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"Interstates Cooperation for Irrigation of Amu Darya River Banks,
Its Potential Role as a Solution for the Poppy Problem "

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Depletion of water resources requires us to search for non-conventional strategies for water preservation and irrigation. Sustainable management of such water resources along with the development of sustainable irrigation systems will contribute to the stability of agricultural yield that is a primary concern in all riparian countries of Amu Darya River (Uzbekistan, Turkmenistan, Tajikistan and Afghanistan). This paper is an attempt to identify the priorities in the reconstruction assistance planned for all riparian states. The problem of growing, processing and traffic of illicit drugs in Afghanistan is then analysed, searching for the economic, social and political causes, with an emphasis on its implications for the future development and the geopolitical picture of the Central Asian region.

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INTER STATES COOPERATION FOR IRRIGATION OF AMU DARYA RIVER BANKS, ITS POTENTIAL ROLE AS A SOLUTION FOR THE POPPY PROBLEM

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Abstract

Depletion of water resources requires us to search for non-conventional strategies for water preservation and irrigation. Sustainable management of such water resources along with the development of sustainable irrigation systems will contribute to the stability of agricultural yield that is a primary concern in all riparian countries (Uzbekistan, Turkmenistan, Tajikistan and Afghanistan). This paper is an attempt to identify the priorities in the reconstruction assistance planned for all riparian states on Amu Darya river. The problem of growing, processing and traffic of illicit drugs in Afghanistan is then analysed, searching for the economic, social and political causes, with an emphasis on its implications for the future development and the geopolitical picture of the Central Asian region.

Keywords Afghanistan, Amu Darya River, Central Asia, Drug control programs, Subsurface Drip Irrigation (SDI), Poppy fields, Uzbekistan, Water resources.

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Introduction

More than ten million residents in north Afghanistan and Central Asia have been suffering from desperate famine, drought, and poverty. People of Afghanistan have suffered so much at the hands of foreign influences for decades and have witnessed an almost unprecedented destruction of many of their cultural and educational infrastructures, industries and agriculture. Mono-cultural economy in Central Asian republics forced by the former Soviet Union has made it difficult to upgrade their state of economy into a modern market model. Such a change requires a new look not only at the domestic but also the interstate aspects of their economy. Afghanistan can hardly attain an effective reconstruction without the knowledge and experience of former Soviet republics on irrigated farming in arid climates and the cooperative improvement of agriculture and water resources usage in those republics. Can science provide them with any remedies for the largely remaining residue of those human catastrophes and contribute to the needed solutions to overcome their current problems? The situation in the Amu Darya Basin ecosystem is too complex and diverse for a single national strategy to encompass the necessary strategies that can be effectively managed and sustained. Scientifically sound strategies are needed as these riparian countries often face a wide range of common dynamic problems that cannot be easily resolved with current legislation, institutions and procedures. Reversing desertification and the land degradation induced by human actions and climatic extremes requires us to reconsider the definition of water and land resources use.

The International Conference on Reconstruction Assistance to Afghanistan adopted the co chair's summary of conclusions in Tokyo on January 22nd 2002 and approved more than $4.5 billion in multiyear reconstruction funds for Afghanistan. Afghanistan would still suffer from hunger and other related tragedies however, if sophisticated interstate agreements could not be achieved to use water resource of Amu Darya with other riparian Central Asian states. These funds can be increased and invested not only for Afghanistan but also for other Central Asian republics. A better understanding of the international law and the current rules on interstate water resources and the former agricultural conditions in Afghanistan is vital to provide a more successful assistance plan.

Illicit drugs are also a global problem with more than 200 million people abusing drugs worldwide. Drug use is responsible for great losses from the societies' financial resources, the high expenses of its containment, and the costs of broken families and deteriorating communities. Intravenous drug use is also helping spread HIV/AIDS and hepatitis. Drugs are directly linked with the rate of crime and violence. Drug cartels undermine governments and corrupt legitimate businesses. Revenues from illicit drugs fund many of the armed conflicts over the world. The social costs are high and inflict all communities to some degree with a variety of problems: street violence, gang warfare, social decay, shattering of lives, expenses of police forces and army watch guards in the borders, judicial systems and jails, treatment and rehabilitation programs. Drug problems can be looked upon as an expenditure of the financial resources away from a healthy development and in this regard are especially harmful to the developing countries. It is estimated that more than four hundred billion dollars is spent globally on drugs every year. Afghanistan has been a major player and also itself a culprit of this phenomenon; as for example it accounts for more than 75 per cent of the global opium production. The international community should be made aware of the continued potential of extensive illicit opium poppy cultivation in Afghanistan, and to assist Afghanistan in preventing the resumption of opium poppy cultivation and the related production and trafficking of opiates particularly Heroin. Historically agriculture has long been the main occupation of people living in Afghanistan but less than 10% of the land is cultivated; war of the 1980's and 90's damaged a large percentage of the arable land. Subsistence crops include wheat and other grains, cotton, sugar beets,

