

Current Situation and Issues on Agriculture of Afghanistan

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Abstract: In Afghanistan, where 80% of the population lives in rural areas and 58% of the GDP is generated by, agriculture and rural development so that those are the most important development sector. After more than 20 years of war, agricultural production and rural infrastructure were left with devastating damages. Agriculture production has been considered as the key sector for revival of the economy and well being of the people in the country. But it is not enough level to achieve the food self-sufficiency and to export of agricultural products. There are especially problems of effective use for the water resource, increase of irrigation area, and improvement of irrigation method. Afghanistan National Development Strategy (ANDS) was formulated in May 2008 in which was positioned as one of the important pillars for the promotion of economic development. Agricultural sector over the range have various problems such as restoration of infrastructure as irrigation facilities, the development of alternative crops to replace poppy cultivation...etc. Therefore development of agricultural activities which is two thirds of the labor population is important to provide a stable life with people engaged in agriculture. Under such circumstances, the objective of this study is to show a current situation of agriculture sector and to clarify issues from the view of water on agriculture of Afghanistan.

Key Words: Afghanistan, Agriculture, Conflict, Irrigation water, Water saving irrigation

1. Introduction

Afghanistan is a landlocked country located in the center of Asia, forming part of South Asia, Central Asia, and Greater Middle East. It is bordered by Pakistan in the south and the east, Iran in the west, Turkmenistan, Uzbekistan and Tajikistan in the north, and China in the far northeast as shown in **Figure 1** (Favre and Kamal, 2004).

In conducting agricultural activities in Afghanistan, one needs to be fully prepared for water shortage in summer. However, people in the country often use limited water resources without an adequate plan even during summer when the temperature and the amount of solar radiation are high. Despite this obvious problem, few studies have addressed the need for effective irrigation planning in Afghanistan (Nishimaki and Toku, 2005).

Data shows that the agricultural output in irrigated agriculture is twice or three times large than in rainfed one. Furthermore, irrigation areas proved to maintain some levels of productivity during the time of a periodic drought, while other areas suffered from a devastating damage. As the crop production in irrigation areas is extremely important in Afghanistan, the introduction of an effective irrigation plan that can deal with water shortages in summer could result in significantly positive outcomes.

In this study, we consider the importance of agriculture in

Afghanistan from the viewpoint of the Gross Domestic

Product (GDP) and the size of work force engaged in agriculture, thereby demonstrating that the development of agriculture is indispensable to the future prosperity of the irrigation planning by pointing out the challenges faced by the agricultural sector in Afghanistan where agricultural industry is a high-priority in national development.

2. Overview of Agriculture in Afghanistan

2.1. Significance of agriculture

Afghanistan is a landlocked country and does not actively engage in trading with neighboring nations.

As shown in **Figure 2**, the agricultural sector shares 30% of the country's GDP in 2008, while the industry sector shares 28% and the service sector 42%. Within the industry sector, many products come from small scale agriculture related activities. Therefore, as much as 60% of population in the country is estimated to make a living from agriculture related activities. Most of these agriculture related activities are within the small scale and self-sufficient production and explain the low level of US\$ 1,000 per capita nominal GDP.

Figure 3 indeed shows that some 80% of population in the work force in Afghanistan are engaged in agriculture sector. These data clearly show that agriculture is a major industry in Afghanistan, involving a large portion of the population. The nation depends on the industry for its development.

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Fig. 1. General map of Afghanistan.



Fig. 2. GDP proportion of major sector of Afghanistan in 2008 (IRACSO, 2010).

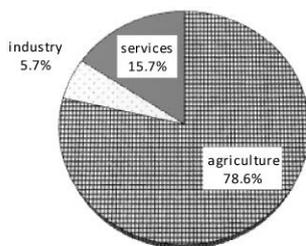


Fig. 3. The work force proportion of major sector of Afghanistan in 2008 (IRACSO, 2010).

2.2. Climate of Afghanistan

Afghanistan occupies the northeastern area of the Plateau of Iran. The Hindu Kush Mountains stretching from Pakistan and their offsets shape a plateau in the center of the country. Because of these geographical characteristics, much rainfall turn to snow which remain in high mountains, then flow into rivers in early spring as the temperature rises. Agriculture in Afghanistan has the form of a typical oasis agriculture seen in Central Asia drawing water from rivers.

Figure 4 shows that the changes of monthly precipitation amount and average air temperature in Kunduz, a major

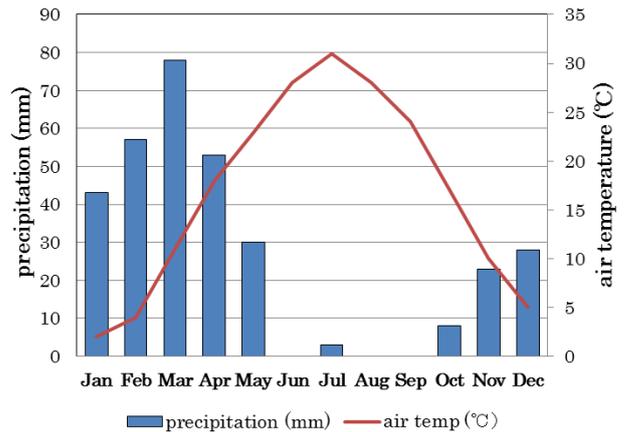


Fig. 4. Monthly precipitation amount and average air temperature in Kunduz, north Afghanistan.

