

An aerial photograph showing a large concrete dam with a spillway, situated in a deep, rocky gorge. A reservoir is formed upstream of the dam. The surrounding landscape is arid and mountainous, with some greenery and a small town visible at the base of the gorge. The text is overlaid on the lower half of the image.

Potential Analysis of the Eastern Region and Nangarhar Province

Implications in Regional Programming

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AKNOWLEDGMENTS AND DISCLAIMER

An earlier version of this paper was produced by the author in January 2005 for CNFA in view of possible involvement in development work in the eastern region of Afghanistan. This document contains the view of the author and does not necessarily represent the positions of CNFA.

Picture Front and Back Cover Pages

**Aerial view of Darunta dam, Nangarhar, 30 December 2003
Photographer: Juan Gonzales, Louis Berger Group.**

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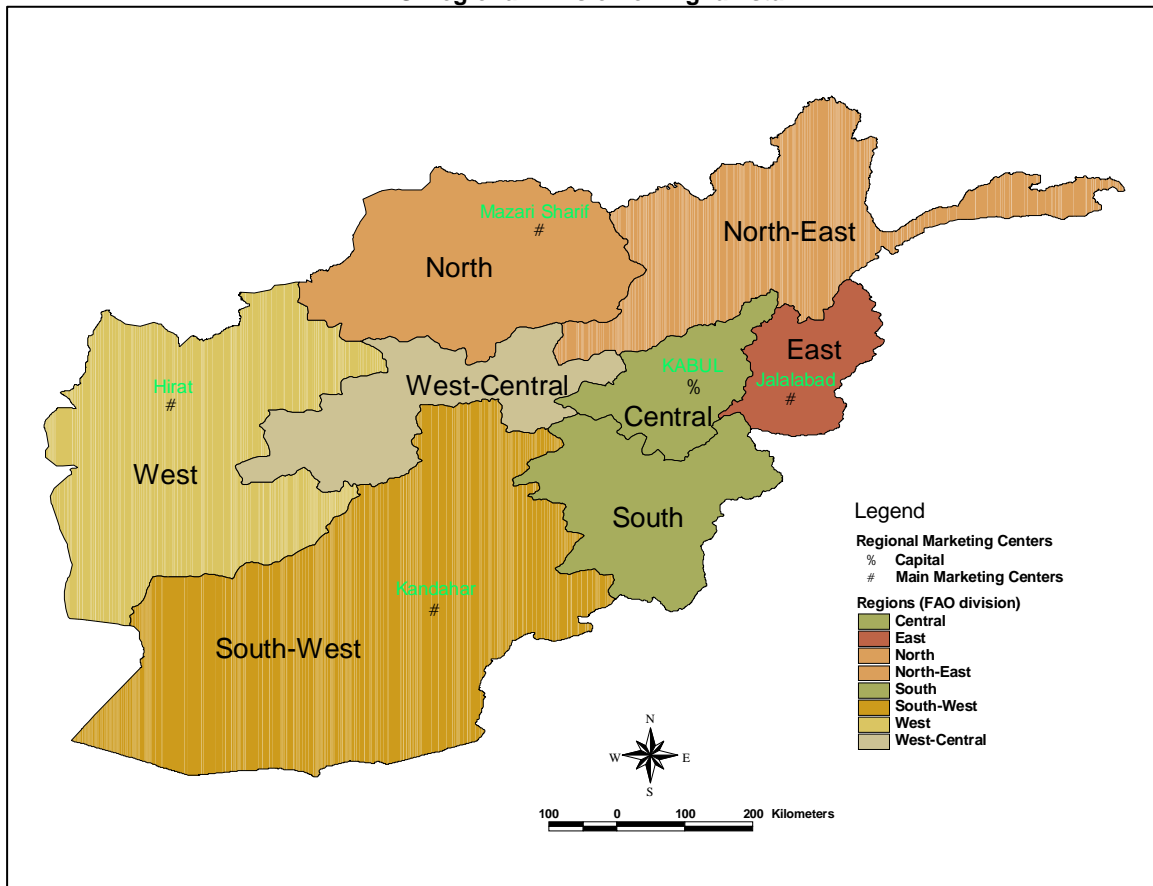
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1. FAO Regional Division

Agriculture data in Afghanistan are presented by region, rather than province. The map 1 shows the regional division of Afghanistan. The Eastern

region (red) includes Nangarhar, Laghman, Kunar and Nuristan provinces. The data analyzed in this paper cover these four provinces.

Map 1
FAO Regional Division of Afghanistan



2. Region Potential Analysis

2.2 Landcover

The table 1 shows that the eastern region is not a main production area in Afghanistan as it represents only 6% of the permanently irrigated land and 3% of the intermittently irrigated land. The

total irrigated land covers only 145,280 hectares. The availability of rainfed land is very small (< 1% of total) and mostly located in the upper valleys of Kunar province.

Table 1
Availability of Farming Land by Region (in ha). Source: FAO, Landcover 1993¹

| Region | Permanently Irrigated | % | Intermittently Irrigated | % | Rainfed | % |
|--------------|-----------------------|------------|--------------------------|------------|----------------|------------|
| TOTAL | 1559654 | 100 | 1648136 | 100 | 4517714 | 100 |
| North | 356375 | 23 | 414604 | 25 | 2210298 | 49 |
| Northeast | 255921 | 16 | 26653 | 2 | 1022384 | 23 |
| West | 189025 | 12 | 277445 | 17 | 858690 | 19 |
| West Central | 41973 | 3 | 63968 | 4 | 151823 | 3 |
| Central | 132022 | 8 | 41406 | 3 | 58256 | 1 |
| South | 223640 | 14 | 252047 | 15 | 90021 | 2 |
| Southwest | 262355 | 17 | 525074 | 32 | 120227 | 3 |
| East | 98342 | 6 | 46939 | 3 | 6014 | 0 |

Table 2
Availability of Other Landcover Resources. Source: FAO, Landcover 1993²

| Region | Forest | % | Rangeland | % | Waterbodies | % | Snow | % |
|--------------|----------------|------------|-----------------|------------|---------------|------------|----------------|------------|
| TOTAL | 1337582 | 100 | 29176732 | 100 | 665750 | 100 | 1463101 | 100 |
| North | 47830 | 4 | 4790748 | 16 | 53702 | 8 | 33585 | 2 |
| Northeast | 26315 | 2 | 3500094 | 12 | 71923 | 11 | 1002909 | 69 |
| West | 40238 | 3 | 4549186 | 16 | 169948 | 26 | 0 | 0 |
| West Central | 0 | 0 | 4503436 | 15 | 13035 | 2 | 14119 | 1 |
| Central | 14301 | 1 | 1457932 | 5 | 2542 | 0 | 94723 | 6 |
| South | 402434 | 30 | 4035075 | 14 | 66344 | 10 | 12427 | 1 |
| Southwest | 722 | 0 | 5697093 | 20 | 276057 | 41 | 317 | 0 |
| East | 805740 | 60 | 643169 | 2 | 12198 | 2 | 305021 | 21 |

¹ FAO, "Landcover Atlas of Afghanistan, 1993", printed in 1999.

² FAO, *Ibid.*, 1999.

The lowlands in Nangarhar and lower Kunar valley benefit from a semi-tropical climate, and have the highest proportion of high cropping intensity irrigated land in the country. The riverine farms, situated along valley bottoms of varying widths, produce a range of crops throughout the year. Double cropping is the rule rather than the exception and triple cropping is noted in areas offering 365 growing days per year. Semi-

tropical crops such as citrus, sugar canes and henna are produced around Jalalabad. The Nangarhar Valley Authority that aimed at reclaiming desert land divided in 4 state farms planted primarily citrus and olive trees.

Yet, based on land availability, the farming potential of the eastern region is limited.

