Potential Risk of Opium Poppy Farming in Tajikistan

Shahnawaz
Director (UNIGIS S/E Asia), UNIGIS International, Interfaculty Department of Geoinformatics - Z_GIS, University of Salzburg Austria, E-mail: s.shahnawaz@sbg.ac.at

Abstract
The sap oozing from shallow incisions made on the seed pods of opium poppy forms base-matter for several legal and illegal drugs. In contrast to the legitimate, its illegitimate products are priced very high in the international narcotics market. Lured to potentially high economic returns, many poor farmers living in the remote areas of some counties fall in a wider trap of drug trafficking and get involved in the illicit cultivation of opium poppy. Besides, an association of such activities with some other criminal and terroristic events has been found in many countries. India produces the largest quantity of opium within the given legal framework whereas Afghanistan is the biggest supplier of illegally produced opium. Tajikistan adjoins Afghanistan and there are many similarities in the environmental and socio-economic conditions of the two countries. Based on these observations, this study assesses the potential risk of illegal farming of opium poppy in Tajikistan. The results show that some areas in the country have agro-climatic conditions suitable for cultivation of opium poppy. Most of such areas are situated in the remote valleys in central parts of Tajikistan. The study concludes that special efforts should be made to improve the socio-economic condition of the people living in such areas so that they don't look at illegal opium poppy cropping as lucrative source of fast cash earning.

1. Introduction

Drug trafficking being unlawful in itself is also associated with a range of criminal activities and terroristic threats in several parts of the world. Opium, among extremely expensive intoxicants, has high demand in the World's illegal drug market (UNODC, 2010). It is extracted from the seed pods of opium poppy plant (*Lachryma papaveris*) and is used as a base-matter for a variety of products that may be beneficial and/or harmful for human health depending on the purpose and quantity of their consumption (UNODC, 2010). The two major products of opium are morphine as a pharmaceutical medication and heroin as a narcotic drug. Due to high potential of abusive use, its cultivation is controlled and monitored by the national governments (e.g. Department of Revenue, Ministry of Finance, Government of India: http://dor.gov.in/Licenced_cultivation_opium) and relevant international agencies (e.g. United Nations Office on Drug and Crime - UNODC: www.unodc.org) worldwide.

Opium poppy is grown as a licit crop in a few countries and as an illicit crop in several countries (Hays, 2013 and World Atlas, 2016). The largest amount of legally produced opium comes from India and most of its illegal production is based in Afghanistan (CIA). It has been observed that Afghanistan not only has the agro-climatic conditions suitable for cultivation of opium poppy but several other factors make this activity more lucrative economically than the production of licit food and other crops. Such factors include limited availability of good quality land for agricultural due to highly mountainous terrain, short growing season due to cold and semiarid climatic conditions, lack of irrigation facilities, underdeveloped transportation infrastructure, sparsely populated isolated river valleys, wide spread poverty and weak governance etc. (CFC, 2012, FAO, 2008, Kienberger et al, 2016, Mansfield, 2005, Pain, 2012 and UNODC, 2015). It is in the light of the above mentioned facts that this paper assesses potential risk of opium poppy farming in the countries adjacent to Afghanistan having similar environmental and socio-economic conditions.

2. Study Area Profile

Tajikistan, situated in Central Asia, is surrounded by four countries i.e. China on the eastern, Uzbekistan on the western, Kyrgyzstan on the northern and Afghanistan on the southern boundaries (Figure 1). Its total geographical area is around 143 thousand km^2. The terrain on nearly 93% of the total area highly mountainous and altitude of about half of the country is more than 3000 meters. The total population of Tajikistan was estimated around 5.5

million in 1992 out of which about 3.8 million persons (69%) were living in rural areas (FAO, 2015 and Figure 2) and rest in the urban areas. The total population increased to nearly 8.6 million in 2015 out of which around 6.3 million (73.2%) live in rural areas and depend largely on subsistent agricultural activities.

