ind. = indeterminate relationship, given available information. In each column, we provide the general result, shown in Figure 3.1.

Employing our household model, we find that, for farmers with medium to large landholdings, an increase in the risk of eradication should discourage the cultivation of opium poppy. As noted in Chapter Three, for farmers with very small or small landholdings, the effects of an increased risk of eradication are indeterminate. These risk-averse farmers might choose to increase the amount of land planted to opium poppy out of an expectation that in some years they are likely to lose the entire crop. Therefore, these farmers feel a need to generate higher cash incomes from opium in years when the crop is not eradicated to compensate for years in which it is. They might also plant more in response to the effects of the program on the variability of returns.

Figure 5.2 shows the share of total hectares planted to opium poppy eradicated over time for all of Afghanistan and for the southern and eastern regions. As can be seen, the percentage of hectares planted to opium that were eradicated has varied greatly by year and by region, even with consideration of the issues of verification noted previously. In the south as a whole, the risk of eradication appears to have been low in relation to overall cultivation in most years, although during the period of the Helmand Food Zone program, it appears to have been higher in the CCA—and might have been especially high for those farmers lacking means of avoidance. In other regions of the country, the number of hectares eradicated as a percentage of hectares planted to opium has

Figure 5.2
Share of Opium Poppy Hectares Eradicated, Total and by Region, 2004–2013



SOURCE: Calculated using data from UNODC, *Afghanistan Opium Survey*, various years.

NOTES: Over the years, the eradication data have been verified to varying degrees. Based on UNODC reporting (*Afghanistan Opium Survey*, various years), we assume little or no verification through 2003–2004 and partial to complete verification for subsequent years. For 2002–2003, UNODC reported that the eradication data were not verified. UNODC did not present an eradication estimate for 2003–2004. For 2004–2005 through 2006–2007, UNODC reported verification of most of each of the estimates that it presented in the annual surveys. From 2007–2008 onward, UNODC reported full verification of the eradication data.

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been large at times, albeit potentially overstated in the years—through the 2006–2007 growing season—in which eradication has not been verified fully. This has especially been the case in the north, where the number of hectares cultivated with opium has been low (see Table 5.3). It has also been the case some years in the east, as shown in Figure 5.2.

Using the figures for 2009, a year with a high level of eradication, as the basis for our calculation, the percentage of hectares planted to opium poppy that were eradicated was about 45 percent in the east and only about 4 percent in the south. For the purposes of illustration, we assume that the percentage of hectares planted to opium that were eradicated corresponds to the probability of eradication for all farmers

in each region, abstracting from their ability to bribe the Counternarcotics Police or otherwise avoid eradication, and that farmers in the south and east face similar prices and cost structures. Drawing on our crop budget and using these numbers, the risk of eradication would have reduced the expected returns to farmers in the south and east by about \$165 and \$1,850 per hectare, respectively.¹⁰ Notwithstanding these drops in expected returns, poppy would still have looked preferable to wheat across both regions.

To compound the challenges of assessing the effects of the threat of eradication on decisions to grow opium poppy, the probability of having one's crop eradicated is not uniformly distributed within provinces or districts. Some farmers are able to use affiliations with local or tribal patronage networks, bribes to police or other officials, or invoke Taliban protection to forestall eradication. Interviewees stated that wealthier farmers are able to bribe their way out of eradication, but poor people lose everything.¹¹ Although these measures come at some cost, once taken, the probability that the fields of wealthier farmers who provide bribes will be eradicated is close to zero. Farmers who are unable or unwilling to take these measures face a much higher probability of eradication than would appear to be the case based on our calculations.¹² In areas where eradication is taking place, farmers with opium poppy fields far from roads face a much lower probability of eradication than those farmers whose fields are easily accessible.

As addressed in Chapter Three, eradication can increase support for and the influence of the Taliban; thus, it can inadvertently promote opium poppy cultivation. In that chapter, we identified two potential paths of influence. The first path consisted of the implicit or explicit impunity from eradication provided by the Taliban in areas of south-

¹⁰ We use the percentage of eradicated hectares in total hectares planted as a proxy for risk of eradication and the expected value of planting opium estimated from our crop budget in Appendix B. If a crop is eradicated, the farmer does not pay harvesting costs, estimated at \$980 per hectare, or *ushr*, estimated at \$565 per hectare. We have adjusted the expected value to account for these savings.

¹¹ Interview response from set of interviews with Afghan implementers in Helmand and Kandahar, spring 2014.

¹² Mansfield and Pain, 2006, pp. 7–10.

ern Afghanistan. The second consisted of the encouragement of opium poppy cultivation by those among the Taliban who finance their operations with opium payments or who view the successful defiance of centrally mandated counternarcotics policies as valuable in strategic, political-military terms.

In some instances, farmers who have lost their opium crops to eradication have fallen into debt as they have lost that year's income, but, as discussed at length in Chapter Three, the effects of accumulated debt are indeterminate across all types of landholders.

Good Performers Initiative

Program Description

GPI was established in 2007 by the government of Afghanistan to recognize exemplary counternarcotics efforts at the provincial level. GPI has awarded more than \$160 million in development projects to date through the support of INL. Each year, GPI provides awards for provinces in three categories: (1) those that are poppy-free (\$1 million each); (2) those that have reduced poppy cultivation by more than 10 percent in the past year (\$1,000 for each hectare above 10 percent); and (3) up to two provinces for recognition of exceptional counternarcotics achievements (\$500,000 each).¹³ Awards support provincial development priorities; development projects are nominated by the Provincial Development Committees in each province based on Provincial Development Plans and are approved by GPI, the MCN, and INL. The projects are then implemented by GPI and the MCN. Past projects include schools, health clinics, drug treatment centers, greenhouses, agricultural equipment, roads, and irrigation projects. GPI ties rewards to the performance of provinces that ensure they are poppy-free or have reduced the cultivation of opium poppy.

Recognizing that reducing cultivation is not the only indicator of progress in counternarcotics, INL and MCN worked closely with relevant Afghan ministries to redesign GPI and expand award catego-

¹³ GPI documents provided to RAND by INL.

ries for good performers. GPI II, which was launched in August 2014, rewards progress in public outreach and law enforcement activities, in addition to reduced or eliminated poppy cultivation.¹⁴ GPI II thus aims to provide incentives and increase provincial efforts across a spectrum of counternarcotics activities, especially in high poppy cultivation areas, and increase support for farmers by focusing solely on the implementation of alternative-livelihoods projects. Selection of projects for award funding under GPI II involves local community input from agricultural cooperatives, Community Development Councils, district stakeholders and governors, and District Development Assemblies. Local organizations can submit their proposals for inclusion in District and Provincial Development Plans.

Program Results

UNODC and U.S. officials in Afghanistan assured us that GPI funding is only given to provinces that are poppy-free or have reduced poppy cultivation. As of spring 2015, the program has funded 222 projects in all of Afghanistan's 34 provinces. Past projects have included primary and secondary school buildings, sport stadiums and gymnasiums, primary health care clinics, irrigation canals and other irrigation structures, bridges, warehouses for agricultural products, hospitals, and drug treatment centers. The program has also provided farmers or farming communities with 390 tractors.¹⁵ Under GPI II, INL has shifted its focus to implementing alternative-livelihood projects in rural communities (recognizing the limitations imposed by security concerns).

Consequences for Farmers' Decisions on Cultivating Opium Poppies

To date, GPI has funded a number of projects that potentially affect decisions by farmers to grow opium poppy. These include

1. investments in irrigation systems
2. investments in roads and bridges

¹⁴ GPI documents provided to RAND by INL.

¹⁵ Ministry of Counter Narcotics, Islamic Republic of Afghanistan, "Good Performers Initiative," web page, updated 2014.

3. construction of warehouses for agricultural products
4. provision of farm machinery.

Drawing on the factor map, Table 5.2 shows the avenues through which these projects may affect decisions to grow opium poppy.

Building roads—and bridges—serves to reduce remoteness, which, as addressed in Chapters Three and Four and in Appendix C, involves the effects of distances, perishability of the agricultural product, and the ease with which government forces can reach a field for eradication. A reduction in remoteness reduces the costs of transporting farm products and agricultural inputs. The reduction in these costs

Table 5.2
Implications for Growing Opium Poppy of Factors Affected by the Good Performers Initiative

Project and Associated Factors	Very Small Landholding	Small Landholding	Medium to Large Landholding
Repairing, expanding, or constructing new infrastructure, such as			
Irrigation systems			
Increased yield, returns	Ind.	Ind.	Ind. (-)
Roads			
Decreased remoteness	Ind.	Ind.	-
Providing cash-for-work opportunities			
Additional outside income	Ind.	Ind.	+ (-)
Increased labor costs	Ind.	Ind.	-
Subsidizing or providing grants for facilities, such as warehouses			
Lower cost of investment input	Ind. (-)	Ind. (-)	Ind. (-)
Increased prices, returns (e.g., if competing for land use)	-	-	-
Increased prices, returns (if not competing for land use, etc., akin to "additional outside income")	Ind.	Ind.	+ (-)

Table 5.2—Continued

Project and Associated Factors	Very Small Landholding	Small Landholding	Medium to Large Landholding
Subsidizing or providing grants for farm equipment, such as tractors and water pumps			
Lower cost of investment input	Ind. (-)	Ind. (-)	Ind. (-)
Increased yield, returns ^a	Ind.	Ind.	Ind. (-)
Governor's influence	Ind.	Ind.	-

SOURCE: RAND analysis based on RAND factor map.