Forest

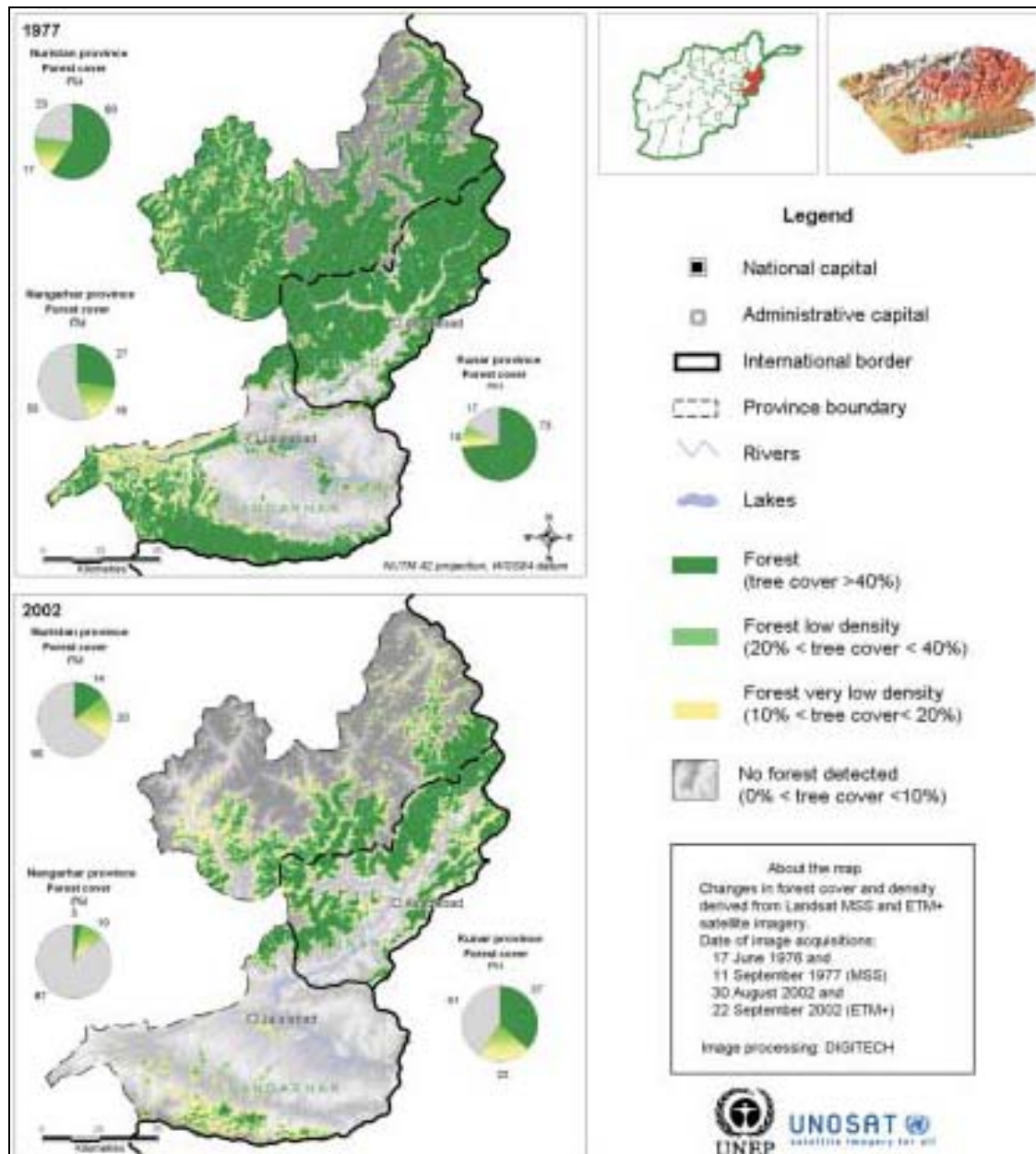
The table 2 shows that 60% of the national forests are located in the Eastern region. These forests are mainly located in Kunar and Nuristan and represent a vast natural resource. The oak and coniferous forests density depends on the amount of monsoon rainfall reaching the area from the Indian subcontinent. The lower valleys have walnut (*Juglans regia*) and birch (*Betula kunaresis*, *B. jacquemontii*) forests and thickets and valley meadows. Between 1500m and 2500m, there is a thick stand of oak forests, dominated by *Quercus baloot* and *Quercus semecarpifolia* on drier slopes and, in more humid places, by *Quercus dilatata*. Above this belt, up to the tree line at 3300m lies a coniferous forest belt with cedar (*Cedrus deodara*), spruce (*Picea smithiana*), fir (*Abies spectabilis*), pine (*Pinus gerardiana*, *Pinus wallichiana*), juniper (*Juniperus semiglobosa*), and yew (*Taxus wallichiana*).

UNEP's satellite analyses³ revealed that conifer forests in the provinces of Nangarhar, Kunar and Nuristan have been reduced by an average of 50 per cent since 1978. Deodar cedar (*Cedrus deodara*) is a straight-grained, decay-resistant, aromatic wood and the primary conifer species harvested for decades. The destructions of the eastern forests are huge environmental and economic concerns.

Appropriate exploitation of these forests could provide a sustainable income to the region. Moreover, the potential for tourism (national and international) of the forested area is substantial. These valleys could follow similar development as Northern Pakistan which has developed well organized tourism infrastructures for national visitors.

³ UNEP, "Afghanistan. Post-Conflict Environment Assessment", 2002. www.unep.org

Figure 1
Forest Cover Change, Nangarhar, Nuristan and Kunar provinces, 1977 and 2002⁴



⁴ UNEP, *Ibid.*, 2002.

Water and hydro-electricity

The Eastern region also account for 21% of the total permanent snow in the country (table 2). The whole region is part of the Kabul river basin. The watersheds of the various rivers flowing into the eastern region are much larger than the region itself. The Kunar River takes its sources on the other side of the border from glaciers in the region of the Teraj Mir Mountain (7,750 m asl) in the Karakoum range of Pakistan.

The mean annual volume of river discharge for the Kabul river basin flowing into the eastern region is 21,650 mtn m3. This represents 26% of the total river discharge in the country (one quarter)⁵.

Hydro-electrical infrastructures on the Kabul River were the best developed in Afghanistan. Yet, hydro-power potential still remains very important. The main hydro-electrical structures built in the Eastern region are:

1. Surobi dam built with German assistance. Norconsult-Norplan (2003) notes the equipment is robust and has been comparatively well maintained with the limited means available. The units can still be operated close to their original output and the station has had a regular energy production throughout the years.
2. The Darunta hydro-power plant was constructed by the USSR and commissioned in 1967 with an initial capacity of 11,000 kW. Darunta dam and the fish-breeding centre were established in 1965 with the assistance of China. The status of the dam was not evaluated by the Norconsult-Norplan power sector review. Yet, it appears that the hydro-electrical capacity of the dam have been severely reduced in the past two decades.

The hydro-power potential of the Kunar river, which alone represents 18% of the total river discharge in Afghanistan (annual mean discharge: 15,250 mtn m3) is untouched. The river offers a huge hydro-potential. The table 3 shows the proposed hydro-electrical project by Norconsult-Norplan (2003).

⁵ Favre, Raphy and Monowar, Golam, "Watershed Atlas of Afghanistan. Working Document for Planners", FAO/UNDP/MIRWE/AREU/SDC, 2004.

Table 3
Summary of Hydro-Power Project of the Draft Power Sector Master Plan
EIA : Environmental Impact Assessment. Source: Favre and Monowar, 2004

| # | PROJECT | Province | District | River Basin | Water shed | Assessment required | Resettle. > 200 pers. | Brief Description and Critical Issues |
|---|----------------------------|-----------|-----------|-------------|------------|---------------------|-----------------------|---|
| 3 | KUNAR Alternative A | Kunar | Bar Kunar | Indus | Kunar | Full EIA | Yes | New 160 m high earth fill dam with a crest length of 1080 m. The site is located 7 km upstream of Asmar settlement. - Large resettlement component |
| 4 | KUNAR Alternative H | Kunar | | Indus | Kunar | Full EIA | Yes | New 105 m high earth fill dam with a crest length of 670 m. The site located 22 km upstream of Asmar and 1 km below Chunek village. |
| 6 | KAMA | Nangahrar | Kama | Indus | Kunar | Full EIA | Yes | New 5-6 m diversion weir from the river with a headrace channel of 16 km long. The site is located close on the Kunar river close to its confluence with the Kabul river. |

Irrigation

The construction of the Darunta dam also aimed at irrigating new land. However, the fertile land in Jalalabad is the alluvial plain, while above the plain the land is composed of unfertile pebble carried by flood originating from small seasonal streams along the Spin Ghar range (see satellite imagery in annex). At huge cost, the Soviet bulldozed the new irrigated land and brought fertile land from the area. In default of arable land, the Soviet had to invent new land for the project to proceed⁶. The fertility of this “invented” land along the canal remains a constraint (see picture 2). In the context of the cold war, the Soviet had taken Nangarhar as their development model showcase at whatever cost. The Nangarhar region

inherit today of the 70s and 80s infrastructures.

The land located above the irrigation canal is mostly occupied by olive trees. Most of the trees have died as irrigation requires pumping of water, which was not done in the past 15 years (see pictures 2 & 4 and satellite image in annex). These soils are unfertile, require energy to apply water and water losses are important due to the stony and light structure of the land.

⁶ Etienne, Gilbert, “*L’Afghanistan ou les aléas de la coopération*”, 1972.