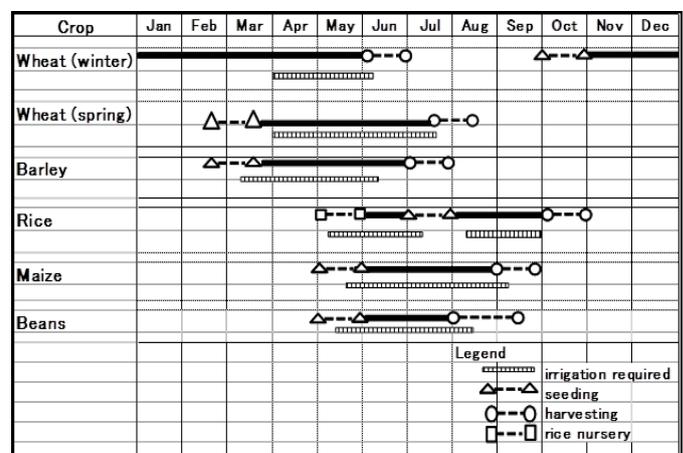


Fig. 5. Typical cropping pattern and irrigation period for major crops in north Afghanistan.

agricultural region with the altitude of 400-2000 meters and with typical meteorological characteristics of Afghanistan. The rainfall begins in October, reaches its peak in March and ends in May. It hardly rains during the periods from June to October, especially in summer when the temperature is high. As a result, the problem of water shortages frequently occurs in the latter part of the planting period between April and October, causing major difficulties in crop cultivation.

2.3. Characteristics of the planting schedule

We examined the planting schedule in such a harsh meteorological condition of Afghanistan. Figure 5 shows the planting schedule in Kunduz, a representative region of the northeast breadbasket area (JICA, 2010). The planting period for crops, except the winter wheat, is between March and October.

According to typical cropping pattern and irrigation period for major crops in Figure 5, irrigation is required from April to September. However, the level of groundwater drops rapidly from August to September due to irrigation for crops. When it is difficult to pump up water, water shortages occur



Fig. 6. Typical irrigation facilities in Afghanistan.
 A: intake gate in river, B: earth canals,
 C: shallow well, D: irrigation pond

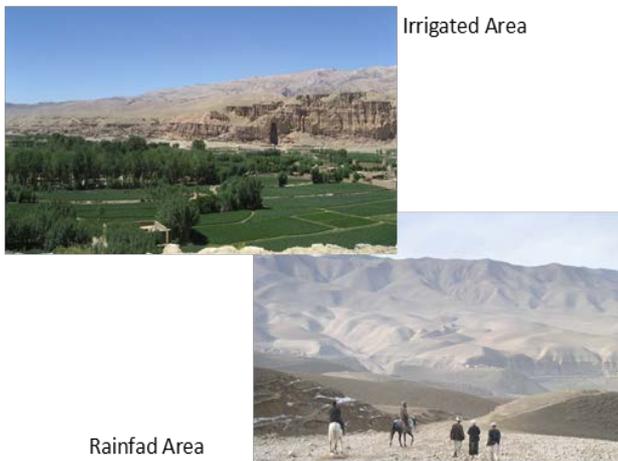


Fig. 7. Irrigation area and rainfed area in Barmiyian Province.

and greatly affect yields of crops.

As for water sources during the planting period, the water melted from snow flows into rivers and provide water sources during the first half of the period from March to early June. For the latter part from June to October, irrigation water is pumped out from the groundwater. Summer is the most challenging season for planting and harvesting as rainfall cannot be expected and the level of groundwater drops (FAO/WFP, 1999). Four photos in **Figure 6** show typical irrigation system in Afghanistan. It is clear that irrigation facilities such as intake gates, earth canals and pond should be improved in increasing the efficient use of irrigation water.

2.4. Comparison of agricultural productivity between rainfed and irrigated agriculture

Figure 7 shows two landscapes which are irrigated and rainfed agriculture area in Barmiyian province. This irrigated area is like green but rainfed area gray.

As shown in **Figure 8**, the yields of wheat, a major grain in

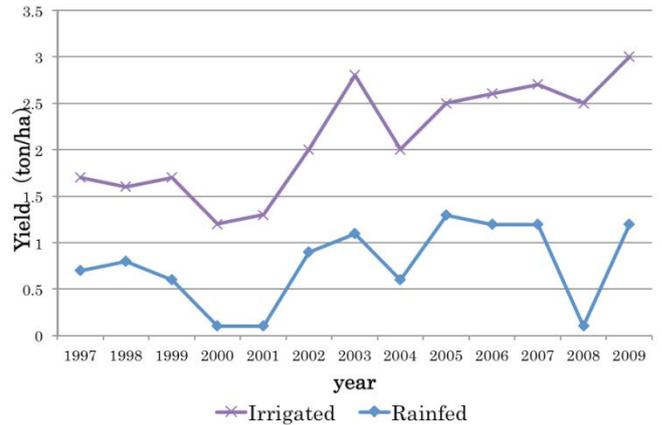


Fig. 8. Comparisons of wheat yield with irrigated and rainfed agriculture.