fruits, and nuts. Grazing is also of great importance in the economy. The UNDCP provides estimates of the level of opium poppy cultivation per region by conducting a census of farmers on the ground. Opium cultivation and processing has been most extensive in the south of the country, in particular Helmand province. Helmand was once Afghanistan's breadbasket, by virtue of a massive irrigation system built by the United States in the 1960's. What had been desert suddenly sprouted with wheat, cotton, vegetables and fruit. Agriculture benefited a lot from this irrigation system. Opium poppies have always been grown in Afghanistan, but it did not become the world's main exporter of heroin until the Soviet invasion of Afghanistan brought near-anarchy to the region. Production and refining exploded as the Afghan Mujahedin traded in drugs to finance their war against the Russians. While opium poppy was always grown in Helmand and elsewhere in Afghanistan, it was a minor crop until war and drought disrupted supplies from the Golden Triangle in south east Asia in the 1970's. So when the Soviet Union invaded Afghanistan in 1979, anti-communist Mujahedin fighters turned to opium cultivation and heroin production to help finance their holy Islamic war.

In Helmand, neglect and nearly two decades of war, first against the Russians and then among Afghan factions, left the once magnificent irrigation system in a shambles. The main Bughra Canal got clogged with silt and many of its sluice gates are damaged and inoperative, as are subsidiary canals and ditches distributing water to individual plots; and the corps no longer exists. This is one of the reasons opium is being grown so freely and widely.

There is a community that apparently sees opium as just another crop. The people lancing the poppy heads to release the brown extract that is eventually refined into heroin, are ordinary farmers who look as far removed from dangerous drug traffickers as one could imagine. The opium harvesting has become part of the normal pattern of life for the village people. There's a shadowy chain of people, beginning with traders in local bazaars who buy the opium. It is turned into heroin along the way in so-called factories that may be nothing more than a shack, going up in value of course at every stage**.** Although the traffickers make the biggest profits, the growers also do well out of opium, which is precisely why the efforts so far to wean them off opium cultivation and to persuade them to grow other crops have been of such limited success. Farmers claim they could get twice as much for opium as for wheat. They hardly know or think about the damage it could do to anyone who becomes addicted to it. They throw such questions back and say they will stop growing opium once there's some development in there, or they say if the west wants to stop the opium trade it should take responsibility for the instability that followed pouring in of the arms to help Afghan fighters some years back. There should be no surprise why they grow opium when they only earn seven dollars a month to feed themselves. Drug control officials suggest it is as much for the west to stop people buying heroin as it is for the Afghanistan government to stop the supply at its source. They are doing their best but the reality is that the villagers need the money to live.

The only hope to make a prohibition on poppy cultivation practical is by providing farmers with an economic incentive. Repairing the irrigation system is the main thing especially because the summers have been dry and they can only grow one crop, poppies, in such dry condition. With water and better seed and some machines and fertilizer, they could plant two crops every year. They could grow wheat or cotton or maize, not opium. They could plant more land and make more money with less work.

Amu Darya

Amu Darya is the second longest river in Central Asia with a maximum tributary length of approximately 2,500km. Its annual river flow is the greatest in Central Asia at approximately 79km^3/year (Micklin, 2000). **Figure 1** shows one of Amu Darya's tributaries, Pyandzh. This is a

special spot in Afghanistan where many tributaries flow inside its territory. Amu Darya Basin is fed by snow and glacial melts from the Hindu-Kushi Mountains in Afghanistan, Pamirs in Tajikistan and in China. This feature determines the favour for irrigation within annual flow distribution where 80-90% of the annual flow is generated from April to October; the maximum flood happens from June to August. Amu Darya Basin includes some tributaries such as Pyandzh, Vakhsh, Kafirnigan, Sherabad, Surkhandarya, Kashkadarya, and Kunduz. Zerafshan no longer reaches Amu Darya, though it was once a tributary of Amu Darya. After the confluence of Pyandzh and Kunduz, Amu Darya proceeds on the boundary between southern Uzbekistan and northern Afghanistan, and then flows through the desert of Turkmenistan and south west Uzbekistan (Amu Darya delta) before reaching its final destination, the southern part of the Aral Sea.

Figure 1. A US satellite Photograph of Pyandzh, August 1989 (N37.5, E69.5. at the center) Earth Science & Image Analysis (http://eol.jsc.nasa.gov/sseop/clickmap/)

1. History of irrigation on the Right Bank of Amu Darya

In some regions of Uzbekistan‘s arid and semiarid zones, the development of irrigation systems has a long history. Development began during the Neolithic time (5000-3000 B.C.) and Bronze Ages (3000-800 B.C.). It has expanded mostly into the Syr Darya, Amu Darya and Zerafshan River Basins. Some archaeological findings of ancient Neolithic time irrigation constructions, consisting of two channels for about 2.5 km, have been revealed in the area of the old delta of Tedzhen River (Southern Turkmen). From the 12th to 18th century, the installation of an irrigating mainline (water quantity intake) system was one of the basic constructions associated with the irrigation technologies development in Khoresm, Zerafshan and Fergana Valleys. A highly advanced irrigation system developed following the addition of Turkestan into Russia. In 1877, the principles of water use and development of the irrigation techniques were applied within the Golodnaya steppe (Syr Darya Basin.) N.A. Petrtov, F.A. Elistratov, and I.G Aleksandrov have developed the initial projects on land reclamation and irrigation system improvement of Golodnaya steppe beginning from early 1885 to 1912.

