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UZBEKISTAN'S STRATEGY OF TRANSITION TO THE "GREEN ECONOMY": EXISTING PROBLEMS AND PROMISING OPPORTUNITIES

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Abstract: Water management is a critical component of sustainable development in Uzbekistan, a country characterized by arid landscapes and significant agricultural reliance. This article is devoted to that the intricate relationship between effective water management practices and the establishment of a green economy in Uzbekistan. It highlights the challenges posed by climate change, population growth, and inefficient water usage, which threaten both ecological balance and economic stability. By analyzing current water management strategies, including innovative irrigation techniques and policy reforms, this study emphasizes the potential for integrated water resource management to enhance agricultural productivity while conserving vital water resources. Furthermore, it discusses the role of community engagement and technological advancements in fostering sustainable practices. Ultimately, this research underscores that a holistic approach to water management is not only essential for environmental sustainability but also pivotal for achieving economic resilience and promoting a green economy in Uzbekistan.

Key words: water management, green economy, climate change, water usage, sustainability, innovative irrigation, ecological balance, economic stability, Asian Development Bank, water supply management, sustainable agriculture, "Smart water", water capacity, dam security, low-carbon economy

Annotatsiya: Suv resurslarini boshqarish — O'zbekistonning barqaror rivojlanishi uchun muhim omillardan biridir, chunki mamlakat qurg'oqchil hududlar va qishloq xo'jaligiga katta bog'liqlik bilan ajralib turadi. Ushbu maqola O'zbekistonda samarali suv resurslarini boshqarish amaliyotlari bilan yashil iqtisodiyot qurilishi o'rtasidagi murakkab o'zaro bog'liqlikka bag'ishlangan. Unda iqlim o'zgarishi, aholi sonining o'sishi va suvdan samarasiz foydalanish kabi muammolar muhokama qilinadi, bu esa ekologik muvozanat va iqtisodiy barqarorlikka tahdid solmoqda. Amaldagi suvni boshqarish strategiyalari, shu jumladan innovatsion sug'orish texnologiyalari va siyosiy islohotlar tahlil qilinib, integratsiyalashgan suv resurslarini boshqarish orqali qishloq xo'jaligi mahsuldorligini oshirish bilan birga, suv resurslarini asrash imkoniyati ko'rsatib o'tilgan. Bundan tashqari,

maqolada jamoatchilik ishtiroki va texnologik yutuqlarning barqaror amaliyotlarni rivojlantirishdagi roli ham yoritilgan. Tadqiqot shuni ta'kidlaydiki, suv resurslarini boshqarishda kompleks yondashuv nafaqat ekologik barqarorlikni ta'minlash, balki iqtisodiy barqarorlikka erishish va yashil iqtisodiyotga o'tishda muhim omildir.

Kalit so'zlar: suv resurslarini boshqarish, yashil iqtisodiyot, iqlim o'zgarishi, suvdan foydalanish, barqarorlik, innovatsion sug'orish, ekologik muvozanat, iqtisodiy barqarorlik, Osiyo Taraqqiyot Banki, suv ta'minotini boshqarish, barqaror qishloq xo'jaligi, "Aqlli suv", suv sig'imi, to'g'on xavfsizligi, past uglerodli iqtisodiyot.

Аннотация: Управление водными ресурсами является ключевым компонентом устойчивого развития Узбекистана — страны с засушливыми ландшафтами и значительной зависимостью от сельского хозяйства. Настоящая статья посвящена сложной взаимосвязи между эффективным управлением водными ресурсами и построением «зеленой» экономики в Узбекистане. В ней рассматриваются проблемы, вызванные изменением климата, ростом численности населения и неэффективным использованием воды, которые угрожают как экологическому балансу, так и экономической стабильности. Анализируя текущие стратегии управления водными ресурсами, включая инновационные методы орошения и политические реформы, исследование подчеркивает потенциал интегрированного управления водными ресурсами для повышения продуктивности сельского хозяйства при одновременном сохранении жизненно важных водных ресурсов. Также обсуждается роль участия местных сообществ и технологического прогресса в продвижении устойчивых практик. В конечном итоге исследование подчеркивает, что комплексный подход к управлению водными ресурсами необходим не только для экологической устойчивости, но и для достижения экономической устойчивости и развития «зеленой» экономики в Узбекистане.