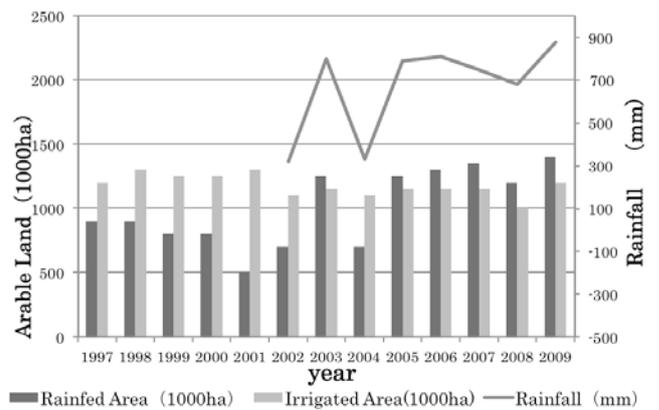


Fig. 9. Relationship between rainfall amount and the size of irrigated and rainfed areas for wheat cultivation.

Afghanistan, are twice or three times larger in irrigation agriculture areas than rainfed, one while the size of the former is only twice larger than the latter. So that irrigated agriculture has contributed greatly to food security in Afghanistan

Furthermore, the irrigation areas have proven to be able to more or less withstand against famines. The year 2000, 2001, 2004 and 2008 are known for seriously low yields. While farmers in rainfed areas suffered from a devastating blow to their yields in these years except the year 2004, those in irrigation areas were able to maintain some levels of yields in all of these years.

Figure 9 shows the relationship between rainfall amount and the size of irrigated areas and rainfed areas (no data exists prior to the year 2002). According to this data, the area under cultivation becomes smaller in the years when precipitation amount is a little.

All these data indicate that the agricultural production in irrigated areas is important to raising the agricultural outputs in Afghanistan. The data also suggest that the improvement in the usage of water resources in irrigation areas constitutes a key to the development of the agricultural sector, considering the

limited availability of water resources in this country.

3. Key Challenges

The arable and permanent cropland area in Afghanistan is 8.5 million hectares, in which the areas with irrigation facilities are about one million hectares (CSO, 2010). However, due to prolonged conflicts and unstable snowfalls, only one million hectares of a land in the irrigated areas were farmed in 2003. Such a reduction of actual irrigated areas affects crop yields and prevents a stable growth of the agricultural industry.

For this reason, a major challenge is to rebuild irrigation areas which are the main crop-growing lands in Afghanistan. In order to meet this challenge, two measures are considered. First, efforts should be made to repair or construct and effectively manage irrigation facilities. Second, a water-saving method that stresses the efficient use of water should be improved.

For the first measure, considering the present degradation of water intake and supply facilities, it is important to, in addition to repairing irrigation facilities, develop new water sources, improve the transportation efficiency and strengthen the capabilities of irrigation organizations. Although such efforts at the field levels continue, the improvements in these areas at the macro-level have been difficult because of budgetary and other constraints.

Meanwhile, the second measure appears to hold promise. It seems that irrigation techniques existed before in Afghanistan. However, the long years of conflicts and other factors resulted in watering use practices without an appropriate irrigation plan. The assessment of necessary irrigation amounts according to crop types and regions and the creation of a simple irrigation plan that controls the levels of water consumption per unit can lead to the establishment of irrigation systems that can be managed by farmers. Therefore, this study focuses on the latter of the two measures.

4. Conclusion

Agriculture is the main source of livelihood and subsistence for 80 percent of the population that lives in rural areas, and a crucial sector for national food security and economic growth. However, agriculture in Afghanistan faces a problem of water shortages during the latter half (summer) of planting period. The issue is the wastage of water due to the

aging of irrigation facilities and unorganized irrigation practices. Therefore, the efficient use of limited water resources is an issue of paramount importance. The research in this area is urgently needed. In particular, the design of an irrigation plan that improves irrigation efficiency is important as such a plan can lead to the immediate improvement of production efficiency and yields by making it accessible to farmers. In addition, agriculture in the irrigation areas with an effective irrigation plan can produce high amounts of yields and reasonable levels of yields even during famines.

Therefore, the diffusion of such a plan could make a great contribution to the development of agriculture industries in Afghanistan. It should be noted that one needs sufficient amounts of meteorological data in order to conceptualize an effective irrigation plan; however, this has been difficult due to the prolonged conflicts. Therefore, it is necessary to research technological development of a simple effective irrigation method immediately to address the needs in Afghanistan.

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