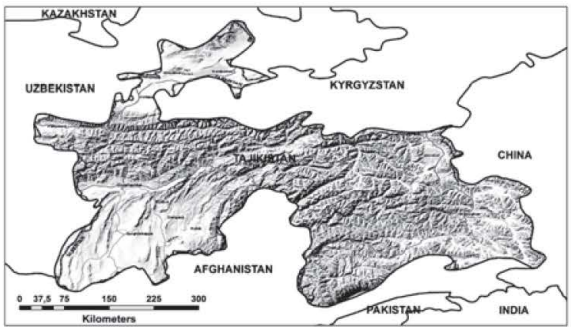

Figure 1: Tajikistan and neighboring countries

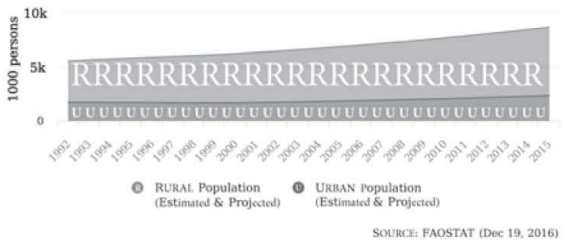

Figure 2: Rural and urban population of Tajikistan from 1992 to 2015

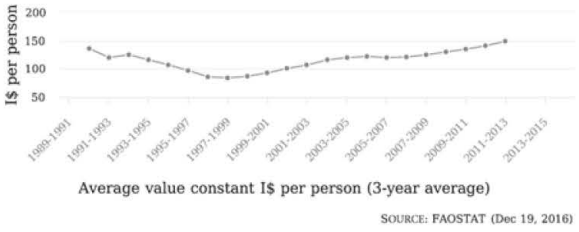

Figure 3: Average value of food production in Tajikistan (3 year average from 1989 to 2015)

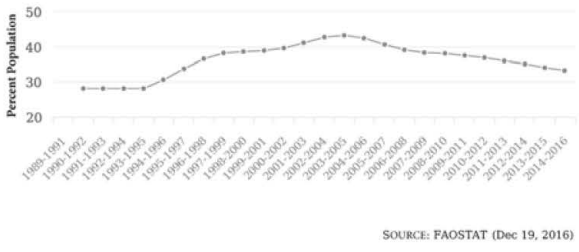

Figure 4: Prevalence of undernourishment in Tajikistan (3 year average from 1989 to 2015)

A higher increase in the number of people and proportion of population living in rural areas clearly indicates that pressure on otherwise limited and less productive agricultural land has increased.

As an effect, cost of food production is increasing continuously since mid-1990s (Figure 3). Further, the availability of food has been decreasing leading to an increase in the proportion of undernourished population (Figure 4).

The poverty ratio in Tajikistan (32%) is at the second place in the region after Afghanistan having 39.1% (ADB, 2016). Although the Government of Tajikistan has initiated a programme for reforming agriculture sector in the country (MoA-Tj, 2012) but it may take some years to improve the situation. Besides, there are also the threats of adverse impact of climate change on agriculture (UNDP, 2012),

The current study has been conducted taking the following facts in consideration:

- Tajikistan shares its southern boundary with Afghanistan which is the largest producer of illicit opium in the world so there is a possibility that some poor farmers may lure to grow opium poppy as a financially lucrative agricultural crop,

- there are many similarities in the physiographic, climatic, socio-economic and developmental factors of Tajikistan and Afghanistan so some farmers may want to try cultivation of opium poppy for amassing higher economic returns from their otherwise poor quality mountainous agricultural land,

- Tajikistan's northern boundary is coterminous with the southern boundary of Kyrgyzstan which has the records of growing opium poppy in some parts of the country during the times of Soviet Union (Shuljgin, 1969) so this may function as an encouraging factor for the poor farmers living in the remote mountainous valleys of Tajikistan.

2. Data and Methods

Global raster datasets of interpolated and extrapolated temperature and precipitation at 30 Arc Seconds (app. 1 km) spatial resolution are available for free download from the WorldClim website (www.worldclim.org).

This study is based on 3 types of the datasets which are following:

- Mean Monthly Temperature of selected months (see details in Table 1).
- Average annual precipitation.
- Digital Elevation Model for deriving slope (SRTM DEM resampled at the same resolution

as the climatic data sets for facilitating overlay analysis).

- Ancillary data of Land Use Land Cover, population distribution, Satellite Images etc. have been used to support observations, analysis and conclusions.

These raster datasets are available for global land surface which have been processed and analyzed using ESRI ArcGIS Desktop version 10.4. Tajikistan's boundary in vector format was used to extract the required parts of the datasets and processed further as per to the following procedures:

- According to Shuljgin (1969), the crop of Opium poppy takes 140-150 frost free days to mature. Around the selected study area, it is sown in the month of April and harvested in September. Its temperature requirements are different during sowing, growth and ripening periods. However, Shuljgin has given very short ranges of suitable temperatures and precipitation. Keeping in mind that Tajikistan is a highly mountainous country where significant annual fluctuations in weather are highly expected, the ranges of temperatures and precipitation have been modified to adjust the probable annual variations (Table 1).