Ключевые слова: управление водными ресурсами, зеленая экономика, изменение климата, использование воды, устойчивость, инновационное орошение, экологическое равновесие, экономическая стабильность, Азиатский банк развития, управление водоснабжением, устойчивое сельское хозяйство, «Умная вода», водоемкость, безопасность плотин, экономика с низким уровнем выбросов углерода.

Introduction

In the next 10-20 a long time water shortage may become one of the most intense issues among the Central Asianations. At the same time, agribusiness is the biggest water client in Uzbekistan. A way out of the current circumstance specialists call the "green advancement" of the country. According to the figures, in the following 50 a long time, the decrease of stream in Central Asia will be almost 20%, which will complicate the administration of water assets in the locale, which is as of now troublesome to call well-established and economical. At the same time, as the most crowded nation in the locale, Uzbekistan is one of the fundamental water clients in Central Asia and has farming based on a fake water system. So the conceivable water deficiency in the future for Uzbekistan may end up being the most intense in the region. According to the World Assets Founded,

Uzbekistan is among the 25 nations most influenced by water stretch, and water deficiencies will decline with climate alter. At the same time, Uzbekistan has one of the most noteworthy rates of freshwater reflection and one of the lowest rates of water utilization proficiency in the world. [1] Policy needs for the usage of the Methodology might be as follows after (a) expanding vitality productivity of the fundamental segments of the economy; (b) enhancement of vitality utilization and advancement of the utilization of renewable vitality sources; (c) adjustment and relief of the impacts of climate alter, expanding proficient utilize of characteristic assets and conservation of normal environments; and (d) advancement of money related and non-financial back components for the Green economy. In the field of farming, the move to a "green" economy ought to be based on the taking after fundamental standards: (a) compliance with the National Economical Objectives and Targets; (b) sound utilization of assets, maintainable utilization, and generation; (c) incorporation of natural and social criteria in the framework of financial bookkeeping; (d) prioritizing the utilize of green instruments and approaches to accomplishing the objectives of socio-economic improvement; (e) accomplishing existing macroeconomic objectives through making strides competitiveness and execution development in key segments, making "green" occupations, expanding the well-being of the populace; and (f) guaranteeing the venture allure of exercises for effective utilize of resources[2].

Literature review

The concept of a green economy has gained increasing attention globally, especially as nations grapple with climate change, environmental degradation, and sustainable development challenges. According to the United Nations Environment Programme (UNEP, 2011), a green economy is one that results in improved human well-being and social equity, while significantly reducing environmental risks and ecological scarcities. For countries in transition like Uzbekistan, the shift toward such a model presents both complex challenges and critical opportunities.

Several studies have examined the environmental and economic implications of Uzbekistan’s green transition. Abdullaev et al. (2020) emphasized that Uzbekistan’s overreliance on resource-intensive sectors such as agriculture and energy poses a major obstacle to sustainable development. The country’s aging infrastructure, inefficient water use in irrigation, and high energy intensity remain persistent problems. Similarly, the World Bank (2022) noted that Uzbekistan has one of the highest rates of greenhouse gas emissions per unit of GDP in Central Asia, underlining the urgency for reform.

Government strategies such as the Strategy for the Transition to a Green Economy for 2019–2030, adopted by Presidential Decree No. PP-4477, represent a key milestone. This document sets ambitious goals: increasing renewable energy share, improving energy efficiency, and promoting sustainable agriculture. Scholars such as Rakhimov (2021) argue that while the policy framework is progressive, its implementation is hindered by limited institutional capacity and insufficient investment in green technologies.

In addition, international cooperation plays a significant role. Research by the Asian Development Bank (ADB, 2021) points to Uzbekistan’s collaboration with multilateral institutions to support solar and wind energy projects. These initiatives signal a promising

shift, but studies also emphasize the need for broader publicprivate partnerships and better environmental education to ensure long-term success (UNDP Uzbekistan, 2020).