The most interesting idea was suggested by A.V. Chapligyn in 1916 concerning the construction of pumping stations along the main line canal from Amu Darya River intended for the

irrigation of Buhara and Karakul oases. Russian engineers at the Buhara-Afghan border near Kerki-Yola made the first experiments of irrigation in the Surkhandarya river valley in 1855 where Termez city was later constructed. Later the construction of water reservoirs from the Tupolang, Karatag and Sherabad rivers commenced here as well.

Lyman D. Wilbur, an American engineer, reported on his irrigation engineering jobs under the two-year contract with the Soviet Union in "Surveying through Khoresm, a journey into parts of Asiatic Russia which had been closed to western travelers since the World War" (*The National Geographic Magazine*, 1932, p753-780.). Two other Americans, Arthur P. Davis, who was a director of the United States Reclamation Service from 1914 to 1923, and V. V. Tchikoff, worked on the same project with Wilbur. At that time, the Russian government was interested in increasing cotton production. They found its soil and climate well suited to cotton growing in Amu Darya river basin, and started thinking about means of bringing water to the lands using modern irrigation technology.

The large-scale irrigation system development still continues to be improved within all territories of Uzbekistan. The contemporary water economy of the Republic of Uzbekistan has under its responsibility more than 267 irrigation systems, 129 thousand hydro-technical constructions, 1,860 pumping stations, and 39 water reservoirs with a total capacity of 57.5km^3 (Nigmadjanov, 2001.) The basic out-dated equipment that generates large losses of water has been applied to the majority of old irrigated lands in Uzbekistan due to difficulties of the transition period. It was determined that 10% of various hydraulic engineering systems, hydro technical constructions, and more than 20% from closed collectors and drain networks on all their extent require technical reconstruction. Nowadays 50% of irrigated lands and irrigation systems require improvement, physical repairs of the canal system, restoration and modernization of many pump stations, collector-drainage systems, and introduction of new cost-effective water protection technologies. Improving the institutional environment for canal operations, controlling outputs and computerizing the process are urgently needed.

In our opinion, the design process of larger irrigation systems is best conceived as a socio-technical process rather than a purely technical process. It should be based on a dialogue with water users and designs that are simple to maintain and operate. It should also use low-cost materials, and should be driven by local demands. A comparative analysis of different strategies for rehabilitation, reconstruction and modernization of irrigation systems in Uzbekistan indicated that more attention to institutional strengthening, involvement of water users in planning and implementation of improvements, made such projects far more cost-effective.

2. Irrigated Agriculture Development

Uzbek irrigated agriculture is characterized as high average crop yields compared with those of other Central Asian riparian countries. This apparent success can be attributed to excess use of water resources that are currently at a degree just to satisfy demands in most places. This situation to meet agricultural water demands is remarkable in view of Uzbekistan's total dependence on irrigation water from Amu Darya, Syr Darya and other rivers. There is increasing pressure on its limited water supply. Nevertheless, there are excellent opportunities for adding to the value of agricultural outputs especially in the plains and foothill areas. On the other hands, several trends show a future likelihood that the productive agriculture of the Amu Darya Basin would have a hard time.

There are different types of irrigation technology that were still applied for the cultivation of various arable crops in the territory of Uzbekistan. All these irrigation technologies can be divided into two subgroups: superficial (furrow/grooved irrigation, strip irrigation, sprinkling, inundation or flooding irrigation, and drip irrigation) and subsurface types of irrigation.

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The Kattakum Desert represents low lands and sandy hills with elevation between 200m and 380m. It encloses heterogeneous environment comprising sand dunes, rarely gypseous flats and clay depressions. It undergoes extreme continental arid conditions, limited and unreliable winter precipitation (90-180 mm), and high level of evapotranspiration. Temperature in the desert extremely fluctuates daily, seasonally and annually. Soils contain low salinity and gypsum content. As a result of all theses extreme conditions, the Kattakum Desert has sparse and diverse psammophytic vegetation covers.

The distinctive features of Kattakum sandy desert in contrast to other Central Asian deserts are low humus content (0.3-0.6%), a high water infiltration rate, insignificant mobile substrate, condensation ability, and low salinity. All of these features are due to the sand properties. Nevertheless the gradual sedimentation of clayey particles from watering water (adjoin irrigated field) decreases deflation of sands. It also improves the water (moisture) holding capacity of soil. It facilitates the large accumulation of humus and nutritional elements into the soil. Moreover, the sandy substrate differs from other substrates. A favorable water regime provides a long period of growth for the vegetation because of easily available stored water in the soil profile.