Table 4
Formal Irrigation Scheme of Nangarhar. Source: Favre and Monowar, 2004

| # | Name of schemes | Province | Area under Irrigation | Main structures | Remarks |
|---|-----------------------------|-----------|-----------------------|--|---|
| 4 | Nangarhar Irrigation system | Nangarhar | 39,000 Ha | Darunta dam and Power station, Main canal Qmax=50m ³ , Pump station, State farms, | Water flow managed by Government, Maintenance by NGOs |

Picture 2
View of dying olive orchards in Nangarhar, 23 May 2004. Note the poor quality of the soil (pebbles)



Proposed Check Dams⁷

From the Spinghar (or Sefid Koh) range which lies immediately south of Jalalabad and forms a mountain frontier with Pakistan (where the well known Tora Bora caves are located). The most important of these torrents is the Surkh Ab (not to be confused with the Surkhab river of the Kunduz watershed) taking its source from Azra (Paktia) and Hesarak (Nangarhar) districts and joining the Kabul river below the Darunta dam in Sorkh Rod district (Nangarhar). Other small tributaries include the Khazan Rod, the Kharasu Rod, the Baghgay Khwar, the Rod Khwar, the Spin Khwar or the Pishe Khwar.

As the water catchments area of these rivers is small, they are all seasonal and dry up in early summer. Water availability for farming is a constraint and therefore annual cropping is mostly practiced. Opium Poppy seems to have adapted well to these agro-ecological conditions as the crop cycle is shorter than wheat and thus the risks of water-shortage at the end of the season is reduced.

The construction of small reservoirs - that could capture water in winter/spring and release it in summer - would increase the water availability and possibly allow perennial crop cultivation such as fruit trees. This is what the governor and community representatives have requested at the AL meeting on the 11th November in Kabul. The map 3 in annex shows the site proposed by the community representatives.

⁷ These check dams were proposed by the leaders of opium poppy production areas of Nangarhar at the Alternative Livelihood meeting called by the MRRD on the 7th of December 2004.

Riparian Issues⁸

Kabul River is a sizeable tributary of the Indus. The riparian issues on the Indus basin are convoluted with the dispute over the border between Afghanistan and Pakistan. The geographical border is a product of British imperial policy drawn up in 1893 and commonly known as the *Durand Line*. The line was devised by the British to strengthen the status of Afghanistan as a buffer between British India and the Russian Empire.

This border was never ratified by Afghanistan but remains in force today. Review of the border has been under negotiation since 1993 and is becoming an increasing point of tension between the Pakistani and Afghan governments. Pakistan see security of their western frontier as vital to national security, as they also face major problems in the north east against the Indian government and Kashmiri separatists over the disputed territory of Jammu-Kashmir. The Afghan/Pakistan border area has long been known as a '*lawless frontier*' over a thousand miles in length. Religious extremism and civil disorder have built up as a result of two decades of war in Afghanistan, which has now merged with the internal troubles that exist within Pakistan.

Norconsult-Norplan hydro-power master plan notes that the Government of Afghanistan is planning to reinforce irrigation, fishing and hydropower generation along the Kabul River but, unless an agreement is found, further developments could trigger further tensions between Afghanistan and Pakistan.

⁸ Favre and Monowar, *Ibid.*, 2004.

2.2 Cereal Production

The table 5 shows that the eastern region contribution to the national wheat and barley production is minimal (wheat 5%). However, the share of rice (16% of total or 78,000 MT) and maize (15%) production is more significant. Rice is

used for local consumption, while maize is used for consumption or as animal feed. These data shows that there may be some potential for rice processing in the eastern region.

Table 5
Comparison of Cereal Production by Region in MT. Source: Maletta and Favre, 2003⁹

| REGION | Irrigated Wheat | % | Rainfed Wheat | % | Milled Rice | % | Barley | % | Maize | % |
|--------------|--------------------|----------|------------------|----------|----------------|-----------|----------|----------|--------------|-----------|
| Total | 3016581 | 100 | 1344690 | 100 | 435000 | 100 | 410000 | 100 | 393323 | 100 |
| North | 547547 | 18 | 608489 | 45 | 21000 | 5 | 173000 | 42 | 19492 | 5 |
| Northeast | 731463 | 24 | 482065 | 36 | 231000 | 53 | 135000 | 33 | 47751 | 12 |
| West | 355450 | 12 | 231739 | 17 | 30000 | 7 | 79000 | 19 | 9495 | 2 |
| West Central | 64213 | 2 | 17574 | 1 | 0 | 0 | 15000 | 4 | 4568 | 1 |
| Central | 385413 | 13 | 3542 | 0 | 9000 | 2 | 3000 | 1 | 16529 | 4 |
| South | 321122 | 11 | 1138 | 0 | 0 | 0 | 3000 | 1 | 0 | 0 |
| Southwest | 470241 | 16 | 0 | 0 | 66000 | 15 | 3000 | 1 | 234734 | 60 |
| East | 141133 | 5 | 144 | 0 | 78000 | 18 | 0 | 0 | 60753 | 15 |

⁹ Maletta, Hector and Favre, Raphy, "Agriculture and Food Production in Post-war Afghanistan. A Report of the Winter Agriculture Survey 2002-2003", FAO, Kabul, August 2003, www.fao.org/world/afghanistan/

2.3 Cultivated Fruits

The table 6 and 7 show that the production of fruits in the eastern region is very limited. Yet, market research, adaptability test and development in Northern Pakistan demonstrate that the potential for fruit production and marketing in the eastern region is vast. Indeed, valleys with similar agro-climatic conditions in Northern Pakistan (Swat, Malakand, Dir, Kohistan, Bajahaur,

etc...) have been turned over the past 2 decades into orchards all the way up the limits of fruit tree cultivation. These orchards in Pakistan provide a much higher income to producers than cereal production. Financial analysis developed for Nangarhar shows that the annual cash flow of adult orchards in the eastern region is above \$ 2,000 per hectare.

Table 6
Comparison of Cultivated Fruits Production by Region in MT. Source: Favre & all, 2004a¹⁰

| | Vine | % | Melon | % | Apple | % | Apricot | % | Mulberry | % |
|--------------|---------------|------------|---------------|------------|--------------|------------|--------------|------------|--------------|------------|
| TOTAL | 515257 | 100 | 295137 | 100 | 61165 | 100 | 59977 | 100 | 41376 | 100 |
| North | 89558 | 17 | 39255 | 13 | 2302 | 4 | 3152 | 5 | 924 | 2 |
| Northeast | 1840 | 0 | 57597 | 20 | 16984 | 28 | 8511 | 14 | 9784 | 24 |
| West | 19658 | 4 | 98173 | 33 | 3728 | 6 | 4617 | 8 | 7080 | 17 |
| West Central | 0 | 0 | 9492 | 3 | 108 | 0 | 1399 | 2 | 155 | 0 |
| Central | 168703 | 33 | 0 | 0 | 15448 | 25 | 14082 | 23 | 6512 | 16 |
| South | 68212 | 13 | 11702 | 4 | 18590 | 30 | 11699 | 20 | 821 | 2 |
| Southwest | 167287 | 32 | 46269 | 16 | 3636 | 6 | 15000 | 25 | 15072 | 36 |
| East | 0 | 0 | 32650 | 11 | 367 | 1 | 1518 | 3 | 1028 | 2 |

Table 7
Comparison of Cultivated Fruits Production by Region in MT. Source: Favre & all, 2004a¹¹

| | Pome-granate | % | Almond | % | Walnut | % | Plum | % | Peach | % | Citrus | % |
|--------------|--------------|------------|--------------|------------|-------------|------------|-------------|------------|-------------|------------|-------------|------------|
| TOTAL | 23137 | 100 | 16079 | 100 | 8828 | 100 | 6608 | 100 | 6234 | 100 | 1712 | 100 |
| North | 3301 | 14 | 4973 | 31 | 2162 | 24 | 1203 | 18 | 509 | 8 | 30 | 2 |
| Northeast | 1426 | 6 | 2990 | 19 | 3184 | 36 | 1167 | 18 | 2888 | 46 | 219 | 13 |
| West | 6864 | 30 | 422 | 3 | 864 | 10 | 311 | 5 | 619 | 10 | 22 | 1 |
| West Central | 4 | 0 | 57 | 0 | 1416 | 16 | 0 | 0 | 0 | 0 | 17 | 1 |
| Central | 584 | 3 | 1970 | 12 | 797 | 9 | 908 | 14 | 872 | 14 | 0 | 0 |
| South | 161 | 1 | 1249 | 8 | 232 | 3 | 754 | 11 | 306 | 5 | 40 | 2 |
| Southwest | 12434 | 54 | 4415 | 27 | 25 | 0 | 2219 | 34 | 784 | 13 | 5 | 0 |
| East | 86 | 0 | 3 | 0 | 147 | 2 | 46 | 1 | 256 | 4 | 1379 | 81 |