Table 1: Suitability criteria

Factor	Minimum and Maximum Values
Slope	0 - 20 Degrees
Mean Monthly Temperature	
April	6 - 14 Degree Celsius
May	11 - 18 Degree Celsius
June -August	14 - 24 Degree Celsius
September	11 - 20 Degree Celsius
Average Annual Precipitation	100 - 500 millimeter

- All the eight datasets (i.e. 1 slope, 6 temperatures and 1 precipitation) were classified according to the corresponding value given in 'Table 1' using 'Fuzzy Logic' i.e. all the suitable values were assigned 'Code 1' and all other values were codes as 'NoData'.

- All the classified datasets were used to perform overlay analysis selecting 'AND' type of 'Fuzzy Overlay' function in ArcGIS for obtaining the combined results.

- The final results obtained in rater format were converted into vector format. These were then draping on the satellite image inserted as base map from ArcGIS Online (ESRI) for identifying the type of land use and land cover of the areas falling under the identified as suitable for farming of opium poppy.

- Additionally, the shape file of the final results was also uploaded on Google Earth Pro for clearer 3-Dimensional visualization of the selected areas found suitable for opium poppy cultivation.

3. Results and Discussion

It is found that there are several isolated areas in Tajikistan where physiographic and agro-climatic conditions are quite suitable for supporting the cultivation of opium poppy (Figure 5). Almost all such areas are found in the present and/or former beds and flood plains of various rivers. In the northwest, a long stretch is located in the former flood plain of Syr Darya along Kayarakkum water reservoir. A medium sized stretch in the western part of the country is situated in the lower parts of Zeravshan River and a small area in the Kafirnigan river valley.

A series of suitable areas is found in the middle parts of the country starting from the Surkhab river valley in the northern parts to the valleys of Kharog and Gount rivers in the southern parts. There are further two stretches in between the two above mentioned areas. One of these located in the valley of Vanj River and the other in Bartang river valley.

Additional data have been used for assessing the possibility if the farmers living the areas suitable for opium poppy can start cultivation of this crop or not. Figure 7 shows estimated distribution of population in 2015 which has been provided by ESRI (2016) in raster format on spatial resolution of 250 meters. This clearly shows that most of the population of Tajikistan lives in the northwestern and south westerns parts of the country because these areas have quite flat terrain and much lower altitude. The central and eastern parts of the country are sparsely populated. Such rural are situated relatively large patches and fertile patches of land situated along the areas of the valley floors (Figure 6).

A visual comparison of Figure 5 and estimated Figure 7 suggests that the areas suitable for cultivation of opium poppy located in the northwestern and southwestern parts of the country also some urban areas and higher density of population. It is highly improbable that the farmers living in these areas will start farming of any illicit crop like opium poppy because it cannot remain

hidden from the government authorities as well as from the people. On the other side, all the areas suitable for opium poppy cultivation in the middle and eastern parts of Tajikistan are located in the remote valleys where small settlements are located sparsely and population density is very low. There is a high risk that the poor farmers living in these isolated mountainous valleys may get attracted toward opium poppy farming for fetching lucrative economic returns from this cash crop and become a victim of the international network of the narcotic drug traffickers.