A number of negative aspects affect the plant cover on sandy soils such as sand mobility that limits plant establishment, especially at the early stage of ontogenesis. Poor soil structure and low organic matter also appear. It is easily loosened with trampling by livestock's grazing.

A special crop rotation is taken into account over there. The cultivation of grapes, fruit trees, melon-guard crops and/or a different assortment of perennial drought/saline tolerant forage plants, especially from Gramineae is recommended for the agriculture development of very fragile sandy desert lands at the first stage of their reclamation. To irrigate such kind of crops, farmers use the artesian (fresh) water by drilling a hole (of about 50-60 m in depth) with water gradually collected (stock) into a special tower.

Opium poppy is a labor-intensive crop. Estimates suggest that approximately 350 person days are required to cultivate one hectare of opium poppy in Afghanistan, compared to approximately 41 person days per hectare for wheat. Harvesting alone is reported to require as much as 200 person days per hectare. Consequently, to spread the demand on both hired and family labor during the harvest period, households both cultivate different varieties of opium poppy with differing maturation periods, and stagger the planting of opium poppy. Poppies are harvested in March and April. However, despite using this method and all these efforts the majority of opium producing households still need hired labor during the opium poppy harvest.

On the other hand, the varying climatic zones within each of the opium poppy cultivating regions of Afghanistan means that the opium poppy harvest is often staggered, reaching different areas at slightly different times. Consequently, for those who are willing and able to travel during the harvest season, opium poppy provides a valuable source of off-farm income. Therefore opium poppy provides an important source of livelihood not only for those who own the land but also for those that are employed to work the land on a short-term basis.

Most of workers on opium field would sell the opium they were paid in the local bazaar once they had completed each harvest, and few farmers store their opium for any period of time despite the increase in opium prices that are experienced in the post harvest period, suggesting that the income generated from their work is used to satisfy more immediate needs. Moreover, the majority of harvesters use the income they earn from the opium harvest for purchasing basic necessities including wheat, clothes, sugar and tea and few invest the income generated for productive purposes. This would also suggest that the income derived from working as a harvester is an important contribution to household livelihood strategies.

3. History of subsurface irrigation use

Many of the local and foreign experts consider the subsurface irrigation system available today as one of the most rational and effective irrigation technologies. The subsurface irrigation concept has more than a century of history. In many advanced countries, scientists have studied this advantageous type of irrigation for many years. In the Soviet Union, the study of subsurface irrigation began in 1923. Subsurface irrigation didn't find wide application until 1950's due to a lack of access to cheap and durable materials required for installation and maintenance. This irrigation system has been developed on a large-scale on the serosems soil in Ukraine, Caucasus and to a lesser extent in Central Asian countries.

B.G. Kornev and A.N. Kostyakov have conducted many years of research to promote this system and adapt it to the conditions of Uzbekistan. Firstly, the moistened polyethylene perforated tube system was applied in 1967 in Tashkent region on the experimental plots of All Union Institute of Agriculture. In 1970, the systematic scientific research on the application of subsurface irrigation system started during the agricultural development of Golodnaya steppe virgin lands. This type of new technology was used for the cultivation of traditional crops, in particular cotton in many collective farms there. In the territory of Syr Darya region, the collective farm under the name of K. Voroshilov has only a single function today. In this region, the area of more than 120ha continued to use and test a subsurface irrigation system. Long-time exploitation of subsurface irrigation by Voroshilov Sherkat' farmers demonstrate the necessity of constructing a settling tank to avoid the untimely up-silting of the perforated tubular pipe system. The cleaning of the pipe system after 3-5 years of exploitation is recommended in that case.

4. The principles and mechanism of subsurface irrigation

Subsurface irrigation involves the supply of water to crops through special moistened pipes laid in rows in arable lands. Water flows in these pipes due to a low-pressure head, and water moves vertically to the plant's root system due to the soaking up force of the soil (capillary pressure). It is possible to adjust the subsurface irrigation system precisely to allow air-moisture soil conditions as well.

Settling-tanks should be constructed before the installation of any pipe system. Their mechanism of work is connected with the sedimentation of mechanical silt/dust particles, as well as precipitation of many heavy cations (Al, Mg, Ca etc.) that easily lead to the up silting and/or corking of tubular pipes. The use of clean/pure and non-saline water is more efficient particularly for the development of subsurface irrigation system in Uzbekistan.

For such purposes, the artesian water (natural springs) gushing out from a 6.5-20m and more depth with a mineral content of 5-7g/l in the arid/semiarid zone can be applied for the cultivation of crops, grapes and fruit trees. It is very important to take the type of soil into account. High yield and good development of plants are anticipated when serosems, slightly clayey loam, and rare non-saline grey brown sandy soils are used under subsurface irrigation system. For instance, the annual yield capacity of cotton is 0.32-0.42 t/ha, sometimes more than 0.60 t/ha, which is 20% higher than after applying furrow irrigation.