NOTES: + = positive relationship; - = negative relationship; Ind. = indeterminate relationship, given available information; () = case-specific result or alternative interpretation. In each column, we first provide the general result, shown in Figure 3.1; then, in parentheses, we provide the result or interpretation that is specific to the program at hand, if it differs from the general result. In the case of outside income, we provide the results from the household model and an alternative interpretation, based on empirical evidence, both of which are also shown in Figure 3.1.

^a Pertaining largely to water pumps and less so to tractors.

increases net returns. For farmers with medium to large landholdings, reducing remoteness should improve the relative attractiveness of perishable crops and, thus, create incentives to shift out of opium poppy. For farmers with very small or small landholdings, these crops also become more attractive. However, the decrease in remoteness could also make these farmers less concerned about ensuring their own sources of food and therefore more able to grow crops, including opium poppy, other than wheat. For poorer farmers, the net effect is indeterminate. As noted in Chapter Three, the empirical evidence that *remoteness*, referring to the distance from a road, is positively correlated with a higher likelihood of growing opium poppy is mixed.

Projects funded by GPI to clean and repair irrigation systems should have improved access to irrigation, which could increase yields of all crops, including opium. However, irrigation might be relatively more beneficial for crops that are less drought-resistant than opium poppy. For wealthier farmers, we might expect the balance of effects to be negative for opium poppy, but the empirical result would come down to issues of relative, marginal returns on the additional yields. Moreover, the improved wheat yields could lessen poorer farmers' con-

cerns about food security, thus increasing their interest in shifting land to higher-return crops like opium poppy or, as addressed previously, lead them to a tipping point and a shift from opium poppy into wheat.¹⁶

The use of local unskilled labor for cleaning and improving irrigation infrastructure and constructing roads and bridges might present households with additional outside income opportunities and could increase the demand for local labor, potentially driving up wages. The wage effect might discourage opium poppy cultivation, at least among wealthier farmers if not among all farmers, but the income effect, as discussed in Chapters Three and Four and in Appendix C, could act to encourage or discourage opium poppy cultivation.

GPI has paid for the construction of warehouses. Warehouses should reduce spoilage and result in higher prices for the better-quality marketed product and higher yields due to reduced losses, making the legal crops stored in these warehouses relatively more attractive vis-à-vis opium poppy than previously.

The effect of providing tractors on opium poppy cultivation is indeterminate. Tractors are used to plow opium poppy fields as well as fields for legal crops. However, as noted in Chapter Four, harvesting wheat is easier to mechanize than harvesting opium poppy, so providing tractors is likely to have a greater effect on costs of growing wheat than opium poppy, particularly for farmers who grow wheat on a commercial scale. However, the difference in net returns for the two crops is so wide that providing tractors would have a very modest impact on decisions to grow one crop or the other.

One characteristic of GPI is its emphasis on collective rewards. Group rewards for communities to cease growing illegal crops have reportedly had some success in Peru. The reward for the community in the form of desired infrastructure, such as a school, improved road, or irrigation system, induces social pressure from the community to dissuade farmers from growing illegal crops.¹⁷ However, in the past, the awards provided by GPI were at times not directly tied to the local

¹⁶ See the discussions of the “tipping point” in Chapter Three and Appendix C.

¹⁷ See Appendix E; discussions with program managers responsible for Peruvian DEVIDA program in October 2013 in Kabul, Afghanistan.

communities that had committed to halting the cultivation of opium poppies. Projects were selected at the district or provincial level, not by the villages where decisions to grow opium poppy are made. This state of affairs has been remedied under GPI II, which focuses on the implementation of alternative-livelihoods projects, and under which projects are selected by local communities.

Because opium poppy is an annual crop, the province can qualify as poppy-free in one year, receive a reward, and then see a return to cultivation in the following year. As shown in Table 4.4, since 2011, Ghor, Faryab, Baghlan, and Kapisa provinces, which were formerly poppy-free and had therefore qualified for GPI, have started to grow some opium poppy again.

One can view the original GPI as targeted at the governor rather than the community. The governor plays a role in determining what projects are to be chosen and where they are to be located. For example, several past projects, such as sport stadiums, have been located in provincial capitals, far from any community engaged in growing opium poppy. However, without convincing the governor to pursue counternarcotics policies, enforcement at the provincial level would be stymied.

In addition to enforcing the law, several Afghans, commentators, and U.S. government officials have argued that forceful, charismatic governors have influenced farmers to reduce or cease cultivating opium poppy because they are admired by the community and because of the threat of eradication. The reduction in opium poppy cultivation in Nangarhar in 2008 has been credited to former Governor Gul Agha Sherzai.¹⁸ However, subsequently, he lost a great deal of power due to shifts in local power balances.¹⁹ As noted in Chapter Three, we included the influence of governors as one potential factor in our map and our analysis of the factor suggested that a governor's willingness and ability to implement aggressive enforcement policies could have indeterminate if not counterproductive effects.

¹⁸ Discussions with civil servants engaged in U.S. counternarcotics policies in Kabul, October 2013.

¹⁹ Comment from former senior U.S. government official who served in Afghanistan.

UNODC polling data suggest that governors might be even less successful at reducing the cultivation of opium poppy through persuasive policies than through punitive policies. According to UNODC survey data on motives for growing opium poppy, not even 1 percent of respondents has cited “received support from government” or “in anticipation of support from government” as their primary reason for ceasing to grow opium poppy. A larger share has expressed concerns about punitive measures, especially historically.²⁰

According to discussants in Kabul,²¹ GPI has inadvertently led to pressure on surveyors engaged to undertake the opium survey that is run by UNODC and the MCN. Because GPI ties awards to hectares cultivated, Afghan political leaders have an incentive to report fewer or no hectares of opium cultivated. These provincial political leaders have put pressure on surveyors to change results so that they are more favorable for some governors.²² However, INL reports that crosschecks using aerial and satellite imagery and other surveys indicate that this pressure has not affected survey results.²³

Helmand Food Zone Program

Program Description

The HFZ program is a program of the government of Afghanistan, initiated and led by the former Governor of Helmand Province, Muhammad Gulab Mangal, as part of the province’s counternarcotics strategy. The program was designed in close collaboration with the Helmand Provincial Reconstruction Team, which supported the program throughout. Developed to support GLE, it had three compo-

²⁰ See the discussions of governance and eradication risk in Chapter Three for the comparative data.

²¹ Discussions with individuals involved with the annual opium survey held in Afghanistan in October 2013.

²² Discussions with individuals involved with the annual opium survey held in Afghanistan in October 2013.

²³ Personal communications with INL.

nents: (1) an alternative-livelihoods program, (2) a public information program, and (3) increased eradication, primarily in areas targeted by the public information campaign and that participated in alternative-livelihoods projects.

As shown in Figure 5.3, the program targeted ten designated districts in Helmand, encompassing about 235,000 hectares of land. These districts grow most of the food in the province; they also grew most of the opium poppy. The program employed an “ink-spot” strategy of creating poppy-free zones that were then supposed to be gradually expanded to the rest of the province. Local communities that received subsidized agricultural inputs, primarily improved wheat seed and fertilizer, signed an agreement with the provincial government stating that they would not grow opium poppy. The agreement gave the government permission to eradicate poppy fields, if farmers still grew opium poppy after signing the agreement.

The program started in 2008 and ended in 2012. The alternative-livelihoods projects were funded by USAID and the governments of the United Kingdom and the Kingdom of Denmark, in coordination with Afghan provincial officials. Over the life of the program, the total cost was \$56 million.²⁴ INL funded eradication through the GLE program.

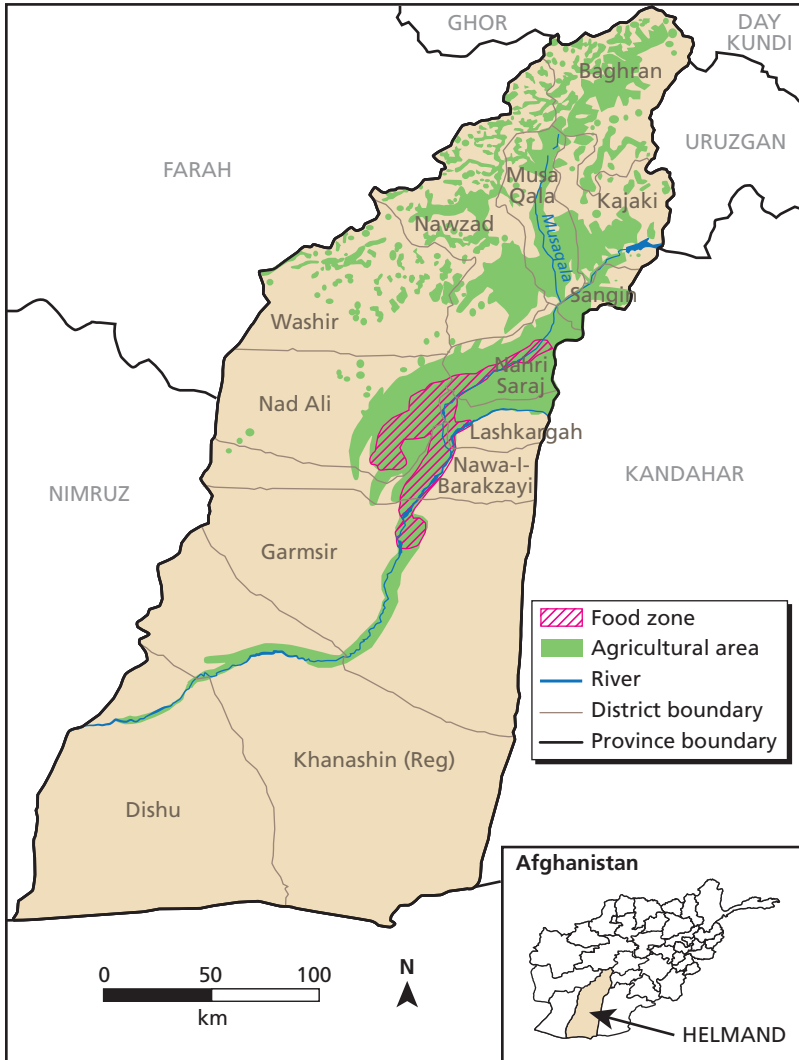
Program Results

Provision of Subsidized Fertilizers and Higher-Quality Wheat and Vegetable Seeds

The primary project in support of alternative livelihoods was the Wheat Seed Program, part of the NSDP, implemented by MAIL. The goal of the NSDP is to replenish the entire country’s seed stock every five years with higher-quality seed. Through the HFZ program, seed distribution was accelerated and more heavily distributed in the food zone than elsewhere in Afghanistan. In addition, farmers were provided subsidized fertilizer. The standard package for each participating farmer was 100 kilograms of high-quality wheat seed, 100 kilograms of DAP