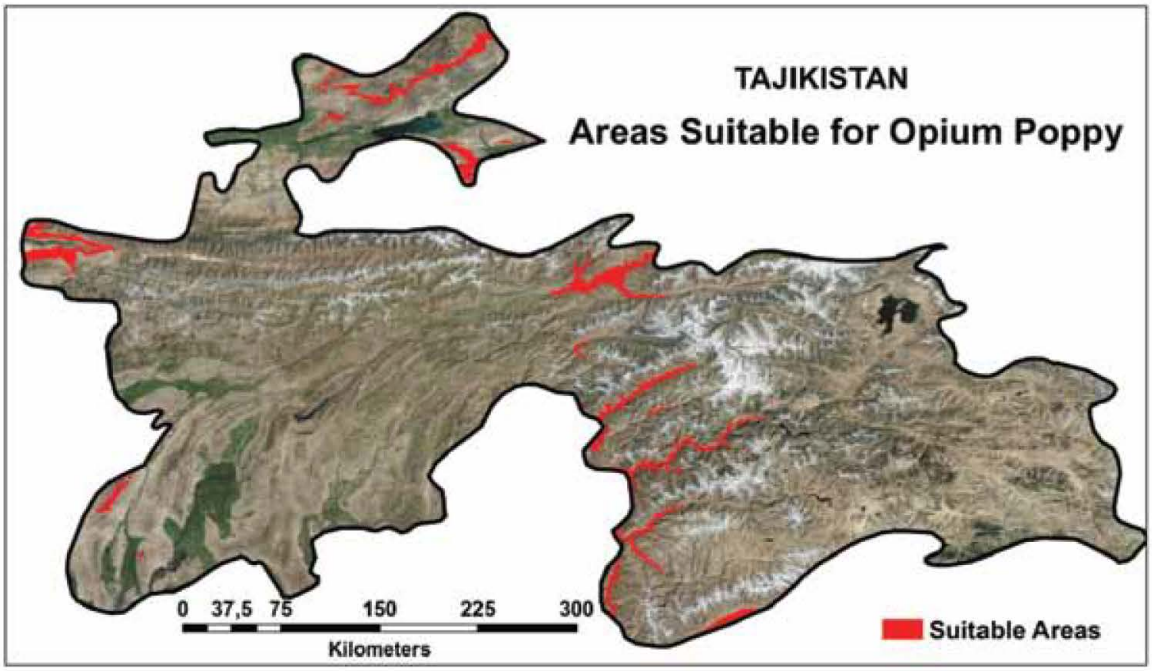

Figure 5: Locations of the areas suitable for opium poppy farming in Tajikistan

Figure 6: 3-Dimensional view of some areas suitable for opium poppy farming in Tajikistan

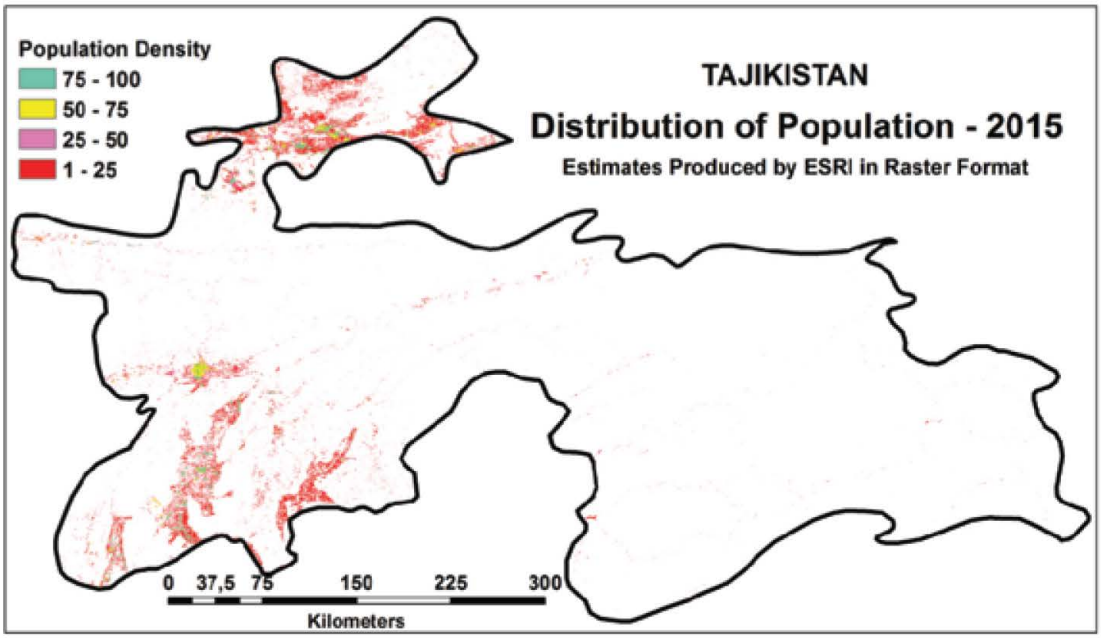

Figure 7: Distribution of population in Tajikistan, 2015 estimates by ESRI

4. Conclusions

The life of many farmers living in the mountainous areas having limited possibilities of agricultural activities is full of hardships and the success of their food crop depends largely on the favorable weather conditions. Such situations prevailing over years make them vulnerable to many illegal activities in their struggle for satisfying their daily needs. Since farming is their primary occupation so it is feasible for them to start cultivation of illicit crops like opium poppy as a cash crop which fetches them lucrative economic returns. This increases the risk of these poor farmers falling as a prey to the international drug trafficking network and get involved in a chain of unlawful activities, besides producing narcotic drugs illegitimately. There are some areas in the middle parts of Tajikistan where environmental and socio-economic conditions are conducive to opium poppy farming. Relevant authorities need to take appropriate developmental measures to improve the socio-economic conditions of these farmers in order to prevent the spread of illicit crops like opium poppy in these areas effectively.