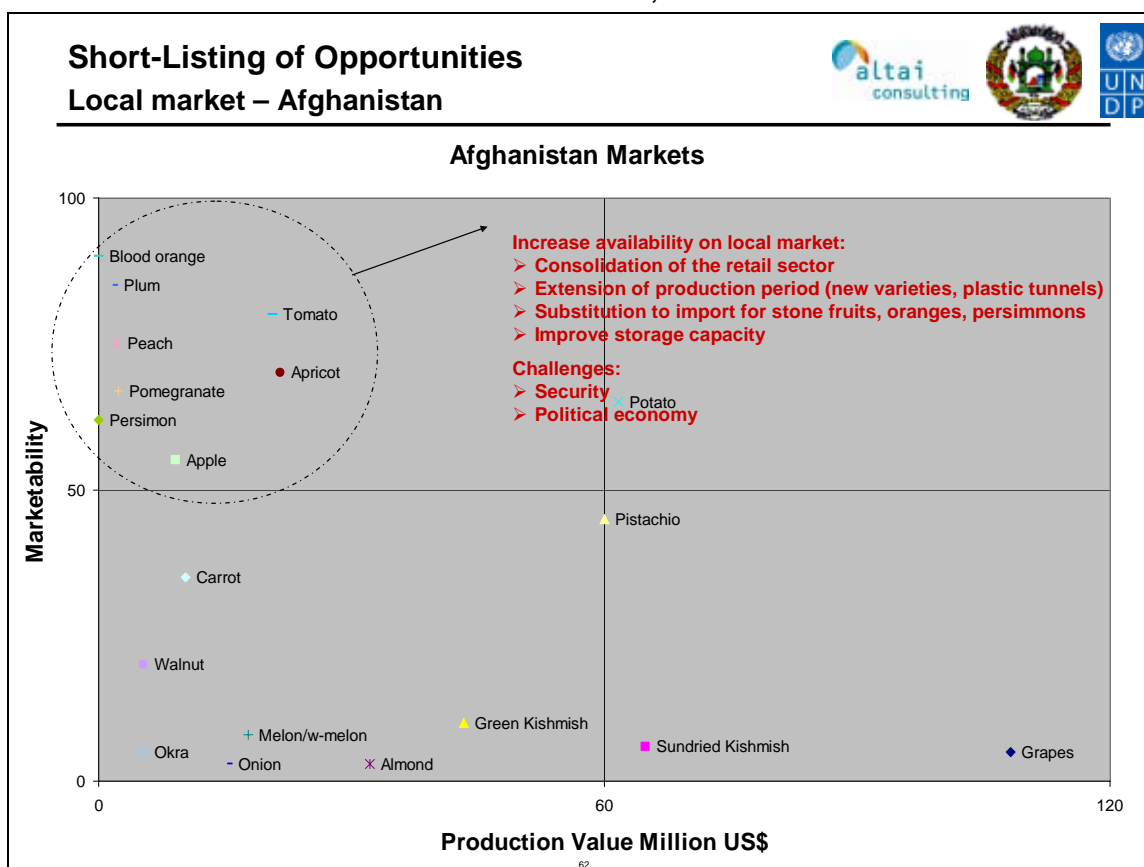
¹⁰ Favre, Raphy; Baudeau, Rodolphe; Tea, Hakara; Beley, Mathieu and Mercier, Violaine, "Market Sector Assessment in Horticulture. Market and Production Research. Phase 1", June 2004, MoC, UNDP, Altai Consulting, 2004a. www.altaiconsulting.com/horticulture.htm

¹¹ Favre, and all, *Ibid.*, 2004a.

Figure 2

Market opportunities matrix; on the x axis the marketability on the local markets and y axis the actual production value. The table shows that the marketability of orange, plum, peach, apricot, pomegranate and persimmon have very good market opportunities but production is limited.

Source: Favre & all, 2004b



Market research conducted in 2004 shows that market opportunities for temperate fruits are vast. The figures 2 and 3 illustrate the marketability by fruit species and the current market value of the available production. As an illustration, we can make the assumption that by 2010, Afghanistan would capture 20% share of the projected almond imports of Pakistan and India (60,000 MT/year), the farmers

in Afghanistan could plant 6,000 more hectares of intensive commercial almond today. This assumption is conservative as the proximity to the market, the trade agreement with India, the good variety potential and the presence of other regional markets such as in the Middle East. Similar exercises could be made for other fruits and nuts for which Afghanistan has comparative advantages.

Figure 3

Market opportunities matrix; on the x axis the marketability on the regional markets (Pakistan and India) and y axis the actual production value. The table shows that the marketability of pomegranate, plum, peach, apricot, and almond have very good market opportunities but production is limited. Source: Favre & all, 2004b

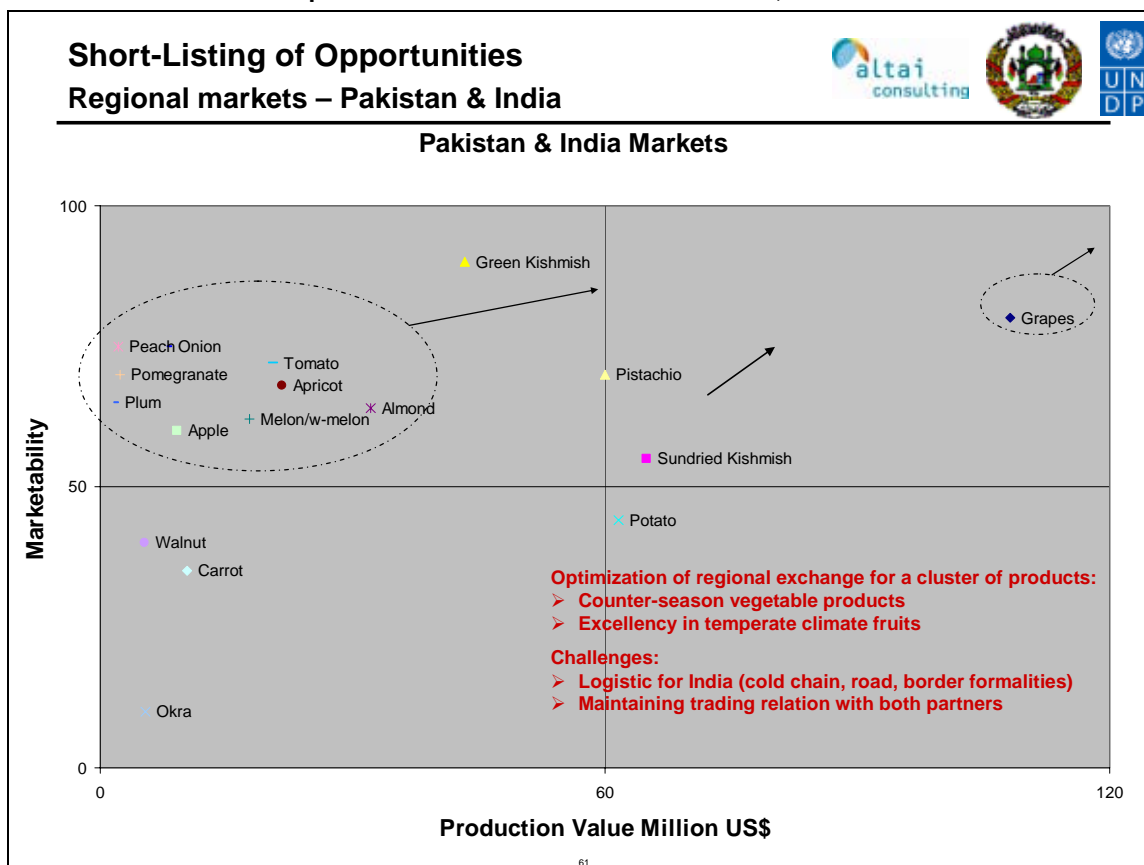


Table 8

Comparative Advantages of Fruit Tree Cultivation in Afghanistan. Source: Favre & all, 2004b