The effectiveness of the subsurface irrigation system is also determined by crop variety and mostly by root system morphology. Cultivated fodder grain, legumes, melon and gourd crops respond positively to the subsurface irrigation while in fruit trees high ramification of their root system leads to the corking of pipe perforations. In such a case, drip irrigation seems to be one of the most effective technologies for viticulture and horticulture development. For

prevention of secondary soil salinization, crop rotation should be used. For example, it is recommended to harvest rice after other crops have been harvested for 3-5 years.

Subsurface irrigation technology increases yield (usually more than 20%). It decreases water intake to 1.3-1.5 times less than that of furrow irrigation. It decreases evaporation that disturbs the treatment of soils under irrigation area. It can simplify the treatment of plants. It increases the efficiency of water-soluble fertilizer and oversimplifies its drilled fertilizing. The seasonal watering is automatically and easily controlled. The subsurface irrigation technology allows for control of the soil aerial-moisture regime. Long-term use of polyethylene pipes would save maintenance costs. Besides, it is a sustainable and technically viable irrigation method that can be applied for farming crop cultivation of steep slopes to prevent soils and water erosions.

In the Right Bank of Amu Darya, low-productive manual works of labors are still widely accepted with out-dated irrigation methods and technologies. Manually operated irrigation does not provide uniform distribution of irrigation water and irrigation rates often exceed crop water requirement in 1.5-2.0 times. This circumstance leads to low water and fertilizer use efficiency. It also negatively affects the environment (soil erosion, buildup of pesticides, and nutrient contamination of surface and groundwater sources, soil salinization and water-logging.) Hence, there is a need for promotion of efficient irrigation methods that would meet the requirements for sustainable water use, soil conservation and improvement of agriculture crop productivity.

New models of irrigation systems (sprinkler, conjunctive, subsurface drip irrigation, lift irrigation, and ground water utilization) have been tested in the region. New technologies on utilization of marginal water sources (recycled water, and drainage water) to improve crop rotations through crop diversification and conserve tillage practice that also cover new alternative crops and their varieties (grains, fodder legumes and other crops) have also been examined. One of the most progressive sprinkler irrigation systems including special sprinkling carts has been recently tested in Uzbekistan. In recent years, an Uzbek rural agriculture production system dependent on groundwater pumped from private tube wells has grown increasingly. Nevertheless, few studies have revealed how water markets should be operated and what the social and environmental consequences of privatization will be.

Crop farming in Amu Darya Delta, particularly rice cultivation with irrigation, is not competitive against other alternatives. Despite several subsequent reforms that aimed at maintaining grain production and keeping peasants in farming, farmers seemed to be worse off. Amu Darya Delta areas are gradually losing their productivity.

5. Agriculture in North Afghanistan

The Kyoto University Scientific Mission to Iranian Plateau and Hindukush has been conducted since 1955. The research team of the 5th Scientific Mission to Iranian Plateau and Hindukush left for Afghanistan in 1964. One of the objectives was to investigate agricultural districts in the provinces of Herat, Badghis, Faryab, Jawzjan, Balkh, Samangan, Kunduz, Takhar, and Badakhshan.

Double cropping was very common in those semi-arid regions. Farmers generally harvested wheat or barley in winter and cotton, beet, or melon in summer by lift brook irrigation. Irrigation canals we can see on the Right Bank of Amu Darya these days had hardly been seen there. “Qanat” or “karez”, which is a subsurface water channel, was used to provide drinking water to local residents but those water resources were not enough to harvest crops. Single crop rice fields with bunded irrigation were seen near the cities of Khanabad and Kunduz in Kunduz province. Bunded irrigation used temporal reservoirs surrounded by low height ditches (1~2m). When the level of river water was high in early summer, farmers built ditches near stream and

stored water for irrigation. Lift irrigation systems by waterwheel had hardly been seen in this area. That was because the slope of the river was very gentle even though the volume of water was rich. Permanent canals were not seen either. Large-scale irrigation systems like those on the Right Bank of Amu Darya were not necessary for Afghan local agriculture to sustain the small local population.

The Right Bank of Amu Darya has been a highly productive land for irrigated agriculture. Besides, some new irrigation technologies such as subsurface drip irrigation are available to increase production and to improve yields of crops. These technologies also enable us to cultivate crops that we cannot cultivate with limited water resources in the semi-acid region so far. We assume that the Left Bank of Amu Darya possesses equivalent edaphic and agricultural potential compared with the Right Bank.

6. The framework of regional cooperation

There have been 2 international freshwater treaties for Amu Darya, signed by the Central Asian Republics. Neither of them included Afghanistan though. The first treaty was “Agreement on joint activities in addressing the Aral Sea and the zone around the Sea crisis, improving the environment, and enduring the social and economic development of the Aral Sea region (1993 Agreement),” signed on May 23, 1993. The second treaty was “Resolution of the Heads of States of the Central Asia on work of the EC of ICAS on implementation of Action Plan on improvement of ecological situation in the Aral Sea Basin for the 3-5 years to come with consideration of social and economic development of the region (1995 Agreement),” signed on May 3, 1995.