References

ADB, 2016, *Basic Statistics - 2016*. Asian Development Bank. Available Online <www.adb.org/publications/basic-statistics-2016>. Accessed on 19.12.2016.

CFC, 2012, The Decision to Plant Poppies: Irrigation, Profits and Alternatives Crops in Afghanistan, *Part 5 of a 5-Part Series on Counter-Narcotics Issues in Afghanistan*. Civil-Military Fusion Centre. Available Online <http://reliefweb.int/sites/reliefweb.int/files/resources/Full_Report_4263.pdf >. Accessed on 19.12.2016.

CIA, The World fact Book: Field Listing - Illicit Drugs. Available Online <www.cia.gov/library/publications/the-world-factbook/fields/2086.html>. Accessed on 19.12.2016.

ESRI, 2016, World Population Estimated-2015, Available Online <www.arcgis.com/home/item.html?id=2417dafad0b54276a2333d76a0b27311>. Accessed on 19.12.2016.

ESRI, *ArcGIS Online - Base Map Imagery*. Available Online home/webmap/viewer.html?useExisting=1>. Accessed on 19.12.2016.

FAO, 2008, *State of Plant and Genetic Resources for Food and Agriculture (PGRFA) in the Republic of Tajikistan - Country Report*. Available Online <www.fao.org/docrep/013/i1500e/Tajikistan.pdf >. Accessed on 19.12.2016.

FAO, 2015, FAOSTAT: Tajiskistan - Country Indicators. Available Online

<www.fao.org/faostat/en/#country/208>. Accessed on 19.12.2016.

Hays, J., 2013, Opium Cultivation, Heroin Production and the Opium and Heroin Trade. Available Online <http://factsanddetails.com/world/cat54/sub348/item1216.html>. Accessed on 19.12.2016.

Mansfield, D., 2005, *Exploring the 'Shades of Grey': An Assessment of the Factors Influencing Decisions to Cultivate Opium Poppy in 2005/06*. A Report for the Afghan Drugs Inter Departmental Unit of the UK Government. Available Online <www.davidmansfield.org/data/Field_Work/UK/Final2005Drivers.pdf >. Accessed on 19.12.2016.

MoA-Tj, 2012, *Programme for reforming the Agriculture Sector of the Republic of Tajikistan for 2012-2020*. Ministry of Agriculture of the Republic of Tajikistan. Available Online <http://factsanddetails.com/world/cat54/sub348/item1216.html>. Accessed on 19.12.2016.

Shuljgin, G., 1969, Cultivation of the Opium Poppy and the Oil Poppy in the Soviet Union. Available Online <www.unodc.org/unodc/en/data-and-analysis/bulletin/bulletin_1969-01-01_4_page002.html>. Accessed on 19.12.2016.

Kienberger, S., Spiekermann, R., Tiede, D., Zeiler, I. and Bussink, C., 2016, Spatial Risk Assessment of Opium Poppy Cultivation in Afghanistan: Integrating Environmental and Socio-economic Drivers. International Journal of Digital Earth. DOI: http://dx.doi.org/10.1080/17538947.2016.1250828.

Pain, A., 2012, Afghanistan's Opium Poppy Economy. Available Online <www.mei.edu/content/afghanistans-opium-poppy-economy>. Accessed on 19.12.2016.

UNDP, 2012, *National Human Development Report 2012 - Tajikistan: Poverty in the Context of Climate Change*. Available Online <www.undp.org/content/dam/tajikistan/docs/library/UNDP_TJK_HDR_2012_Eng.pdf>. Accessed on 19.12.2016.

UNODC, 2010, *World Drug Report 201*. Available Online <www.unodc.org/documents/wdr/WDR_2010/World_Drug_Report_2010_lo-res.pdf>. Accessed on 19.12.2016.

UNODC, 2015, *Afghanistan Opium Survey 2014 - Socio-economic analysis*. Available Online <www.unodc.org/documents/crop-monitoring/Afghanistan/Afghan-opium-survey-2014.pdf>. Accessed on 19.12.2016.

World Atlas, 2016, Top Opium Poppy Producing Countries. Available Online <www.worldatlas.com/articles/top-opium-poppy-producing-countries.html>. Accessed on 19.12.2016.

WorldClim, "WorldClim - Global Climatic Data". Available Online <www.worldclim.org>. Accessed on 19.12.2016.