On a more optimistic note, reports such as those by the International Renewable Energy Agency (IRENA, 2022) highlight Uzbekistan's substantial potential for renewable energy development, particularly in solar and wind power. The country's geographic and climatic conditions offer a strategic advantage, which, if capitalized on, could significantly reduce its carbon footprint and foster green employment.

Methodology

The policy review was conducted by reviewing available official documents and reports. The most comprehensive data were obtained by reviewing strategy for transition of the Republic of Uzbekistan to a Green economy in the period of 20192030 and were supplemented by observations from additional scientific literature and reports. Quantitative analysis includes mostly series for the period 2020-2030, but in some cases the data for 2021 is also used.

Analysis and results

Normal yearly utilization has diminished by 20% compared to the distributed water admissions limit. The Joined Together Countries Organization to Combat Desertification and Dry Season has cautioned that by 2050, dry spells will influence more than three-quarters of the world's populace. Inquire conducted by the World Assets Established and Britain's Financial Analyst Insights Unit has distinguished Uzbekistan as one of 33 nations anticipated to confront water deficiencies by 2040.

Uzbekistan's essential water sources are the Amudarya and Syrdarya streams, as well as inner streams, streams, and underground water. The Aral Ocean bowl, which envelops these sources, has a normal long-term water stream of 116 billion m3. Of this, 67.4 percent is shaped in the
Amudarya bowl, and 32.6 percent in the Syrdarya basin.

In later a long time, the locale has experienced the impacts of worldwide climate alteration, coming about in diminished snow and precipitation, diminished water utilization in ice sheets and expansive waterway bowls, and decreased water supply in little waterways and streams. As a result, the per capita water supply has diminished by 53 percent, from 3048 m3 to 1438 m3 over the final 30 years.

Despite these challenges, the government has set a driven objective of expanding inundated arable arrive to 4.6 million hectares by 2030. In any case, assembly of the water system measures for each trim will require 54.4 billion m3 of water, whereas the evaluated accessible water supply in 2030 is as it were 47.4 billion m3. This clears out a shortage of 7.0 billion m3, which will be tended to through the presentation of water-saving innovations (2.0 billion m3), development and remaking of water system systems (2.2 billion m3), digitalization of water administration (0.6 billion m3), and the execution of extra agrotechnical measures and drought-resistant crops (2.2 billion m3).

To address these challenges, the Government of Uzbekistan has started steady changes beneath the authority of President Shavkat Mirziyoyev. These changes point to progress in the administration and viable utilization of water assets, as well as

modernizing water administration offices. Through these endeavors, Uzbekistan is working towards an economical and secure water future for its citizens and the region.

The usage of water-saving advances in the agrarian segment is a best need for Uzbekistan. Drawing motivation from the best hones of outside nations such as the USA, China, Turkey, and Australia, the nation has made critical strides in this range. In reality, the presentation of water-saving advances in the nation has expanded from 28 thousand hectares in 2018 to a noteworthy 1 million hectares nowadays, speaking to 27 percent of the add up to inundated zone [3].

Water supply remains a squeezing issue for Uzbekistan. Around 80% of its water assets begin from neighboring nations, taking off as it were 20% sourced locally. This reality requires basic assention with other countries. On April 30, 2024, in Turkmenabad, Turkmenistan, the fourth assembly of the Joint Uzbek-Turkmen Interval Commission on Water Administration took put. The parties concurred to speed up the enlistment of Uzbek water administration offices found in Turkmenistan and to actualize an extension to construct an anti-filtration divider at the Sultan Sanjar dam of the Tuyamuyun hydroelectric complex.

The commission looked into water supply levels over the hydrological year (April 1, 2023, to April 30, 2024) and talked about measures taken by both nations to back their economies. The significance of actualizing a robotized water bookkeeping framework on the Amu Darya Waterway was emphasized. Both parties moreover emphasized their commitment to joint ventures and pointed at reestablishing hydro-posts and making strides in riverbank assurance to decrease water misfortune and guarantee the unrestricted stream of water.