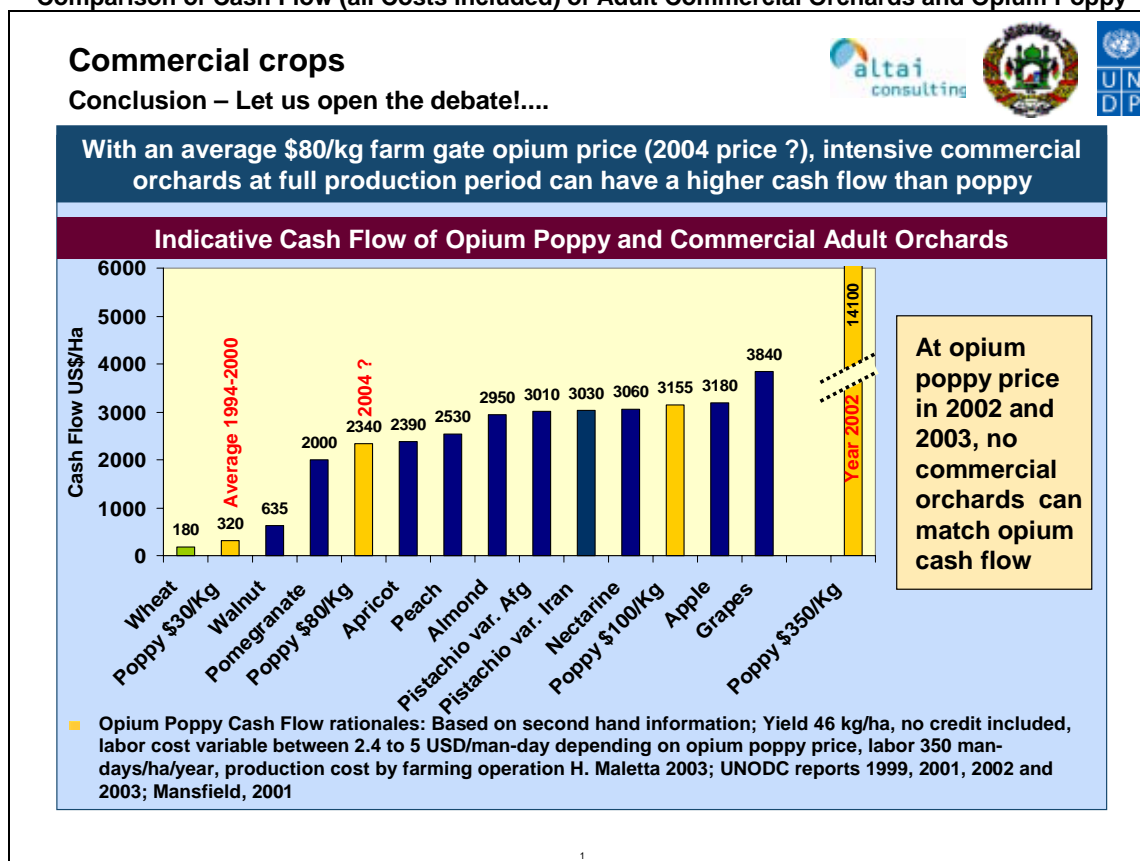
| Comparative Advantages of Afghanistan | Limitations of Afghanistan |
|---|---|
| <ul style="list-style-type: none"> • Excellent climate and good varieties for temperate fruit production • Proximity of large market such as India, Pakistan, Middle East • Preferential trade agreement with India • Low labor cost in rural areas • Good surface water availability in Afghanistan (2,480 m³/head/year) as compared to Central Asian republic and Iran (1,450 m³/head/year. This translates into lower irrigation cost as compared to Iran | <ul style="list-style-type: none"> • Low productivity of existing orchards system • Lack of know-how for intensive fruit tree farming • No or poor pest management • Lack of uniformity of varieties • High quality seedlings not available • Absence of sorting/grading and poor packaging • Road network in poor conditions as compared to neighboring countries • Absence of basic infrastructures in wholesale market |

The Table 8 summarizes the comparative advantages and the rationales for promoting commercial orchards in Afghanistan. Temperate fruits production is one of the few sectors in which Afghan agriculture has comparative advantages. The limitations listed in table 8 could be addressed through public support to private commercial development.

The figure 4 shows that projected cash flow of adult commercial fruit orchards can compete with opium poppy as long as the farm gate price of opium paste remains below \$ 100/kg. The average opium paste price at farm gate was \$ 92/kg. At \$ 350/kg of opium paste at farm gate (2002 average price) no other crops can compete. However, at \$ 30/kg which was the average 1994-2000 farm gate price, commercial fruit orchards are very competitive with opium poppy.

Figure 4

Comparison of Cash Flow (all Costs included) of Adult Commercial Orchards and Opium Poppy



In supporting plantation of commercial fruit orchards in Afghanistan/Nangarhar, it is possible to establish a production tool that can be competitive to opium poppy cultivation and offer alternative livelihood to producers. Most of the

upper valleys in Pakistan have been converted into fruit orchards. Afghanistan has a far greater potential than these narrow valleys in Northern Pakistan.

In Afghanistan, commercial orchards are sometimes intercropped with fodder legumes (clover or alfalfa). This offers very interesting opportunities of simultaneous development with livestock/dairy sector. Such potential synergies have not been studied thoroughly but casual field observation shows that milk availability is higher in fruit production areas than in other

regions. In Kabul, the FAO milk collection scheme is collecting milk from 14 centers in Wardak and Logar provinces (south of Kabul) which valleys are planted with apple and apricot trees. A recent FAO dairy survey in Parwan (North of Kabul), renown for its vineyard rather than orchards, showed that milk is not available in sufficient quantities.

2.4 Vegetables

Despite its proximity with Pakistan which is the only country with trade opportunities for vegetable marketing, the table 9 and 10 show that the eastern region is not a main center of vegetable production. The eastern region is at the

before last position for all the vegetables reviewed, except for okra which requires warmer climate to perform well (comparative advantages with other regions).

Table 9
Comparison of Vegetable Production by Region in MT. Source: Favre & all, 2004a

| | Potato | % | Onion | % | Tomato | % |
|--------------|---------------|------------|---------------|------------|---------------|------------|
| Total | 474324 | 100 | 117647 | 100 | 117647 | 100 |
| North | 18243 | 4 | 14343 | 12 | 14343 | 12 |
| Northeast | 59946 | 13 | 26118 | 22 | 26118 | 22 |
| West | 35041 | 7 | 17267 | 15 | 17267 | 15 |
| West Central | 146300 | 31 | 6933 | 6 | 6933 | 6 |
| Central | 64213 | 14 | 19618 | 17 | 19618 | 17 |
| South | 94136 | 20 | 5756 | 5 | 5756 | 5 |
| Southwest | 53610 | 11 | 14439 | 12 | 14439 | 12 |
| East | 2835 | 1 | 13174 | 11 | 13174 | 11 |

Table 10
Comparison of Vegetable Production by Region in MT. Source: Favre & all, 2004a

| Total | Carrot | % | Pumpkin | % | Okra | % |
|--------------|-------------|----------|-------------|----------|-------------|-----------|
| North | 34272 | 100 | 20081 | 100 | 18453 | 100 |
| Northeast | 3327 | 10 | 2278 | 11 | 1114 | 6 |
| West | 11889 | 35 | 7053 | 35 | 2874 | 16 |
| West Central | 5044 | 15 | 3687 | 18 | 3919 | 21 |
| Central | 3213 | 9 | 170 | 1 | 30 | 0 |
| South | 4836 | 14 | 3652 | 18 | 2508 | 14 |
| Southwest | 1143 | 3 | 912 | 5 | 378 | 2 |
| East | 3102 | 9 | 1106 | 6 | 3462 | 19 |
| | 1718 | 5 | 1223 | 6 | 4168 | 23 |