²⁴ Ministry of Counter Narcotics, 2013, pp. 64–80; Upper Quartile, 2011; U.S. Mission Afghanistan, Regional Platform, Southwest; Regional Command, Air Ground Team; and Helmand Provincial Reconstruction Team, *Helmand Plan Annual Review 2010*, March 12, 2011.

Figure 5.3
Helmand Food Zone, 2009



SOURCE: Ministry of Counter Narcotics, 2013.

RAND RR1075-5.3

fertilizer, and 200 kilograms of urea fertilizer, a quantity sufficient to cover four jeribs of land and similar in size to packages provided under AVIPA and AVIPA-Plus. In 2008–2009, the first year of the program, wheat seed was provided free of charge; in later years, farmers were supposed to pay 20 percent of the cost, but this target was not always pursued. The program also provided higher-quality vegetable seeds for winter crops.

Between 2009 and 2010, the Wheat Seed Program provided farmers with 5,975 tons of seed, covering about one-half of Helmand's annual requirement of 12,300 tons of wheat seed. Some districts received more than 100 percent of their requirement, while others received less than one-quarter. Assessments of the program found that the wheat seed reached targeted farmers, but that the subsidy on wheat seed was above and beyond what was necessary to induce farmers to take the seed.²⁵ Interviewees claimed that the seed and fertilizer served to improve the yields and incomes of participating farmers. We were unable to find reliable data on yields and the size of the wheat harvest in Helmand to buttress these claims. However, Helmand is an important source of wheat in Afghanistan and overall trends in wheat yields and output provide some support. Implementers whom we interviewed were positive about the project.²⁶ Interviewees stated that the project purchased certified seeds from reputable companies in Herat and that the fertilizers were also of high quality.²⁷

Implementers noted in interviews that some fraud occurred in the allocation of the packages. Although each recipient had to show his or her *tazkira* (identity or voter registration card), in some cases village elders asked poor farmers to pick up the packages from the distribution centers, but then the elders took the wheat seed and fertilizer from the

²⁵ Upper Quartile, 2011, p. 16; discussions with U.S. government officials in Kabul in September and October 2013 and by telephone to Helmand in October 2013.

²⁶ Interview response from set of interviews with Afghan implementers in Helmand and Kandahar, spring 2014.

²⁷ Interview response from set of interviews with Afghan implementers in Helmand and Kandahar, spring 2014.

poor farmers. In a few cases, recipients managed to obtain the packages two or three times.²⁸

Public Information Campaigns

The HFZ program delivered counternarcotics messages through radio and television broadcasts, billboards, and the distribution of pamphlets for illiterate as well as literate farmers. The campaigns were designed to raise awareness among farmers of Afghanistan's counternarcotics programs in general and the HFZ program in particular. The campaign focused on informing the target audiences that opium is forbidden by Islam, about the links between opium poppy and drug addiction, and the overall social costs of opiates. The campaigns also touted the financial benefits of alternative crops, providing examples of success stories. The campaigns informed farmers about where they could obtain subsidized agricultural inputs and about the threat of eradication if farmers cultivate opium poppy, especially for those who break their pledges not to cultivate the crop. During the pre-planting and planting seasons, campaigns focused on positive messages: the value of subsidized seeds and fertilizers and the benefits of cultivating alternative crops. During the eradication and harvest seasons, the campaigns focused on the illegality of poppy and the risk of eradication.²⁹

An important component of the HFZ program public information campaigns was a focus on tribal elders and *shuras*. In 2009, Governor Mangal called for a Grand Provincial Shura with tribal elders and *ulema* from all districts of Helmand during the pre-planting season. Meetings with *shuras* were called in the eight districts of Helmand covered by the 2009–2010 program. Members were asked to pledge that farmers will not grow poppy in exchange for agricultural inputs. *Ulemas* in two districts, Lashkar Gah and Nad Ali, issued *fatwas* against poppy cultivation. However, elders in rural areas where the influence of insurgents has been strong were reluctant to distribute anti-opium poppy

²⁸ Interview responses from a set of interviews with Afghan implementers in Helmand and Kandahar, spring 2014. See also Mansfield, Alcis Ltd., and the Organisation for Sustainable Development and Research, 2011, pp. 19–21, 67.

²⁹ Ministry of Counter Narcotics, 2013, pp. 65–66.

materials in their villages due to fear of reprisals from insurgents. In these areas, radio messages and word of mouth played a more important role in informing farmers.³⁰

It is difficult to evaluate the effectiveness of public information campaigns. However, an assessment conducted by Upper Quartile concluded the following:

The separate operating units within the [Provincial Reconstruction Team] responsible for communications and public information are not well coordinated. Their views on the success of the [public information] campaign are contradictory and there is no robust, objective evidence on its impact to clarify the true position.³¹

In contrast, Afghanistan's MCN claimed that public awareness campaigns appear to have had a significant effect on influencing decisions to grow opium poppy. It stated that messaging has been an effective supply-reduction technique in the HFZ program, but cautioned that conclusive research on the effectiveness of counternarcotics messaging is still lacking.³²

Eradication

Eradication was a key component of the HFZ program. The program aspired to eradicate all opium poppy cultivated in areas receiving food zone program assistance. Any farmer found growing opium poppy in those areas was to have his crop eradicated, regardless of social position, connections, personal wealth, or opposition from the Taliban. Eradication consisted of three activities under the Governor: (1) self-eradication, (2) governor-led eradication, and (3) measures to disrupt lancing—that is, slicing the opium poppy bulb to extract the resin. In addition, former Governor Mangal asked the Interior Ministry to coor-

³⁰ Ministry of Counter Narcotics, 2013, pp. 65–66.

³¹ Upper Quartile, 2010, p. 13.

³² Ministry of Counter Narcotics, 2013, p. 20.

dinate the operations of its Poppy Eradication Force (PEF) in Helmand with GLE.³³

The provincial government enforced self-eradication by insisting on pledges from farmers to refrain from growing opium poppy in exchange for receiving subsidized wheat seed and fertilizer, pressure on farmers from village elders and the *ulema*, and if all else failed, short-term detention of up to 72 hours for those who breached their Good Conduct Pledge.

Governor-led eradication was focused on the interior of the food zone. Provincial Counternarcotics Police who conducted eradication operations usually plowed under the flowering plants and were to receive protection from the Afghan National Army. Prior to selecting fields for eradication, the governor requested that the security situation be assessed for that area. In 2009, when the Poppy Eradication Force was still operating, the PEF primarily focused on the edges of the food zone. Lancing was to be disrupted by setting up checkpoints along major roads to stop lancers from other provinces or Pakistan from traveling to opium poppy fields, destroying lancing tools, and fining or possibly imprisoning those who transported or otherwise facilitated the movement of lancers to the fields.³⁴

The number of hectares eradicated has fluctuated over the course of the HFZ program, subject to the foregoing caveats relating to verification (see Table 5.3). The largest numbers of hectares eradicated might have preceded the program, but the number of hectares eradicated rose 62 percent between 2008 and 2009, the first full year when the HFZ program was being implemented and eradication was being verified. However, it subsequently fell to levels last seen in 2005. The share of total land planted to opium poppy that was eradicated hit 5.9 percent in Helmand in 2009, but then fell to 2 or 3 percent in 2010 and 2011 (Table 5.3).

³³ The PEF was an armed force of the Ministry of Interior financed by the U.S. government that had been set up with the sole purpose of eradicating opium poppies. It has been disbanded.

³⁴ Office of the Governor of Helmand, *Helmand Provincial Counter-Narcotics Strategy*, May 28, 2009, pp. 20–21.

Table 5.3
Hectares of Opium Poppy Eradicated and Cultivated in Helmand Province

	2005	2006	2007	2008	2009	2010	2011	2012	2013
GLE	1,031	3,166	1,003	1,416	1,475	1,602	1,940	3,637	2,162
Poppy Eradication Force	15	1,807	3,000	1,121	2,644	0	0	0	0
Total	1,046	4,973	4,003	2,537	4,119	1,602	1,940	3,637	2,162
Hectares Planted	27,546	74,297	106,773	106,127	73,952	66,647	65,247	78,813	102,855
Share of Total	3.95%	7.17%	3.90%	2.45%	5.90%	2.46%	3.06%	4.84%	2.15%

SOURCE: UNODC, *Afghanistan Opium Survey*, 2005–2013.