The 1993 Agreement consisted of 5 articles. This agreement basically said that republics knew there were some issues relevant to environmental degradation and inadequate water use in the Aral Sea basin. Hence, interstate coordination would be required to solve the issues. Nevertheless, water resources allocation was not covered in this treaty. Four intergovernmental institutions were approved by this agreement: the Interstate Council on the Aral Sea Basin (ICAS); the Executive Committee of ICAS (EC-ICAS); Commission of Social and Economic Development and Cooperation in Scientific, Technical, and Ecological Spheres; and Coordinating Commission on Water resources, acting as the Interstate Commission for Water Coordination (ICWC) in conformity with the agreement signed on February 18 in 1992. ICWC was responsible for water allocation throughout Central Asia. ICAS was charged with implementing the 1993 Agreement. One of the noteworthy points for this treaty was that Russia promised financial and technical assistance in water treatment in Article 3 though Russia did not sign the treaty. The other point was that the importance of legal framework such as international water law appeared on the interstate concern in the Preamble.

The 1995 agreement also consisted of 7 resolutions and 1 joint declaration. The joint declaration was composed of 5 articles. Those articles were the same as those in 1993. The seven resolutions contained the clarification of establishing the International Fund for the Aral Sea (IFAS), and the Executive Committee of IFAS (EC-IFAS). The new IFAS was established in 1997 as a successor to the former ICAS and IFAS. The International Fund for the Aral Sea (IFAS), 1994, provides funds for protection of Aral Sea. Setting up ICAS and EC-ICAS was the main purpose of this treaty.

7. The need for interstate coordination

A number of researches have been conducted by a variety of institutes and scholars for Amu Darya Basin since the dissolution of the Soviet Union. Most of them concluded that a legal and institutional framework was required for the cooperative management of scarce trans-

boundary water to resolve unsustainable economic practices, environmental degradation, and serious social problems in Amu Darya Basin. The first question should be whether or not this is true.

E.A. Chait (2000) has done an interesting analysis in his working paper, "Water Politics of Syr Darya Basin, Central Asia: Question of State Interests." According to his paper, the national leaders of the Central Asian Republics believed that the cooperative management over shared trans-boundary water resources was not a better option for achieving their own political and economic goals. The reason why they thought like that was the conservationist water management schemes proposed by the international organizations such as the World Bank and United Nations Development Program (UNDP). Those schemes did not fit the republics' agenda reflecting economical development. Besides, their ineffective continuous investments in regional institutions have disappointed national leaders and upper echelons of republics.

Many scholars have conceived that the current interstate coordination framework should be meliorated. McKinney and Karimov (1996) reported that there was a need to develop a basis for international water law to regulate the republics' relations, their rights and responsibilities, and coordinate their measures for interstate Amu Darya Basin administration, data collection for water allocation and common planning needs. In their contents, they placed an emphasis on pricing water properly to attain optimum water resources allocation. Vinogradov and Langford (1999) concluded that legal and institutional mechanisms played an increasingly important role in cooperative efforts to manage trans-boundary water resources in the Aral Sea basin, including Amu Darya Basin. The mechanism critical to achieve includes equitable and reasonable utilization. The obligation was not to cause significant harm to other republics and sustainable development. These criteria have been stated in Article 5, the Draft Articles of the Law of Non-Navigational Uses of International Water Courses, approved by the General Assembly of United Nations in 1997. They also described that the development of hydrocarbon resources could promote the solution of conflicts relevant to the difference between upstream power generation in Tajikistan and downstream irrigation in Uzbekistan and Turkmenistan in terms of seasonal demands for water.

International law in Amu Darya Basin should be developed to achieve the optimum trans-boundary water resources management. The law must be enforceable for any riparian states including Afghanistan located in the Left Bank of Amu Darya. Presence of free riders invalidates the law. Therefore Afghanistan must be contained in the interstate coordination.

8. Opium production and traffic routes

While much of the South East Asian crop finds its way to the United States, Europe is the main destination for heroin coming from Afghanistan. According to the US Drug Enforcement Agency (DEA) Afghanistan in 2000 produced more than 70% of the world's opium, and about 80% of the opiate products in Europe. Laboratories convert the raw opium into a morphine base, white heroin or brown heroin. These are then transported through a number of intermediate countries, where it is sometimes further refined and processed, and finally shipped to Europe and North America.

Even though the Taliban in Afghanistan almost stamped out poppy growing in the areas they controlled, they did almost nothing to stop the refining and export of heroin from huge stockpiles within their borders. Even some diplomats suggested the Taliban was simply trying to drive up the price of opium they had stockpiled. Some also suggested Afghanistan could do more by destroying drug stockpiles and heroin labs and arresting producers and traffickers. Following the military events after September 2001, large quantities of opiates were made available from illicit stocks. The availability of heroin originating in Afghanistan has remained high in the

region. Most of the drugs that reach the West now go out through Iran, which has about a million addicts of its own.