Figure 5
Afghanistan Import/Export of Vegetable. Source: Favre & all, 2004a

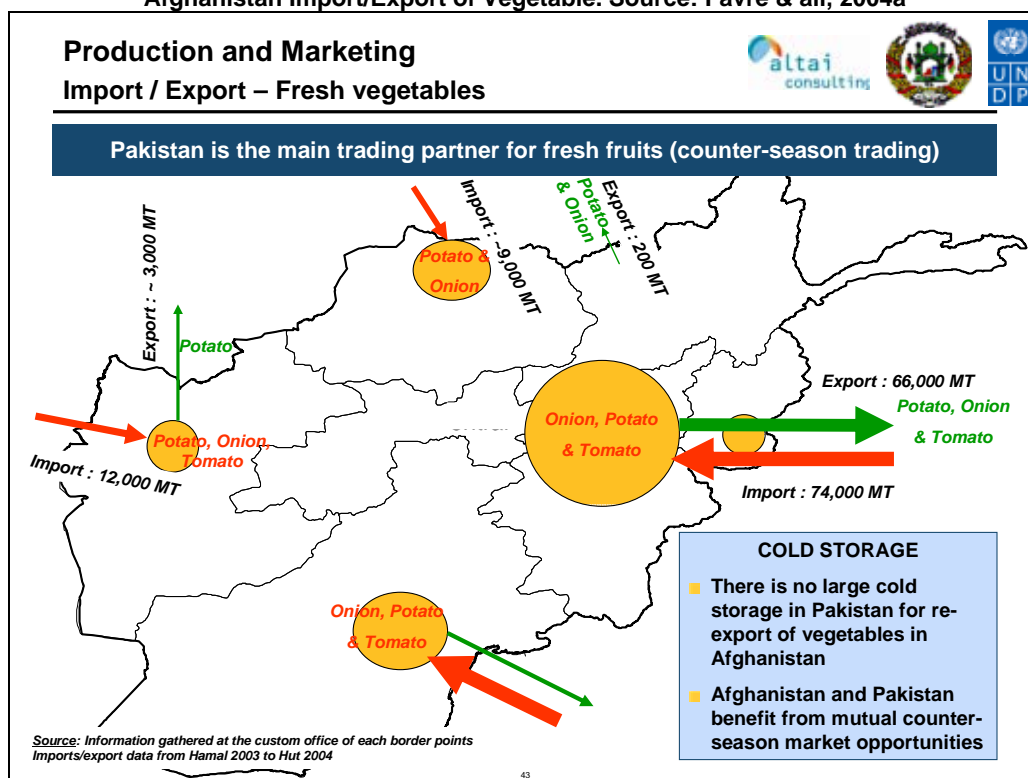
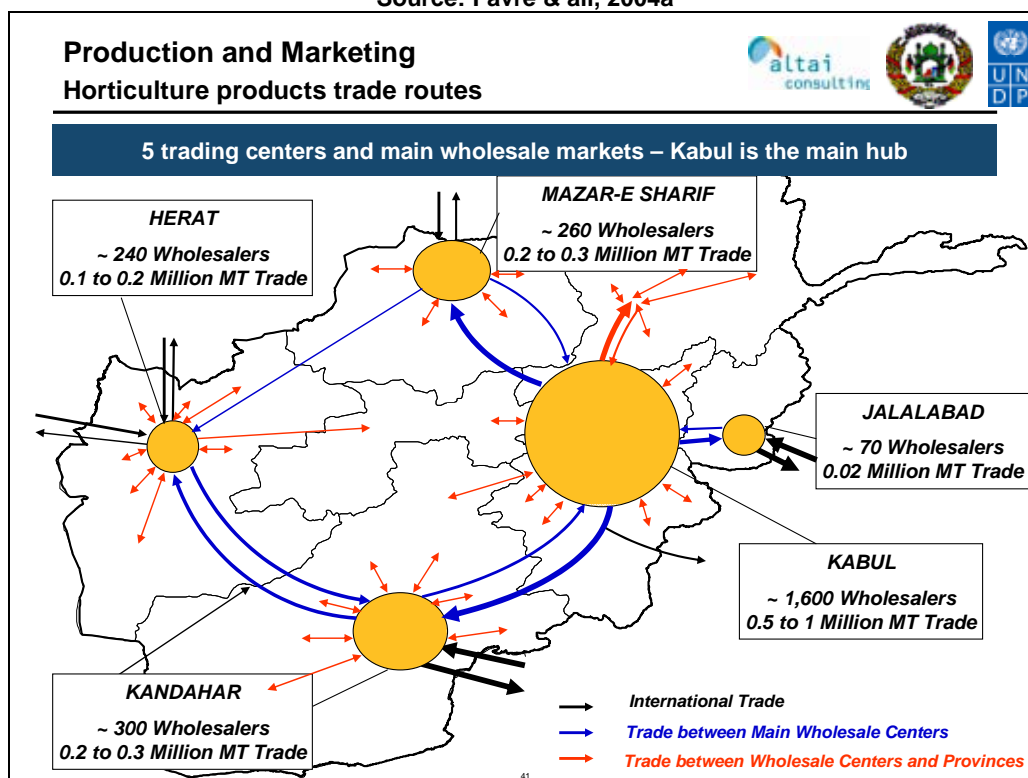


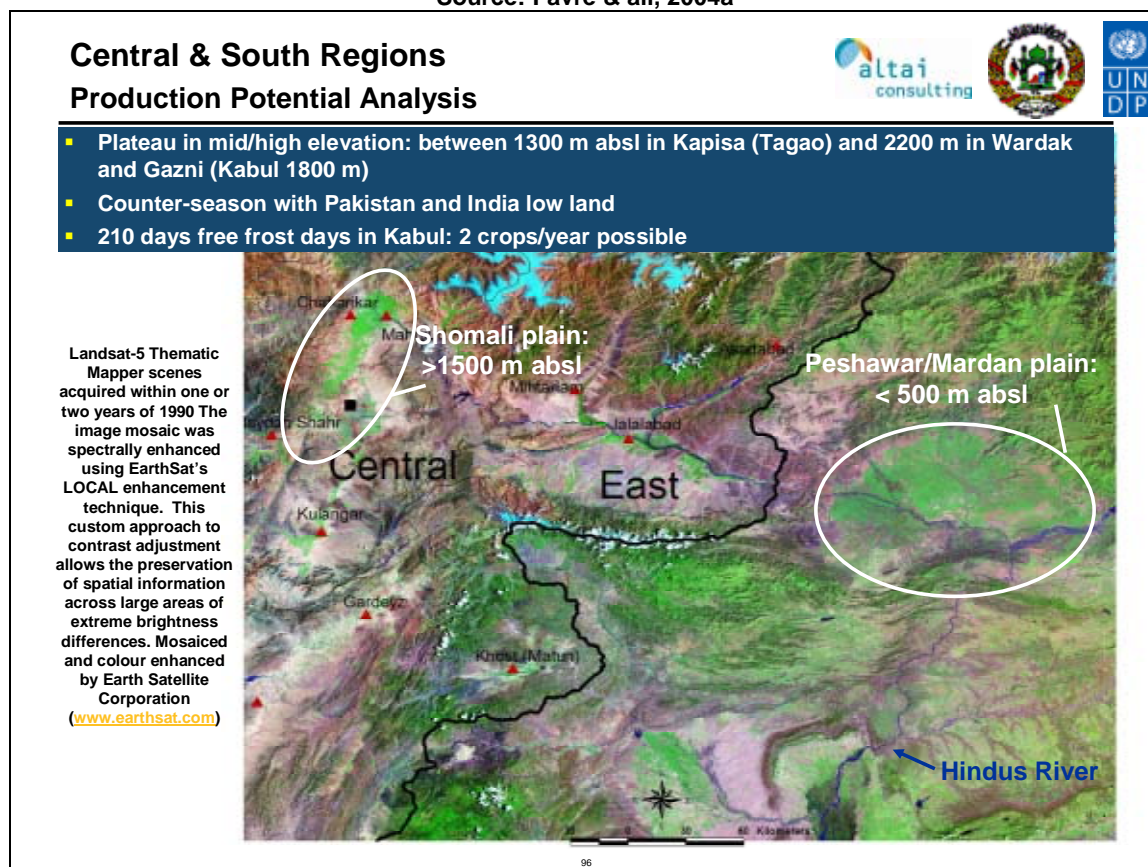
Figure 6
Map of the Horticulture Products Wholesale Markets and the Size of Trade.
Source: Favre & all, 2004a



The figure 5 shows that Pakistan is by far the main trading partner for vegetables. Most of the trade is going through Turkham border in Nangarhar. Yet, this trade is occurring outside the whole-sale market of Jalalabad as vegetables are transiting directly to Pakistan from wholesale market in

Kabul or farmers fields in the eastern region. The figure 6 shows the relative small size of Jalalabad with other wholesale markets in Afghanistan. The size of the wholesale market in Jalalabad illustrates both the limited market demand of a small size town and the limited production in the region.

Figure 7
Elevation Differential between Afghanistan and Pakistan offers Counter-season Opportunities.
Source: Favre & all, 2004a



The figure 7 illustrates the elevation differential between Pakistan lowlands and Afghanistan highlands. This elevation differential offers counter-season opportunities between Pakistan and Afghanistan that is illustrated by the trade data and crop calendars (see Favre and all, 2004a). Counter-seasons opportunities for vegetable production are well understood by traders and

farmers have proved to be fast in responding to market signals¹². This opportunity does not require major public support to develop as most farmers can invest in annual crops (which is not the case for perennial crops such as fruit trees).

¹² Opium poppy is an example amongst others.

The window of opportunity for vegetable production in Nangarhar is narrow and limited to a few weeks transition period toward the end of the Pakistan production and before the Afghan highlands enters into production (see the position of the eastern region on the figure 7). Another window of opportunity is winter vegetable production before Pakistan enters into production again. These narrow windows of opportunities

explain the low production level of vegetables in Nangarhar.

Market research has shown that vegetable price at farm gate in Afghanistan are more expensive than Pakistan (see Favre and all, 2004a). This is limiting the opportunities for vegetable processing industries such as tomato paste in Afghanistan.

2.5 Other crops

The table 11 shows that the eastern region produces a significant share of cotton (35%) and clover (78%). The cotton production offer opportunities for

small scale basic processing plants. The high level of clover production reflects the fairly good livestock/dairy sector in Nangarhar.

Table 11
Comparison of Vegetable Production by Region in MT. Source: Maletta and Favre, 2003

| | Oilseeds | % | Pulses | % | Cotton | % | Clover | % |
|--------------|-----------------|------------|---------------|------------|---------------|------------|----------------|------------|
| TOTAL | 68,787 | 100 | 69,377 | 100 | 17,509 | 100 | 137,073 | 100 |
| North | 38,636 | 56 | 15,099 | 22 | 1,078 | 6 | 208 | 0 |
| Northeast | 24,970 | 36 | 11,011 | 16 | 73 | 0 | 696 | 1 |
| West | 4,413 | 6 | 16,832 | 24 | 6,127 | 35 | 17,791 | 13 |
| West Central | 203 | 0 | 440 | 1 | 0 | 0 | 1,489 | 1 |
| Central | 0 | 0 | 1,327 | 2 | 150 | 1 | 1,082 | 1 |
| South | 289 | 0 | 1,143 | 2 | 0 | 0 | 7,889 | 6 |
| Southwest | 276 | 0 | 23,475 | 34 | 3,921 | 22 | 663 | 0 |
| East | 0 | 0 | 50 | 0 | 6,160 | 35 | 107,256 | 78 |

In late 2004, CNFA conducted a production, processing and market assessment¹³ on sugar-cane in Nangarhar. The findings showed some development potentials as sugar-cane offers a fair gross-income per hectare and with improved processing technique with technology from Pakistan it may be

possible to capture higher value on the market. Henna is also produced in Nangarhar. Production, processing and marketing of henna is unknown and would deserve to be inquired.