NOTES: Over the years, the eradication data have been verified to varying degrees. Based on UNODC reporting (*Afghanistan Opium Survey*, various years), we assume little or no verification through 2003–2004 and partial to complete verification for subsequent years. For 2002–2003, UNODC reported that the eradication data were not verified. UNODC did not present an eradication estimate for 2003–2004. For 2004–2005 through 2006–2007, UNODC reported verification of most of each of the estimates that it presented in the annual surveys. From 2007–2008 onward, UNODC reported full verification of the eradication data.

Eradication in the south has taken a toll on human life. There were 300 casualties in Helmand during eradication at the time of the HFZ program, out of which 139 persons were killed and 161 wounded.³⁵

Consequences for Farmers' Decisions on Cultivating Opium Poppies

The three core features of the HFZ program were

1. provision of subsidized fertilizers and higher-quality wheat and vegetable seed
2. public information campaigns
3. eradication.

As shown in Table 5.4, these programmatic elements incorporated measures that touch on several factors affecting farmer decisions

³⁵ UNODC, *Afghanistan Opium Survey*, 2011.

Table 5.4
Implications for Growing Opium Poppy of Factors Affected by the Helmand Food Zone Program

Project and Associated Factors	Very Small Landholding	Small Landholding	Medium to Large Landholding
Subsidizing agricultural inputs, such as			
Vegetable seed			
Lower cost of recurring input	Negl. ^a	Negl. ^a	Negl. ^a
Increased price, returns	–	–	–
Increased yield, returns	Ind. (–)	Ind. (–)	Ind. (–)
Higher quality wheat seed			
Lower cost of recurring input	Negl. ^a	Negl. ^a	Negl. ^a
Increased yield, returns	Ind.	Ind.	Ind. (–)
Fertilizer			
Lower cost of recurring input	Ind. (–)	Ind. (–)	Ind. (–)
Increased yield, returns	Ind.	Ind.	Ind. (–)
Undertaking public information campaigns			
Governor's influence	Ind.	Ind.	–
<i>Shura</i> council's influence	Ind.	Ind.	–
Religiosity	–	–	–
Eradicating opium poppy			
Eradication risk	Ind.	Ind.	–
Taliban influence	+	+	+
Accumulated debt	Ind.	Ind.	Ind.
Increasing police or military presence	Ind.	Ind.	–

SOURCE: RAND analysis based on RAND factor map, framework, and program assessment.

NOTES: + = positive relationship; – = negative relationship; Ind. = indeterminate relationship, given available information; () = case-specific result or alternative interpretation; Negl. = negligible. In each column, we first provide the general result, shown in Figure 3.1; then, in parentheses, we provide the result or interpretation that is specific to the program at hand, if it differs from the general result.

^a The cost of wheat and vegetable seed is negligible both in absolute terms and relative to other costs.

to cultivate opium poppy: input costs, governor's influence, *shura's* influence, and eradication risk. In this section, we discuss each of these effects in turn.

Provision of Subsidized Fertilizers and Higher-Quality Wheat and Vegetable Seeds

Providing farmers with subsidized higher-yielding wheat and vegetable seeds should have increased yields for both types of crops. The subsidy component reduces their costs and increases their net returns, making them more attractive, but the cost differences could be negligible. The effects of the increases in yields would differ by crop type. In the case of vegetable seeds, which tend to be cash crops, higher yields would improve attractiveness of vegetables in relation to poppy for all farmers. For farmers with medium to large landholdings, higher yields for wheat might make wheat relatively more attractive than opium poppy. On the other hand, the higher yields from better-quality wheat seed can reduce concerns about food security, in which case farmers with small landholdings may choose to plant more opium poppy to take advantage of opium's higher returns. Alternatively, the higher yields could enable farmers with especially small landholdings who currently monocrop opium poppy to shift into wheat, if they reach a tipping point.³⁶

In theory, the effects of fertilizer can lead to less or more opium poppy, in part because the fertilizer can be applied to any crop, including opium poppy. In practice, our interviewees insisted that farmers who participated in the NSDP in Helmand had agreed not to grow opium poppy.³⁷ Due to communal pressure, personal integrity, religious beliefs, and fear of eradication, these interviewees argued that almost all farmers who participated refrained from growing opium poppy in the year that they received the subsidized package.³⁸ One

³⁶ See the discussions of the "tipping point" in Chapter Three and Appendix C.

³⁷ Interview response from set of interviews with Afghan implementers in Helmand and Kandahar, spring 2014.

³⁸ Interview response from set of interviews with Afghan implementers in Helmand and Kandahar, spring 2014.

interviewee said, “In those areas that the people received alternative crops there is no cultivation of opium, but in those areas that did not receive alternate crops they are cultivating poppy, and its cultivation has been increased recently.”³⁹ Interviewees noted vegetables as cash crops as an important substitute for opium. They also said that farmers prefer cultivating crops with which they are familiar, such as tomatoes, onions, pumpkins, eggplant, garlic, melons, watermelon, and cucumbers, and which can be easily sold on local markets.⁴⁰

Public Information Campaigns

Public information campaigns were a key component of the HFZ program. Using our factor map, we trace through how such programs may have affected decisions to grow opium poppy.

A key component of the public information campaign in Helmand was to communicate the importance ascribed by the governor to reducing the cultivation of opium poppy. In our discussions with U.S. civil servants and foreign assistance specialists in Afghanistan in October 2013, there was a consensus that the HFZ program would not have been initiated and implemented without the leadership of Governor Mangal. Written materials also make this point.⁴¹ More broadly, our interlocutors stressed the importance of governor support for counternarcotics programs in any province.

Drawing on our factor map, we find that the effects of a governor’s willingness and ability to implement counternarcotics policies on the cultivation of opium poppy are not entirely clear. Our analysis in Chapter Three suggested that a governor’s willingness and ability to implement aggressive enforcement policies could have an indeterminate if not counterproductive effect. In general, we find that indeterminacy is more likely for farmers with very small or small landholdings than for farmers with medium to large landholdings. One program

³⁹ Interview response from set of interviews with Afghan implementers in Helmand and Kandahar, spring 2014.

⁴⁰ Interview response from set of interviews with Afghan implementers in Helmand and Kandahar, spring 2014.

⁴¹ Office of the Governor of Helmand, 2009, p. 6.

implementer whom we interviewed said district governors and military commanders in remote districts try to make farmers cultivate opium. If the counternarcotics policy is rigorously implemented, the increased risk of eradication or other enforcement actions on the part of the governor should serve to reduce incentives to grow opium poppy by wealthier farmers. According to our interviews with implementers, the district leadership, as well as the provincial leadership, plays a major role in discouraging the cultivation of opium poppy.

Another key component of the public information campaign was to obtain support for the program from the local *shura*. Because the local *shura* tends to be closer to the local population, it is assumed to have more influence than more distant institutions, like the district government. The provincial government made a concerted effort to convince the local *shura* to make the local community promise not to grow opium poppy. According to one interview with an implementer, members of the local *shura* and village elders play important roles in efforts to discourage opium poppy cultivation. However, as addressed in Chapter Three, the effects of the local *shura* are also indeterminate for farmers with very small and small landholdings.

The governor also appealed to local religious leaders to re-emphasize the teaching that growing and consuming opiates is contrary to Islam. All else equal, our analysis in Chapter Three suggests that such religious beliefs should discourage the cultivation of opium poppy. As part of this effort, participants in the NSDP were asked to swear that they would not grow opium poppy. Many of our interviewees said that farmers took their pledges not to grow opium poppy in exchange for program participation seriously.⁴² This was the case for all the programs evaluated, not just the HFZ program. The public information campaign also directly targeted farmers with the message that growing opium poppy is contrary to Islam. Program implementers who were interviewed as part of our survey claimed that in the year when the program was implemented, participants did not grow opium poppy.

⁴² Interview response from set of interviews with Afghan implementers in Helmand and Kandahar, spring 2014.

However, they noted that after the program ended, farmers cultivated opium again.

Not surprisingly, the influence of the Taliban reduces the effectiveness of these programs. One project implementer who was interviewed said that some community leaders cooperated with the program, but others did not because of pressure from the Taliban. He stated that the Taliban pushes farmers to cultivate poppy. Another noted that landowners in insecure areas often grow opium poppy.

Eradication

As noted in the discussion of the GLE, we have identified at least three channels through which eradication-induced crop losses can affect decisionmaking: the perception of the risk of eradication, which we refer to as *eradication risk*; the influence of the Taliban; and the accumulation of debt.

Employing our household model, we find that for farmers with medium to large landholdings, an increase in the risk of eradication should discourage the cultivation of opium poppy. As noted in Chapter Three, for farmers with very small or small landholdings the effects of an increased risk of eradication are indeterminate.

The provincial government directed eradication to those districts that were part of the HFZ program.⁴³ Patterns of eradication suggested that this policy was implemented. By 2012, 3,143 hectares, or 86 percent of all the hectares of opium poppy that were eradicated, were located in the food zone. However, as noted above, after a surge in eradication in 2009, the number of hectares eradicated fell sharply over most of the rest of the program's life, although eradication resurged in 2012 (Table 5.3).

To the extent that eradication serves to increase the Taliban's influence in a given locale, it might be said to encourage poppy cultivation. If Taliban influence also reduces the efficacy of public information campaigns, then eradication might be said to negatively reinforce that tendency and to further reduce the efficacy of such campaigns.

⁴³ Office of the Governor of Helmand, 2009, p. 8.

Eradication, per se, could also add to the accumulated debt of households, but, in this case, the effect on the decision to cultivate opium poppy is indeterminate.