Political and military events after September 2001 have changed the situation of poppy fields and may further change it in the coming years. Illicit opium poppy cultivation increased in the parts of Afghanistan controlled by the Northern Alliance and recently has expanded to other districts, many of which are close to the northern border of Afghanistan. Opiates originating in Afghanistan continue to be smuggled into and through Iran and Pakistan. There has been a significant increase in the quantity of drugs from Afghanistan seized in some countries in Central Asia. Heroin seizures in Tajikistan have not decreased so far, though it is not known whether the confiscated narcotics had originated from "stocks", or whether they came directly from cultivated areas.

The colder climate of north Afghanistan usually delays the season farmers plant the poppy opium and so cultivation and also harvest takes place later than areas in the south.

The UNDCP is trying to evaluate the new situation in regions where poppies had been cultivated in 2001, in particular in areas that were controlled by the Northern Alliance at that time (3,000 hectares). These areas have increased following the fall of Taliban. In 2001, opium cultivation had fallen to an estimated 7606ha. But it is currently estimated by the UNDCP to be of the order of 45,000 – 65,000ha. Unlike the previous two years, farmers have said that climatic conditions were favourable. The resulting potential opium production could reach 240 metric tons.

The current government in Afghanistan has banned opium trade and also instituted an especial commission to follow this ban. This commission has approved a compensation of $ 350 US for burning every acre of land (about a fourth of a hectare in Afghanistan) under opium cultivation but this is not a considerable amount as such an area of land can produce 5 kilos of opium extract worth 240 US dollars. So Farmers could get 1200 US dollars if they sell the harvest of opium in the market. In a situation like this, they might bribe the government officials to keep the poppy cultivation on their land, and the current estimation of 3500-4000 tons of opium production point to the same possibility.

It is not just the household economical problems of Afghan farmers that keeps the opium farming running; as probably narcotics help finance fundamentalist groups in Central Asia, such as that of Juma Namangani, one of the founders of the Islamic Movement of Uzbekistan, whose bases are located in northern Afghanistan. After leading 750 men on an incursion into Kirgizstan in 1999 in an effort to reach Uzbekistan, Namangani had to retreat in the following year, but not before inflicting heavy losses on that country's police forces. He and his men then entered Afghanistan and changing strategies, infiltrated in small groups into northern and western Uzbekistan. This young warlord whose brutality is legendary, allegedly seeks to control the prime drug transit routes in order to increase his market "area", and thereby his power.

It is interesting to note that both the incursion in 2000 and that of 1999 came just after the opium harvest, as if their aim was to gain control of transit routes for the fruits of the harvest. While Ben Laden probably does not need to revert to drug money to finance his anti-Western struggle, this is not the case for those local warlords who hope to destabilize Central Asia. The potential for instability is still there!

We still can see all the ingredients for illicit opium cultivation in parts of Afghanistan: civil war, an absence of law and order and no alternative for farmers. The criminal gangs who control the refining and shipment of heroin are still very much in place.

9. Discussion

We are witnessing how the population of the Aral Sea Basin countries is continuously growing and the demand for fresh drinking water, local food production and more employment opportunities is gradually increasing. We are proposing a critical long-term resolution to achieve this aim. Agricultural development using Subsurface Drip Irrigation (SDI) for crops such as rice on the Left Bank of Amu Darya (Afghanistan) is what we suggest. The former Soviet Union and Central Asian Republics have irrigated the Right Bank of Amu Darya (Uzbekistan) since the end of the 19th century. On the contrary, the Left Bank of Amu Darya has been ignored though its soil, climatic and agricultural potentials are almost equal to the Right Bank. Our proposal is to build permanent food production systems on these forgotten dry lands to help feed Afghan people and to provide them with jobs.

Food assistance may temporary satisfy the Afghan's hunger, but it shall not resolve the absolute scarcity of food production. Long-term reconstruction and rehabilitation of domestic agriculture in Afghanistan is critical for the resolution. This is what we stand for and is the main purpose of this paper. Actually, several rehabilitation plans are ongoing. The United Nations Food and Agriculture Organization (FAO) have distributed 1500 tons of wheat seed to approximately 30,000 families in rural areas of northern Afghanistan. WFP is also set to shift the focus of its operations from relief to rehabilitation. WFP has announced a new nine-month emergency operation that uses innovative food aid projects to help millions of Afghans reestablish their shattered lives and build the future for their devastated country. This $285 million operation will provide Afghan people not only continuous emergency food aid, but also foundations for reconstructing the devastations by the three-year-drought and the two-decade-war. The operation will also fund a series of rapid impact programs designed to reconstruct basic infrastructures such as irrigation systems. Nevertheless, these irrigation systems require much water from watercourses including Amu Darya and its tributaries such as the Kunduz River, and the Pyandzh River. Afghanistan has not participated in the interstate agreement for trans-boundary water resources of Amu Darya. It is easy to infer what may happen next. Conflicts between Afghanistan and the Central Asian Republics may occur. In the worst case, these conflicts might bring another tragedy to Afghanistan. Therefore, it is inevitable to arrange the interstate coordination for trans-boundary water use among all riparian states before the rehabilitation plan for Afghan irrigation systems is promoted. There are some preconditions to make this proposal feasible as of engineering technology, political economics, international legitimacy and international law. We are suggesting practical resolutions that address the issues related to international legitimacy. We believe Afghanistan should be integrated within the framework of Amu Darya Basin water resources agreement to avoid inter-state water conflicts and to provide a stable and reasonable political climate for further reconstruction efforts in Afghanistan. The international community may have to donate more than $4.5 billion besides the above-mentioned funds to contribute to the Central Asian republics.