¹³ CNFA, "Mission Report to Jalalabad and Peshawar. Sugar Assessment", December 2004.

2.6 Livestock

The table 12 shows that the Eastern region has the highest number of cows per family (1.1) in the country. There is currently no initiative to support dairy production/processing in the Eastern region which appears to have the

highest potential. However, with the high summer temperature in Nangarhar the scheme would require a well operated cold chain, which results in higher costs and higher technical difficulties.

Table 12
Number of cows and milking cows per family

| | Cows/family¹⁴ | Milking Cows/family¹⁵ |
|--------------|---------------------------------|---|
| TOTAL | 0.7 | 0.4 |
| North | 0.2 | 0.1 |
| North-East | 0.9 | 0.5 |
| West | 0.3 | 0.2 |
| West Central | 0.6 | 0.4 |
| Central | 0.4 | 0.2 |
| South | 1 | 0.6 |
| Southwest | 0.6 | 0.4 |
| East | 1.8 | 1.1 |

¹⁴ FAO, "Afghanistan National Livestock Census. Interim Report", 2003.

¹⁵ Source: 60% ratio from Maletta and Favre, *Ibid.*, 2003.

2.7 Some Projects in Nangarhar

IFHope nursery

IFHope established its operations in Nangarhar Province in November 2002, supported by a USAID grant for agricultural, horticultural, and irrigation development. IFHope's facilities in Nangarhar currently comprise 73 Ha of horticultural nurseries. Some 600,000 fruit- and nut-tree saplings are currently growing on IFHope's fruit-tree nursery land. During winter 2004-05, 70,500 saplings have been distributed in collaboration with CNFA as a pilot project through private entrepreneurs. The objective of this pilot is to foster the commercial development of Nangarhar's horticultural sector by enabling entrepreneurial farmers to establish some 200 Ha of commercial orchards. The success of this pilot has led to a partnership between IFHope and DAI for the establishment of 3,000 ha of

commercial orchards in the next 2 years.

The program targets entrepreneurial landholders who have the capital and who are willing to take on the risk of investing in large-scale orchard production aimed at broad markets. By providing input incentives, business plans, market assessments, and horticultural extension services, IFHope can attract local landowners to set aside portions of their holdings for orchard establishment. Farmers' investors participating in the program will enjoy the "first mover" advantage by capturing market share at good price level. Moreover, these farmers' investors are setting examples of investment in commercial fruit production for others to invest in the coming years.

Picture 3

Almond grafted seedlings raised on IFHope nursery in Jalalabad. Nangarhar, September 2005



Gulestan Ltd.

Gulestan is a Kabul-based, Afghan company established in 2004 which intends to produce essential oils for the cosmetics and well-being markets worldwide. Gulestan is an example of private sector development in post-Taleban Afghanistan. The founders of Gulestan includes founders of Jacques Andhrel cosmetic, director of research and director of marketing of Loreal, Afghan-American businessmen and economic adviser to Karzai and Director of Studies at the Center on International Cooperation at New York University. Nangarhar will be the first place of Gulestan to start its activities. Orange flowers, daffodils, coriander, basil are

already cultivated in the region and will be distilled in order to achieve sizeable production. This production will be sold to Loreal and other interested companies who already expressed their interest in Afghan product as a source of diversification of their supplies but also for R&D with Loreal.

This project offer interesting opportunities to add-value to existing production in Nangarhar. Gulistan activities could optimize the economic return on sour orange commercial orchards and other aromatic plants cultivated in the region.

Olive farm and processing plant

The olive farm is a visible feature of Nangarhar landscape. A detailed discussion of the olive farm and processing plant is not possible here and only some key points are presented:

- Ownership: The olive farm and processing plant is totally owned by the state (MAAH) which results in extremely low productivity.
- Olive production: Initially 2,700 ha in 4 farms planted in the early 1980s. Farms 2, 3 and 4 benefits from gravity water while farm 1 requires irrigation pump. Currently approximately 2,000 ha could be rehabilitated. Some olive trees have been pruned, fertilized and irrigated with FAO and Italian government support.
- Olive oil equipment: Machineries rehabilitated by the Italian government. Machines were flown to Italy, repaired and sent back to Jalalabad. The Italian government also provided 2 new oil presses and 2 oil/water separators. With the new equipment provided by the Italian government, quality olive oil could be produced. The quality of the variety of olives could not be asserted. The fruits seen at the factory were of much smaller size than the one seen in Helmand (US olive varieties imported before the war).
- Coming season: the farm management anticipates a 400 MT olive harvest this winter; WFP will provide the farm management with food for olive harvesting; last year and before last year production are still not marketed;
- Private sector interest: a Pakistani company (zeitun-e Pakistan Ltd.) had approached the farm

management for joined venture. However, the afghan authorities have reportedly not welcomed this private initiative.

Prior to a privatization of the olive processing plant, any investment in this enterprise will neither be profitable nor sustainable.

Picture 4

Aerial view of olive farms located above the irrigation canals (white harrow). Intensive private agricultural lands are located below the canal (green harrow) or land benefiting from flood water from seasonal streams (brown harrow). Nangarhar, November 2004



2.8 Industrial Park

Jalalabad has no industrial park and electricity supply is erratic. Some entrepreneurs in Jalalabad would have reportedly opposed the recently proposed industrial park location near Chapirhar (20 km from the city) by the government. Entrepreneurs would prefer to identify a suitable location between Jalalabad and Turkham road.

The road situation is Nagarhar and the eastern region as a whole is deplorable.

It takes 4 hours to drive the 150 km between Jalalabad to Kabul with a 4 wheel drive vehicle at an average speed of 37 km/hour. The Jalalabad-Kabul road is the main trading road in Afghanistan. The figure 6 shows the importance of this road for vegetables.

Without minimal infrastructures, the private sector won't be able to establish a vibrant industry in Nangarhar region.

3. Main Development Issues & Conclusion

The table below summarizes the issues and potentials addressed in this document and possible activities are proposed. The items listed in the table are not presented by priority, but randomly.

| DEVELOPMENT ISSUES | POTENTIAL | ACTIVITIES/ PROGRAMMING |
|---|---|--|
| 1. Limited irrigated land availability | Producers actively looking for high value crops | Focus on adapted high value crops |
| 2. Forest destruction | Sustainable forest product income. The region has the potential to become a “ <i>champion</i> ” in forestry | More surveys are required to better understand the underlying causes of forest destruction |
| 3. Under developed hydro-electric capacity | Important hydro-electricity potential sufficient for the whole region and more. The region has the potential to become a “ <i>champion</i> ” in hydro-power | Rehabilitation and creation of hydro-electric infrastructures |
| 4. Irrigation infrastructures not maintained by users and local authorities (NGOs doing it for the past 15 years) | Limited potential for new irrigation perimeters | Promote local institutions capable of maintaining existing infrastructures |
| 5. Inadapted irrigation infrastructures resulting from politically motivated assistance since the 60s | Low soil fertility in large track of irrigated area | Learn from past lessons |
| 6. Water shortage on the Spin Ghar range (small water catchments areas – seasonal rivers) | Potential for water catchments in reservoirs | Feasibility studies and construction of small/medium size water reservoirs along the course of seasonal rivers (map 3) |
| 7. River basin riparian issues | Increase water use on the Kabul river basin for Afghanistan | Negotiation on the water use of the Kabul River basin |
| 8. Low production of fruits | High potential for fruits production The region has the potential to become a “ <i>champion</i> ” in perennial horticulture and in particular with citrus, walnuts and almonds | Promote commercial orchards establishment through professional nurseries, farmers investment, extension service with technical input from neighboring countries and research, following the model developed in Nangarhar |

| DEVELOPMENT ISSUES | POTENTIAL | ACTIVITIES/ PROGRAMMING |
|--|---|--|
| 9. Low production of vegetables | Short windows of counter-season opportunities in summer and fall | Market information |
| 10. Low development of other crops | Potentials for tropical and semi-tropical species | Research in new crops |
| 11. Under-developed milk processing industry | Nangarhar has the highest number of cow per family in Afghanistan | Feasibility study on the dairy sector in Nangarhar |
| 12. Fragrance industry | Interesting potential to prospect | Gulistan investment in Nangarhar |
| 13. Deteriorated road infrastructures | Reduce transportation cost and increase competitiveness of the embryonic Afghan economy | Investment in tarmac roads in the whole region |
| 14. Absence of industrial park | Potential for private sector development | Joined public-private investment in an industrial park with the required infrastructures |