Finally, as noted elsewhere in this report and documented in Mansfield's extensive fieldwork, a major effect of eradication in the case of the HFZ program has been to push cultivation of opium poppy from the CCA to the *dash*. Although opium production in the CCA fell, this balloon effect resulted in no net decline in production in Helmand.

Overall Assessment

The UNODC has stated that the HFZ program contributed to a decline in opium cultivation within the CCA. The executive summary of the UNODC's 2013 Opium Survey asserts that, "the fact that the extent of opium cultivation outside the former Hilmand 'Food Zone' was far greater [in 2013] than inside it, is testimony to the validity of the alternative livelihood programme, which came to an end in 2012."⁴⁴ In 2011, the UNODC conducted a separate survey of opium cultivation inside and outside of the food zone. The survey found that poppy cultivation within the food zone fell 38 percent between 2010 and 2011.⁴⁵ Whereas in 2009 the cultivation of opium poppy was distributed evenly across the food zone, by 2012 it had become concentrated in a few peripheral areas in the Marja, Nad Ali, and Naheri-Saraj districts. The land in the center of Helmand—that is, the food zone—was planted to vineyards and orchards.⁴⁶

The decline in cultivation of opium poppy may also have been affected by the surge of large numbers of troops from ISAF and the Afghan National Army into Helmand in 2009. The increased presence of security forces may have contributed to farmers' decisions to reduce opium poppy cultivation.⁴⁷ The contemporaneous decline in opium production is consistent with our household model, at least in regard to farmers with medium to large landholdings.

⁴⁴ UNODC, *Afghanistan Opium Survey*, 2013, p. 10.

⁴⁵ UNODC, *Afghanistan Opium Survey*, 2012, p. 19.

⁴⁶ Ministry of Counter Narcotics, 2013, p. 69.

⁴⁷ Mansfield, 2011b, p. 30.

As noted, at the same time that opium poppy cultivation was falling in the food zone, a new area, the *dasht*, was opened up for opium poppy cultivation. In 2011, opium poppy cultivation exploded in the periphery of the province, especially north of the Boghra canal. While opium poppy accounted for one-seventh of cultivated land in the food zone in 2011, almost a third of farmed land outside the food zone was under opium poppy cultivation.⁴⁸

This “balloon effect,” which we discuss at length in Chapter Two, was made possible by a combination of technological change and the inadvertent effects of the HFZ program. Entrepreneurs brought drilling rigs to Helmand, which led to a sharp decline in the cost of drilling wells. The costs of pumping water were also such that farmers could now profitably grow opium poppy even after paying to drill a well. As a result, cultivated land north of the Boghra canal rose from 834 hectares in 1999 to 26,571 hectares in 2010 and an estimated 34,720 hectares in 2012.⁴⁹ In addition to these technological changes, the threat of eradication in the HFZ and the subsidized provision of seeds and fertilizer for alternative crops made growing opium poppy less attractive in those areas, consistent with the factor map. Because of the Taliban presence and protection and the lack of presence on the part of the Afghan government, the threat of eradication is lower in the *dasht*.

Differences in income also appeared to contribute to the expansion in opium cultivation in the *dasht*. On average, incomes of farmers in the HFZ were about 30 percent higher than those of farmers outside of the food zone. Those farmers depended on opium poppy for 36 percent of their income. In other words, moving to the *dasht*, opium poppy was the most important cash crop. However, opium remains an important source of income inside the food zone, contributing 30 percent of income on average.⁵⁰

The shift to the *dasht*, which appears to have been initially driven by policy and enabled by technology, might be long lived. Even after the end of the HFZ program and declines in the number of hectares

⁴⁸ Mansfield, 2013a, p. 72

⁴⁹ Mansfield, 2011b, p. 20; UNODC, *Afghanistan Opium Survey*, 2013.

⁵⁰ Ministry of Counter Narcotics, 2013, p. 71.

of opium poppy eradicated, households continue to farm the *dasht*; the total number of hectares farmed continues to rise. Barring a sharp rise in the price of drilling wells and pumping water, salination of land, or the disappearance of water, farmers appear to be becoming entrenched in these new regions.

Policy and Programmatic Guidance

Opium is Afghanistan's most important cash crop and, although opium poppy grows throughout much of Afghanistan, it has become entrenched in the south, especially in Helmand province. In southern Afghanistan, on average 219,000 households, over one-half of rural households, grew opium poppy between 2005–2006 and 2009–2010.¹ There, opium yields generated over one-quarter of household income.² Well-established, if loosely formed, networks purchase raw opium from farmers, consolidate purchases at local markets, and then sell it for domestic consumption, export, or further processing into heroin for sale in foreign markets, thus mitigating the challenges of engaging in agriculture in an otherwise insecure environment. To complicate matters, many small landholders and sharecroppers in the poppy-growing economy are very poor, face concerns about feeding their families, and depend on the crop as a source of cash income. Moreover, both insurgents and Afghan government officials often demand payments in-kind or cash from opium poppy farmers and traders; in many cases, proceeds from opium and heroin finance operations and provide personal enrichment.

Recent trends in opium poppy cultivation in Afghanistan are discouraging. To the extent that reductions in cultivation have occurred in one area, like the HFZ, they have been followed by the introduction or expansion of opium poppy cultivation in others, such as the formerly desert areas. The availability of relatively inexpensive drilling technol-

¹ Calculated from UNODC data.

² UNODC, *Afghanistan Opium Survey*, various years.

ogy and tube wells makes the potential for cultivation to expand to previously uncultivated areas—in the *dasht* and elsewhere—that much easier. In aggregate, the number of hectares devoted to opium poppy cultivation has returned to and surpassed peak 2005–2006 levels.

Against that backdrop, the Afghan government and foreign donors, including the U.S. government, through INL and other agencies, have employed—and continue to employ—a variety of programs to encourage farmers to engage more fully in legal livelihoods and to discourage them from growing opium poppy.

In the preceding chapters, we developed a framework for assessing the effects of such programs on farmers' incentives to cultivate opium poppy and applied the framework to ten programs—seven tied to rural development and three with features pertaining to eradication. The entrenchment of opium poppy in the south and the recent resurgence of cultivation do not prove the impossibility of influencing farmers' decisions to cultivate opium poppy, but they do suggest the implausibility of a near-term, program-led decline in aggregate production in the current environment, which includes substantial poverty, the ongoing insurgency, the drawdown of ISAF forces, and the overall challenges of governing Afghanistan. That said, some elements of the programs we considered could help to set the stage for reductions in future years, particularly after the security situation improves and rural incomes rise.

In this chapter, we synthesize our findings from the prior chapters and offer recommendations to INL and other U.S. agencies, the Afghan government, and the donor community concerning where and how they should concentrate their efforts. Specifically, we provide recommendations on how to design programs that might better serve to reduce the cultivation of opium poppies in the future, even if that is not the programs' primary goal.

Rural Development Programs

In Chapter Four, we looked at seven programs targeting rural development. As depicted in Table 6.1, the core elements of those programs fell into several broad categories. Each category can be parsed further

by particular types of projects or activities and channels of influence, with implications for opium poppy cultivation and rural incomes. In tracing the implications of each program, project, or channel of influence on opium poppy cultivation, we follow the same procedure as in Chapter Four. We first report the direction of change associated with the relevant factor, be it positive, negative, or indeterminate, found in the factor map in Chapter Three and then offer alternative and case-specific findings parenthetically. We base the parenthetical findings on a combination of empirical evidence, including that presented in Appendix E, and case-specific knowledge, as available. In some instances, the factor map indicated indeterminacy because it was not possible to assign a direction of change to a general type of factor, such as agricultural investment. However, with more information about the terms of the program it is sometimes possible to assign a direction.

The positive, negative, or indeterminate signs do not address the potential magnitude of the influence. The ultimate effect might be large, small, or even imperceptible. We might, as a practical matter, observe no tangible effect on cultivation decisions because of threshold or sufficiency constraints; that is, a price or input cost might need to reach a certain level, in terms of dollars per kilogram or dollars per hour, to provoke a behavioral change. We address these types of issues in the bulleted text that follows the table.

Here, we summarize our findings for each category, with a separate bullet for training, and draw out implications for program design on the basis of the analysis in Chapters Three through Five and in Appendixes B, C, and E.