10. Conclusion

There are four conditions necessary to attain equitable, reasonable, and optimal utilization of Amu Darya river water resources among all riparian states. First of all, sophisticated interstate agreements for water use must be signed. Second, all riparian states: Uzbekistan, Tajikistan, Turkmenistan, and Afghanistan must participate in the agreement. Third, an independent institution with superior authority for water use of all participants must be founded. Without these conditions, we shall not be able to achieve effective reconstruction assistance to Afghani-

stan. Fourth, some of the Afghanistan Reconstruction Funds must be allocated to co-improvement of water use efficiency and agricultural development for all riparian States.

International Law Commission (ILC) had developed the draft articles on the law of the non-navigational uses of international watercourses in 1994. Then, the General Assembly of the UN approved the draft articles in 1997. These articles have become the common legislative framework for international watercourses since then, although they still seem deficient. Article 4 says that every watercourse state is entitled to participate in the negotiation, and to become a party to any watercourse agreement that applies to the entire international watercourse, as well as to participate in any relevant consultation. The second provision says that a watercourse state user of an international watercourse that may be affected to a significant extent by the implementation of a proposed water agreement that applies to only a part of the watercourse or to a particular project, program, or use is entitled to participate in consultations on, and in the negotiation of, such an agreement, to the extent that its use is thereby affected, and to become a party thereto. Therefore Afghanistan is entitled to participate in a proposed water agreement such as the 1993 Agreement and 1995 Agreement signed by the Central Asian states according to the Article 4.

An independent juristic body is required to settle an interstate dispute. Existing institutions such as ICWC, ICAS, and IFAS are not juristic institutions and are not able to prescribe interstate water law, do not have authority of compulsory execution, and settle disputes. They are not legislative organizations either. Since Central Asian Republics did not have a place for dispute settlement, a serious dispute occurred between Kyrgyzstan and Uzbekistan in 1997 due to the difference in seasonal water demands. Kyrgyzstan finally decided that most of its water resources would be introduced into hydroelectric power generations in 2001 to complement energy shortage.

To settle this kind of dispute, all riparian states must entrust authority of water allocation to the independent juristic institution whose major objective is to achieve equitable and optimal water resources allocation among all riparian states based on the sophisticated international water law. The institution should consist of independent judges and agents independent from riparian states. They can be of foreign origin such as Russia or Japan. Without the settlement system of dispute, it is very difficult for riparian states to achieve peaceful optimal water resources allocation.

Interstates coordination of water use by the independent juristic institution helps achieve optimal water resources allocation and peaceful settlement of disputes. Sophisticated interstate water law provides fair provisions. Funds must be provided to facilitate the above-mentioned activities to reconstruct Afghanistan and the Central Asian states.

It can also be concluded that addressing the serious drug control situation in Afghanistan needs the support and cooperation of the international community, in particular the neighboring countries. Achieving peace, security and development in Afghanistan is closely linked to the solving of the drug control problem.

The international community can address the opium problem in Afghanistan by assisting its agricultural economy to get back on the right path. Afghanistan needs a comprehensive strategy that can provide sustainable alternatives to poppy cultivation. Wheat, rice and cotton are the most widely touted alternatives to poppy for local farmers. But to flourish, production would need far more rain than the region has received, and large-scale improvement of irrigation facilities across the region is necessary.

The key is to mobilize resources from the international community to provide farmers with the irrigation, seed, fertilizer and machinery they need to raise alternative crops. Priorities

include repair of irrigation systems, provision of improved seeds and fertilizer, and assistance with market access.

With our short discussion on all the social, economical, political, and humane perspectives of the opium issue, the importance of providing a competent system of irrigation for the farmers living in north Afghanistan could not be overemphasized, considering the potentials of Amu Darya river to support a healthy and strong agriculture on its left bank.

Also credit must be offered to local farmers to help them escape the debt trap. Many farmers are in debt to local drug lords who are demanding they grow poppy. Even farmers who cultivate cereals are struggling to feed themselves, as their entire crop is taken to repay the debts they have accumulated. Apart from a long-term restructuring plan, they also need immediate assistance.

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