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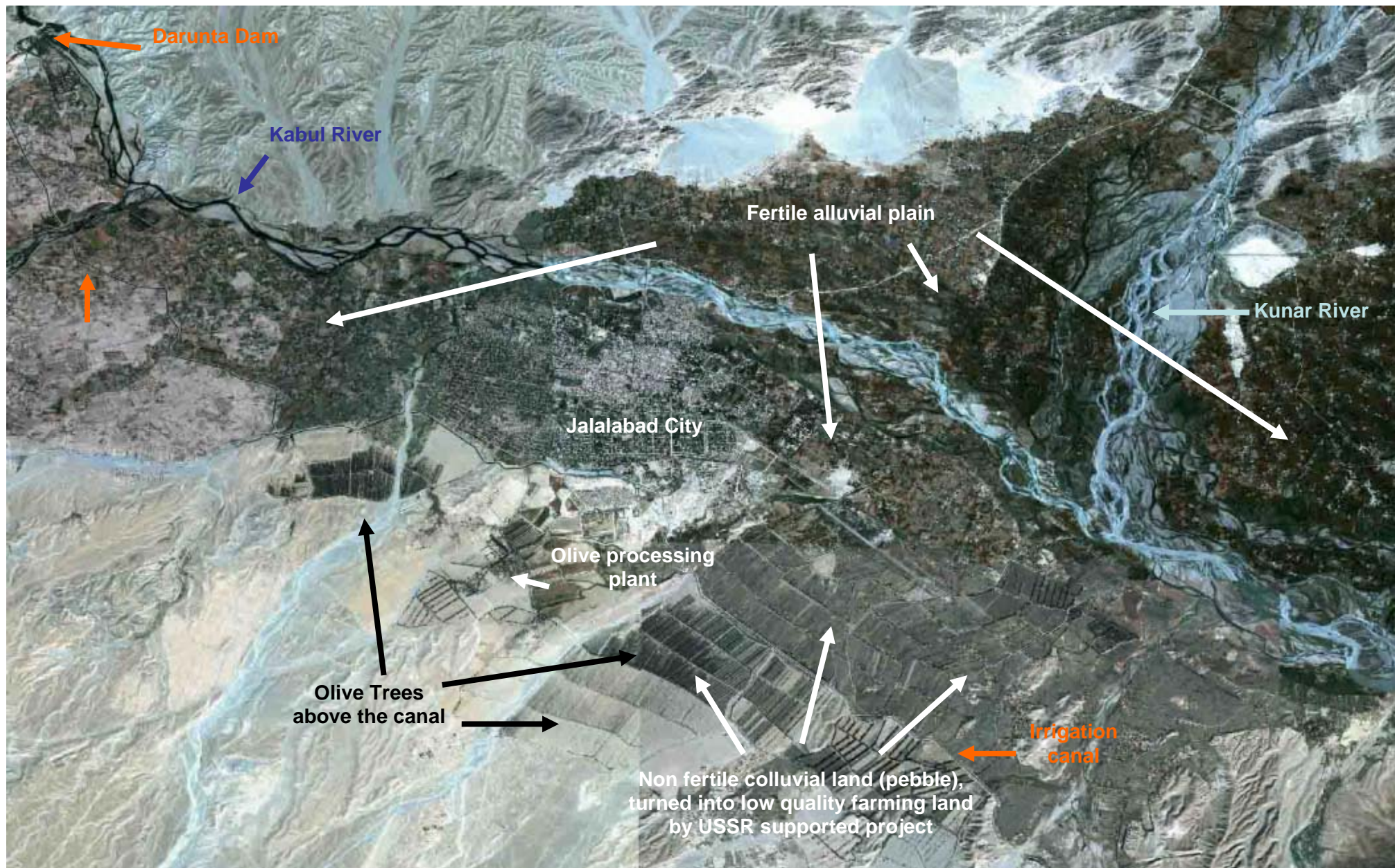
ANNEXES

Map 3 References

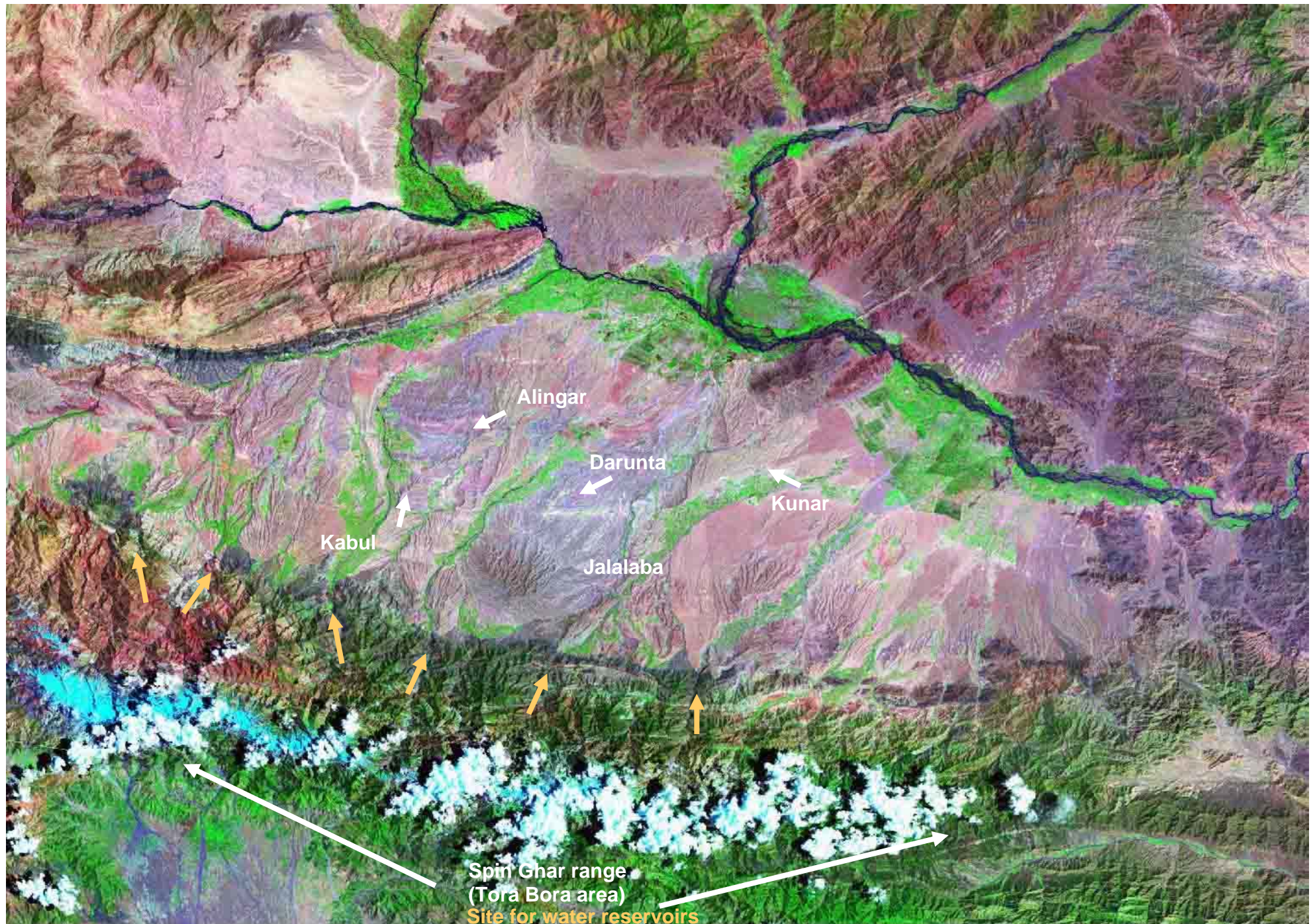
Digitally Compressed Mosaic of Afghanistan/Pakistan and Environs (Map 9)

The image with this document is a mosaic of more than 100 Landsat-5 Thematic Mapper scenes acquired within one or two years of 1990 (the original image covers a larger area with 163 images). The image is digitally compressed by MrSID. The color image is comprised of three spectral bands, TM 7, 4, and 2 composited as R, G, and B respectively. The mosaic is unprojected (in geodetic latitude and longitude) on the WGS84 datum/spheroid with a pixel size of two arc seconds (approximately 60 meters). The image mosaic was spectrally enhanced using EarthSat's LOCAL enhancement technique. This custom approach to contrast adjustment allows the preservation of spatial information across large areas of extreme brightness differences. Mosaiced and color enhanced by Earth Satellite Corporation (www.earthsat.com).

Map 2: Aerial View of Irrigated Area in Nangarhar



Map 3: Location of Proposed Water Reservoirs





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