- **Fertilizer.** Distributing subsidized fertilizer could have a modest but tangible impact on farmer incomes by reducing costs and improving yields, but it might or might not serve to reduce the cultivation of opium poppy. The indeterminacy in our analysis stems from two sources, both relating to the yield effect: First, farmers with smaller and larger landholdings might respond differently to an improvement in yields; second, farmers might choose to apply fertilizer—a non-crop-specific input—to opium poppy. For farmers with smaller landholdings, the better yields on wheat

Table 6.1
Programs and Implications for Rural Income and Opium Poppy Cultivation

Category/Project/Channels of Influence	Implications			
	Rural Income	Poppy Cultivation		
		Very Small Landholding	Small Landholding	Medium to Large Landholding
Subsidizing agricultural inputs, such as				
Fertilizer				
Lower cost of recurring input ^a	+	Ind. (-)	Ind. (-)	Ind. (-)
Increased yield, returns	+	Ind.	Ind.	Ind. (-)
Higher-quality wheat seed				
Lower cost of recurring input	Negl. ^b	Negl. ^b	Negl. ^b	Negl. ^b
Increased yield, returns	+	Ind.	Ind.	Ind. (-)
Vegetable seed				
Lower cost of recurring input	Negl. ^b	Negl. ^b	Negl. ^b	Negl. ^b
Increased price, returns	+	-	-	-
Increased yield, returns	+	Ind. (-)	Ind. (-)	Ind. (-)
Higher-quality saplings and vines ^c				
Lower cost of investment input	+	Ind. (-)	Ind. (-)	Ind. (-)
Increased price, returns	+	-	-	-
Increased yield, returns	+	Ind. (-)	Ind. (-)	Ind. (-)

Table 6.1—Continued

Category/Project/Channels of Influence	Implications			
	Rural Income	Poppy Cultivation		
		Very Small Landholding	Small Landholding	Medium to Large Landholding
Subsidizing or providing grants for farm equipment or facilities, such as				
Farm equipment, such as tractors and water pumps				
Lower cost of investment input	Ind.	Ind. (-)	Ind. (-)	Ind. (-)
Increased yield, returns ^d	+	Ind.	Ind.	Ind. (-)
Facilities, such as plastic hoop greenhouses, cool rooms, beehives, drying sheds, chicken coops				
Lower cost of investment input	+	Ind. (-)	Ind. (-)	Ind. (-)
Increased prices, returns (e.g., if competing for land use)	+	-	-	-
Increased prices, returns (if not competing for land use, etc., akin to “additional outside income”)	+	Ind.	Ind.	+ (-)
Repairing, expanding, or constructing new infrastructure, such as				
Irrigation systems				
Increased yield, returns	+	Ind.	Ind.	Ind. (-)
Roads				
Decreased remoteness	+	Ind.	Ind.	-

Table 6.1—Continued

Category/Project/Channels of Influence	Implications			
	Rural Income	Poppy Cultivation		
		Very Small Landholding	Small Landholding	Medium to Large Landholding
Introducing or diffusing new technologies				
Training				
Increased yield, returns (wheat)	+	Ind.	Ind.	Ind. (-)
Increased yield, returns (not wheat)	+	Ind. (-)	Ind. (-)	Ind. (-)
Increased price, returns (not wheat)	+	-	-	-
Other	See discussion	See discussion	See discussion	See discussion
Non-traditional crops	See discussion	See discussion	See discussion	See discussion
Providing cash-for-work opportunities				
Additional outside income	+	Ind.	Ind.	+(-)
Increased labor costs	+	Ind.	Ind.	-
Promoting market links between farmers and urban or export markets				
Decreased remoteness	+	Ind. (-)	Ind. (-)	-
Increased prices, returns (e.g., if competing for land use)	+	-	-	-
Increased prices, returns (if not competing for land use, etc., akin to "additional outside income")	+	Ind.	Ind.	+ (-)
Promoting non-agricultural rural enterprises				
Additional outside income	+	Ind.	Ind.	+ (-)
Increased labor costs	+	Ind.	Ind.	-

Table 6.1—Continued

Category/Project/Channels of Influence	Implications			
	Rural Income	Poppy Cultivation		
		Very Small Landholding	Small Landholding	Medium to Large Landholding
Undertaking public information campaigns ^e				
Governor’s influence	n/a	Ind.	Ind.	–
<i>Shura</i> council’s influence	n/a	Ind.	Ind.	–
Religiosity	n/a	–	–	–
Eradicating opium poppy ^f				
Eradication risk	n/a	Ind.	Ind.	–
Taliban influence	n/a	+	+	+
Accumulated debt	–	Ind.	Ind.	Ind.
Increasing police or military presence	n/a	Ind.	Ind.	–

SOURCE: RAND analysis based on factor map, framework, and program assessments.

NOTES: + = positive relationship; – = negative relationship; Ind. = indeterminate relationship, given available information; () = alternative or case-specific interpretation; n/a = not applicable; Negl. = negligible.

^a In the case of a recurring input, the pure cost effect is analogous to a price effect.

^b The cost of wheat and vegetable seed is negligible both in absolute terms and relative to other costs.

^c Saplings and vines constitute investments.

^d Pertaining largely to water pumps and less so to tractors.

^e We include public information campaigns in this table, as relevant to rural development programs, but did not focus on such campaigns specifically.

^f We include eradication and police and military presence in this table, as relevant to the HFZ program, but defer a discussion of eradication to a subsequent section of this chapter.

might relax concerns about food security and could promote cultivation of opium poppy. For farmers with larger landholdings, the ultimate effect would depend more on the relative returns of wheat, other commodities, and opium poppy. Empirical evidence suggests that applying fertilizer to wheat can substantially boost wheat yields and potentially favor wheat; however, the cultivation decision would depend on the relative value of the additional yield on wheat and on poppy. Finally, because fertilizer is applied each season, one-off subsidy programs do not generate sustained increases in yields or farm incomes.

- **High-quality wheat seed.** Distributing subsidized high-quality wheat seed could help to raise farm incomes through higher yields, if not lower costs,³ but might not serve to reduce the cultivation of opium poppy. As was true of fertilizer, the better yields on wheat might relax farmers' concerns about food security and could promote cultivation of opium poppy, especially among farmers with smaller landholdings. For farmers with larger landholdings, the ultimate effect would still depend largely on the relative returns of wheat and opium poppy. In this case, the yield of wheat alone would rise—the input is crop-specific—however, absent a dramatic change in market conditions, it is unlikely that wheat would supplant opium poppy as a cash crop. Even compared with fields planted with subsidized, higher-yielding wheat seed, returns to opium poppy might be nine times those to wheat. Given the potential for replanting from harvested seed, such pro-

³ In contrast to fertilizer, the cost of seed constitutes a very small share of input costs, so the subsidy, per se, would not have an appreciable effect on net returns. AVIPA and AVIPA-Plus provided a relatively high subsidy, covering a large share of the total cost. According to discussions with government officials engaged in providing aid, the programs probably could have achieved close to the same effect with a lower subsidy.

grams might best be confined to a single year in a region,⁴ to avoid repeated awards and duplication of benefits.⁵

- **Saplings and vines.** Investments in higher-quality, yield-improving orchards and vineyards can significantly raise farm incomes and might dissuade some opium poppy cultivation, as orchards and vineyards are likely to compete with opium poppy for land use, even if opium poppy is interspersed initially. The effects of lower input costs, higher prices, and higher yields are mutually reinforcing; moreover, empirical evidence suggests that fruit crops can generate net income comparable to that of opium poppy, albeit with substantial start-up costs. Among the many different types of projects that we considered, those oriented toward distributing subsidized high-quality saplings and vines—especially if accompanied by training in orchard and vine care—appear to have been among the most efficacious in the pursuit of rural development.⁶
- **Farm equipment.** Programs that subsidize the purchase of tractors and water pumps might boost farm incomes, but need not lead to reductions in opium poppy cultivation. Although tractors might be somewhat more important to cultivating wheat, which is a capital-intensive crop, than to cultivating opium poppy, which is a labor-intensive crop, and hence more likely to improve the relative attractiveness of wheat, they can be used for cultivating opium poppy as well. Thus, the issue of relative returns across commodities comes into play. Moreover, if the equipment results in higher yields and helps to relax concerns about food security,

⁴ One of the strengths of the AVIPA and AVIPA-Plus programs was their broad reach. They distributed higher-yielding varieties of wheat to a substantial share of Afghan farmers in a short period, in contrast to programs that focus on pilot projects with a small number of farmers and then attempt to encourage more farmers to adopt the new practices or crops.

⁵ Limiting seed subsidies and distribution through AVIPA and AVIPA-Plus to just one year would have avoided providing the same farmers with high-quality wheat two or more years in a row.

⁶ Supported by USAID, the European Union, and DfID and often implemented in conjunction with MAIL, such programs have contributed to large increases in orchards and fruit harvests in Afghanistan. Moreover, well-tended orchards can yield revenues comparable to those from opium poppy.

it could serve to promote opium poppy cultivation, especially among farmers with smaller landholdings. Recent tractor programs have been plagued by corruption, loss (e.g., through resale and damage),⁷ and poor targeting (e.g., to those lacking need of subsidies).⁸ Finally, the provision of water pumps has threatened to disrupt the allocation of water in irrigated areas or exploit groundwater at rates that are unsustainable.

- **Facilities.** Subsidies for the construction of plastic hoop greenhouses, cool rooms, beehives, drying sheds, and chicken coops, when coupled with assistance in marketing and management, have led to profitable, sustainable operations, such as growing winter vegetables, and have helped raise rural incomes and, in some instances, could lead to reductions in opium poppy cultivation. The result would depend, in part, on whether the operations compete directly for land and other resources, as might be more likely if they target winter, spring, or year-round agricultural production.⁹ However, if the operations do not compete directly with opium poppy for household resources and, thus, are functionally equivalent to outside income opportunities, they could encourage opium poppy cultivation by reducing food insecurity. Projects involving more complex technologies or requiring electricity, such as cold-storage facilities, have performed poorly or failed.

⁷ Some recipients have lacked the ability or resources to maintain equipment. Producer cooperatives, in particular, have had a poor record in maintaining equipment in Afghanistan, as there are few incentives for individuals to take responsibility for maintaining collectively owned property.

⁸ Private providers have emerged to provide capital-intensive agricultural services, like plowing or threshing. In some cases, these relatively high-income providers have benefited because they can cover costs of requisite copayments, even if they have the means to purchase the equipment without the subsidy.

⁹ Farmers have taken advantage of the program to subsidize plastic sheeting for low-cost greenhouses to grow vegetables in the winter months for sale Kabul, Kandahar, and other cities. Factors that have made these programs successful and sustainable—as rural development programs—have been the existence of a large market in the cities for the vegetables, the lower cost and greater ability of project implementers to reach more farmers, the high returns made possible by the technology, and the simplicity of the technology.

- **Infrastructure.** Well-maintained irrigation systems and roads could help to raise rural incomes, but could affect opium poppy cultivation negatively or positively through their effects on yields, in the case of irrigation, and remoteness, in the case of roads. Roads, for example, can reduce the cost of transporting perishable and heavier, non-perishable crops like wheat, but also lower the cost of transporting opium. The benefits might be relatively greater for most legal crops, because they are bulkier than opium poppy, but, for poorer households, better connectivity to markets and a relaxation of concerns about food security could favor opium poppy cultivation. Similarly, irrigation can be of benefit to legal and illegal crops¹⁰ and affect food security, through yield effects. In practice, both types of projects have struggled to ensure ongoing post-project maintenance.
- **Training.** Many rural development programs, including several of those we examined, provide training to promote the diffusion of technologies or to provide new skills in support industries, which could eventually discourage opium poppy cultivation. Program implementers find training is needed in conjunction with the provision of subsidized inputs like higher-quality seeds, saplings, cuttings, or chicks and to add value to agricultural products through better techniques for drying, sorting, and processing. Projects that appeared to deliver effective training were hands-on and coupled with inputs provided by the donor,¹¹ but might have promoted better learning with more hours and refresher courses. The least-successful training projects lacked strong, existing markets for new skills. Official evaluation reports criticized projects for poor course design, lack of appropriate course materials, poor-quality trainers, and more focus on reporting numbers of trainees than learning and retention. Projects designed to provide training

¹⁰ As was true of water pumps, irrigation might be somewhat more important for wheat cultivation than for opium poppy cultivation—because of the latter’s drought resistance—and hence more likely to improve the relative attractiveness of wheat, but the issue of relative returns would still, as above, come into play.

¹¹ Some projects might also have benefited from co-payments, to weed out potential participants who are not serious about continuing with the activity.

in improved livestock breeding and management also faced challenges.¹²

- **Non-traditional crops.** The introduction of non-traditional, high-value crops could boost rural incomes and, if competing directly with opium poppy for land use, help to discourage opium poppy cultivation, but only if tied to efforts to train farmers and processors, develop commercial markets and other supporting infrastructure, and establish and expand links between farmers and commercial markets (see “Market links” bullet). Regarding the relevance of existing markets, interviewees harshly criticized a project to grow chili peppers, a non-traditional crop that lacked an existing market.¹³
- **Cash-for-work.** Cash-for-work programs are intended to provide new or additional work and income to participants; on that basis, their effects on farmers’ decisions to cultivate opium poppy would depend, in part, on whether such projects draw labor from poppy cultivation and stimulate rural wages or serve to provide non-competing additional household income. If the former, they might negatively affect farmers’ decisions to cultivate opium poppy, especially those with medium to large landholdings; if the latter, they might positively or negatively affect those decisions. Evidence to date suggests little if any rural wage effect¹⁴ and, at most, a modest effect on the availability of rural labor at harvest.¹⁵

¹² Improving livestock management is often more challenging than raising yields from crops, as learning new approaches to breeding and birthing takes a sustained effort. One targeted group, the Kuchis, are nomadic and not very receptive to feeding sheep and goats in pens.

¹³ Saffron is grown near Herat, but a project to encourage farmers to grow saffron in Helmand was unsuccessful due, in part, to the lack of traditional marketing networks for the crop.

¹⁴ Moreover, our crop budgets suggest that opium poppy would remain profitable in absolute terms and in relation to wheat even with substantially higher harvest wages.

¹⁵ Some of our interlocutors stated that opium farmers had had difficulty in getting sufficient labor for the harvest at the time of one cash-for-work program, but data on the amount of opium harvested do not bear this claim out.

Such programs require ongoing financing by donors but cannot, by their nature, contribute to sustained increases in rural incomes.

- **Market links.** Establishing and expanding links between farmers and commercial markets is a necessary step for developing commercial agriculture in Afghanistan, and could serve to discourage opium poppy cultivation. The development of links to commercial agriculture can create a more favorable environment for measures intended to promote higher-value agricultural products and, potentially, foster incentives to reduce the cultivation of opium poppy. In relation to the household model, projects that link farmers to markets can be thought of as both mitigating remoteness for commercial commodities and enabling production of higher-value commodities, which could, in turn, either constitute competing products for opium poppy or generate something akin to outside income. If the former, they might be more inclined to discourage poppy—thus suggesting the desirability of promoting commercial commodities that compete directly with poppy for land and other resource use. In our view, projects that have been most able to promote links have focused on making introductions, informing Afghans of export requirements, and assisting Afghans in improving the quality of their products for commercial sale.¹⁶ Subsidies on shipping costs were less successful and sometimes counterproductive.¹⁷
- **Non-agricultural rural income.** Projects to create opportunities for non-agricultural rural incomes, such as through handicraft production and re-invigorated carpet weaving, in southern Afghanistan have had little lasting effect, measured on their own terms. Moreover, were they to succeed in the future, they could

¹⁶ Linking local farmers to urban Afghan markets might represent an avenue toward long-term growth in exports. To sell in urban markets, Afghans must match imports in terms of price and quality. Once Afghan producers show they can compete on their home market by improving sorting, grading, and packaging, they might be in a better position to compete on export markets.

¹⁷ One of our discussants informed us that the transportation subsidy on pomegranates had hurt Afghanistan's brand image because exporters found it profitable to ship lower-quality products.

act to create outside income opportunities, which might imply an increase or decrease in opium poppy cultivation or, if they were to draw labor away from agriculture and boost rural wages, could discourage opium poppy cultivation. However, the recent track record of such projects in Afghanistan suggests little or no likely effect via either channel.

The foregoing analysis suggests that a modest set of different types of projects, such as those focusing on substantially improving the relative returns of high-value, poppy-competing, legal commodities with well-established accessible markets and boosting rural wages, holds the most promise for opium poppy reductions, in the sense that the projects tend to point in the right direction—i.e., largely away from opium poppy—and might eventually steer farmers toward legal opportunities. Training, primarily in conjunction with such projects, also appears to hold value in the mix of options.

However, to the extent that the projects point in the right direction, they might not do so with sufficient strength to induce a change in behavior. For example, wages might need to more than quadruple (see Appendix B) to engender a shift from opium poppy to wheat cultivation, though perhaps less so for other high-value crops. Moreover, more projects hold promise for farmers with medium to large landholdings than for those with smaller landholdings—and, inasmuch as we observe conflicting incentives within a particular program, the conflicts appear more often across categories of landholders than across channels of influence.

Data presented in Table 2.2 indicate that more than 85 percent of all irrigated arable land in Afghanistan is held by farmers with two or more hectares, but that nearly one-half of all farms with irrigated land are less than 2 hectares. Moreover, local observations of landholdings in the south suggest the possibility of farms in excess of 2 hectares, at least in the *dasht*. If, then, a substantial share of opium poppy in Afghanistan grows on medium to large landholdings, gearing programs and projects toward farmers with such landholdings might seem reasonable or desirable as an immediate strategy; however, to develop mechanisms with only those households in mind would be to

set aside the concerns—and cultivation—of the large share of farmers who occupy smaller plots, the needs of those working the land, and the potential for shifts in opium cultivation to new regions.¹⁸

These last observations on the distribution of landholdings point to an important, if implicit, dimension of our findings: time. In our framework, we treated very small, small, and medium to large as fixed categories in a static rural system, but they need not be. To the extent that policy, programs, and projects can, over time, move farmers from the lesser categories of very small and small to the greater category of medium to large, the more amenable the system might be to reorientation toward legal pursuits. Farmers with medium to large landholdings, taken as a proxy for a set of attributes relating to wealth and risk aversion, can be expected to respond more readily to the incentives of net returns and less to those of food sufficiency, which would imply greater susceptibility to programs that reduce the relative profitability of opium poppy, even if, in a static model, an increase in outside income, taken on its own, could have other effects. Moreover, the system is profitable for such farmers—and somewhat insensitive to modest wage increases—in large part because of the existence of a substantial population of impoverished sharecroppers who seek opportunities to feed and shelter their families and to improve their status and are willing to offer their family's labor to do so.¹⁹ The availability of unpriced or underpriced labor, in the form of women—oftentimes unable to seek off-farm employment, but sometimes able to serve lim-

¹⁸ For a more about shifts in opium cultivation, see the discussion on recommendations.

¹⁹ An average 11-member household can cultivate about 1 hectare of opium poppy with its own labor, hiring some additional labor at harvest. For a household to cultivate more than 1 or 2 hectares, it must bring in substantially more outside labor. If it hires the labor, costs will rise sharply, cutting into returns. Using our crop budgets, net returns on the first hectare of opium poppy cultivated by an owner-operator household are about \$3,500. However, to farm a second or third hectare, the household would need to employ more outside labor, at least at harvest time, if not throughout the growing season. If hired at prevailing daily wage rates, returns could fall to about \$1,450 per hectare. Although still more profitable than wheat, a number of alternative crops, especially perennials, could generate more attractive returns, albeit potentially requiring a substantial up-front investment. For the landowner, net returns on an additional hectare using sharecropping might amount to almost \$2,300 per hectare, about \$850 more than from employing hired labor directly.

ited on-farm roles—and children, also bolsters the system.²⁰ Thus, the persistence of poppy in Afghanistan is not just about rural incomes, but also about socio-cultural conditions.

Taking the longer view, higher incomes—likely supporting higher wages—appear to be a necessary, if insufficient, condition for substantially curtailing the cultivation of illegal crops. We find evidence to support this statement both in our analysis of the factors that influence opium poppy cultivation (Chapters Three, Four, and Five and Appendix D, and summarized above) and, by implication, in the experience of other countries (Appendix E). For example, over the past five decades, Thailand and Turkey have successfully all but eliminated the illegal cultivation of opium poppy, but only in conjunction with rising rural incomes. This finding hinges largely—but not entirely—on the labor intensity of cultivating the illegal crop.²¹

In our recommendations, we turn to our findings on the potential of rural development programs to foster increases in rural incomes and social change.

Other Programs

INL has supported two major programs associated with eradication in Afghanistan: Governor-Led Eradication and the Good Performers Initiative.

Under GLE, we found that the likelihood of having one's field eradicated varies greatly across Afghanistan and within communities. In areas where the number of hectares planted to opium poppy has been small, the share of hectares eradicated can be substantial, suggesting that some households might view the risk of eradication as also substantial. In areas of ubiquitous cultivation, like Helmand and Kan-

²⁰ If women were able to participate in the rural—or other—labor market, rural wages might decline, but households would not have access to unpriced, under-valued labor.

²¹ For crops that are labor intensive, such as opium poppy, profitability depends crucially on the availability of low-cost labor; when incomes rise, that availability tends to diminish, as does the desirability of the crop.

dahar, the share of hectares eradicated has been very small, suggesting the perception of risk is low, overall.

As eradication is not pursued unless the governor initiates the activity, the incentives provided by GPI have encouraged governors to engage in eradication. In the past, GPI was less closely linked to communities that have seen their opium crops eradicated than in the case of programs in other countries attempting to reduce the cultivation of illegal drugs. In recent years, INL has successfully steered the selection of projects under the award away from projects centered in cities (sport stadiums and technical colleges) or that were not directly connected to communities affected by eradication. Under GPI II, projects are now proposed by the local communities themselves.

We have found little evidence—in theory or empirical observation—to suggest that eradication can, *as a blanket policy*, shift this system away from illegal cultivation.²² In its programming, INL explicitly recognizes this limitation of eradication. Eradication was one of the few program areas for which we observed conflicting incentives across landholder types and across channels of influence. Eradication risk might discourage opium poppy cultivation among farmers with medium to large landholdings, but concurrently rising Taliban influence might also encourage opium poppy cultivation among all farmers. Taliban influence might rise concurrently if, for example, insurgents offer farmers protection from eradication. This does not mean that eradication cannot play a strategic, targeted role, particularly with the advancement of incomes, good governance, and social change, but that a widespread eradication policy is unlikely to induce Afghan farmers, writ large, to shift out of opium poppy cultivation.

Moreover, whatever part eradication might have played in reducing opium poppy cultivation in parts of Helmand, farmers have found

²² For example, our household model finds that an increase in the probability of eradication might discourage opium poppy cultivation among farmers with medium to large landholdings, depending on their attitudes toward risk and the effects of the eradication program on uncertainty, but not necessarily among farmers with smaller landholdings.

other places to grow opium poppy in the *dasht*—and, if need be, can eventually relocate to other parts of Afghanistan.²³

If promoting a shift in the location of cultivation, eradication might drive opium poppy further into regions outside the Afghan government's sphere of influence, foster the development of new areas of entrenched cultivation, and, at the same time, introduce or exacerbate violence and corruption in those areas, depending, in part, on the nature of policy responses. In calculating the net societal consequences of such a shift, one would need to consider not just the spillage of opium poppy from one region to another, but the spillage of the income and social ills that might be conveyed with the crop.²⁴ Thus, whether shifting poppy from a densely populated and relatively fertile and well-off area to a sparsely populated and previously infertile and impoverished area implies a net societal gain or loss, remains to be determined.

Recommendations for INL

As long as large quantities of opium poppy are grown in Afghanistan, that country will continue to be a focus of international counternarcotics efforts. However, the question remains as to how INL and other U.S. agencies, the Afghan government, and the donor community should direct those efforts. Here, we derive recommendations from the foregoing analysis.

Nothing in our analysis suggests the plausibility of a near-term, program-led decline in aggregate opium poppy cultivation, but assistance and other programs can still be directed to foster the necessary conditions, especially with regard to incomes, to create better conditions for reducing cultivation of opium poppy over the long term.

²³ Whereas policy and programs, including the announcement and implementation of eradication, appear to have contributed to the reduction in opium poppy cultivation in the CCA in 2009–2010, it seems to have, at the same time, also contributed to the expansion of opium poppy to the *dasht*, a previously untouched and still formally ungoverned region. See discussion in Chapters Two and Four, drawing from Mansfield's extensive fieldwork.

²⁴ See Paoli, Greenfield, and Reuter (2009) and Greenfield and Paoli (2012).

In the few countries that have successfully reduced the cultivation of illegal drugs (see Appendix E), rural incomes have increased substantially over the course of these efforts, sometimes over several decades. Arguably, all rural development programs are intended to lift incomes, but, depending on the means of implementation, some hold more or less promise. In the analysis above, we identified several programmatic elements that have served to increase rural incomes in Afghanistan. Based on that analysis, in combination with our assessment of the various factors that affect opium cultivation decisions and with reference to concerns about sustainability and corruption, we recommend that future rural development programs or programs designed to reduce the cultivation of opium poppy in Afghanistan

- focus on traditional agricultural products, such as fruit, nuts, grapes, and other perennial orchard crops, with well-established markets
- improve product quality through better sorting, grading, and processing
- establish stronger links between farms and markets
- employ inexpensive, readily available, maintainable, and simple technologies
- reach a large enough number of farmers to stimulate and sustain associated support and marketing industries.

Regarding the last bullet point, we are not ruling out the value of smaller-scale pilot programs, but they should be designed as means to test scalable ideas, with appropriate controls and expectations, not as ends in themselves. The types of projects that we are recommending might not require large expenditures—arguably a good thing in an environment that is highly susceptible to corruption—but, on the basis of their established track records and conditions in Afghanistan, are more likely to succeed as engines of growth than others. Specifically, we also recommend that INL and others refrain from projects that

- try to introduce agricultural products new to Afghanistan

- rely on complex technologies, especially those that need electricity and other not-yet-developed or widely accessible supporting infrastructure
- fail to ensure a local market for the product.

Within the broad contours of that framework, projects that focus on substantially improving the relative returns of high-value, poppy-competing legal commodities with well-established, accessible markets and boosting rural wages are more likely to point the system in the direction of legality than others, particularly as incomes rise.

Although many of the programs under consideration spoke to the issue of social change in regard to the role of women, none appeared likely to engender lasting social change. In particular, the effects of any project in our analysis that intended to draw women into the economy (e.g., through training programs for women, beekeeping, handicrafts, and carpet-weaving) were short lived, possibly due in part to the social condition of women in Afghanistan. Although outside the scope of our analysis, we note that past research has found that education of girls is key to such social change.²⁵

Our recommendations on eradication speak to current conditions. In light of the pervasiveness of opium cultivation in southern Afghanistan, the security challenges facing the Afghan government in that region, the strength of farmer and insurgent opposition to eradication, the susceptibility of eradication to corruption, the deficiencies with which eradication is pursued, and the potential for regional shifts of cultivation, we find little evidence to support a blanket policy of widespread eradication efforts in Helmand or Kandahar.²⁶

²⁵ See, for example, T. Paul Schultz, "Why Governments Should Invest More to Educate Girls," *World Development*, Vol. 30, No. 2, February 2002, pp. 207–225; and Peter Glick, "What Policies Will Reduce Gender Schooling Gaps in Developing Countries: Evidence and Interpretation," *World Development*, Vol. 36, No. 9, September 2008, pp. 1623–1646.

²⁶ In a future that includes the advancement of rural incomes, good governance, and social change, a strategic, well-targeted eradication effort might play a part in a comprehensive program of positive and negative incentives, but offers little promise as a widespread policy or practice in the current operating environment.

We also recommend that INL continue to review the selection process for awards under GPI. Areas that have been hit by eradication might warrant additional recognition of the costs imposed. The program's focus on projects in rural areas that have or might cultivate opium poppy represents a positive development.

Appendixes

The following appendixes are available online at
www.rand.org/pubs/research_reports/RR1075.html

- A. Tables Concerning Chronology of Factors Affecting Opium Poppy Cultivation
- B. Crop Budgets and Documentation
- C. A Household Model of Opium Poppy Production in Afghanistan
- D. Annotated List of Programs
- E. Other Less-Developed Countries' Experiences with Counternarcotics and Related Programs

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This report identifies a broad range of factors that drive opium poppy cultivation in southern Afghanistan, the locus of opium production in that country, and assesses the positive and negative effects of programs designed to promote rural development, eradicate opium poppies, or otherwise create incentives for farmers to reduce the cultivation of opium poppies. The authors consider the decision to cultivate opium poppy or other crops from the perspective of farmers who must balance concerns about household income and food sufficiency in the context of socio-economic and environmental factors that, for example, relate to security, eradication, and environmental risks; governance and religiosity; landholding terms and conditions; household circumstances; and agricultural input costs and commodity prices. A factor might encourage or discourage opium poppy cultivation and, in some instances, it could have indeterminate or conflicting effects. Then, the authors examine how rural development, crop eradication, and other programs touch on the factors—and affect poppy cultivation—through mechanisms that include subsidies on fertilizer, high-quality wheat seed, saplings and vines, and farm equipment and facilities; infrastructure investment; training; introduction of non-traditional crops; cash-for-work programs; improved market links; and non-agricultural rural income. On the basis of the assessment, the authors also provide advice on how to design programs that might better serve to reduce the cultivation of opium poppies in southern Afghanistan over the long term.



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