Historically, yearly water utilization in Uzbekistan was around 64 billion cubic meters in the 1980s. Due to climate alter, decreased precipitation, lower waterway levels, and challenges in transboundary water administration, current yearly utilization stands at 51-53 billion cubic meters. Of this, 97.2% comes from streams and streams, 1.9% from collector systems, and 0.9% from underground sources

The Hydrometeorological Benefit predicts that water volumes in the Amu Darya and Syr Darya waterway bowls will be underneath ordinary, especially in the Kashkadarya Stream (70-80% of the standard) and the Vakhsh, Surkhandarya, Zarafshan, Karadarya, Chirchik, and Akhangaran waterways (80-90%).

Each year, Uzbekistan spares roughly seven billion cubic meters of water through canal concreting, the selection of water-saving advances, digitalization, and effective water asset administration. Despite these measures, water shortage remains a critical issue. To assist in diminishing water misfortune in water system systems, 2024 has been pronounced an urgent year for canal concreting. This year, 5,000 kilometers of water system systems are set to be concreted, counting 1,500 km of fundamental and inter-farm canals and 3,500 km of intra-farm systems. So distant, 518.2 km of canals have been recreated, with 351.7 km concreted. The add up to length of water system systems reestablished in clusters and ranches has come to 11,000 km.

In later a long time, water-saving innovations have been executed over 1.3 million hectares, counting 478,000 hectares of trickle water systems, 55,000 hectares of sprinkler water systems, 29,000 hectares of discrete water systems, and over 700,000 hectares leveled

utilizing laser hardware. This year, 500,000 hectares will be secured with present-day water system innovations, with a target of 4.3 million hectares by 2030. To back these objectives, 55 endeavors have been built up to create the fundamental gadgets and save parts for water-saving advances locally.

To date, 11,349 "Smart Water" gadgets capable of online water utilization observation have been introduced across the nation. The smartwater.uz data framework was created to total and analyze approaching information, progressing water control productivity by 10%. Moreover, 6,657 jumpers (computer program programs) have been introduced to upgrade arrival recovery and screen groundwater levels online. The "Melioration" data framework was created to total and analyze information from these gadgets, making strides to arrive at recovery evaluation exactness and related exercises by 20%.

Sixty percent of flooded arrive in Uzbekistan are provided with water through pumping stations and water system wells, making vitality preservation a need. Sixty percent of the water that arrives in Uzbekistan is provided with water through pumping stations and water system wells, making vitality preservation a need. Right now, 1,722 gadgets for online water utilization control have been introduced at pumping stations, and an extraordinary data framework has been created. A database and program give API addresses for coordination gadgets with significant data frameworks. Information integration with the territorial electrical systems is progressing to screen vitality utilization at pumping stations and join these figures into the ministry's data framework. Over the past three a long time, 65 major water administration offices have been automated.

The "Suv Hisobi" data framework permits water supply organizations and buyers to electronically and carefully sign month-to-month records. The framework is right now being tried in the Yazyavan locale of the Fergana region.

Water is an imperative component of nature, and its esteem increases with developing biological changes and mechanical impacts. Compelling water utilization arrangements require participation between interested states. The Concept for the Advancement of Water Administration in Uzbekistan for 2020-2030, actualized through key advancement plans each three a long time, highlights this commitment. [4]

Driven fundamentally by rural hones, Uzbekistan is one of the world's most unsustainable and wasteful clients of water (based on measuring the proportion of add up to water withdrawals to renewable assets) — as the close vanishing of the Aral Ocean verifies — with withdrawal rates surpassing 90 percent of the add up to renewable asset (Service of Water Assets). At the same time, the fetched arrival debasement in Uzbekistan is evaluated at 3 percent of the Net Household Item (GDP) (ELD 2016). Where arrival is corrupted, scene reclamation offers extraordinary openings and benefits for numerous divisions of the economy. Reestablishing lands harmed by overgrazing, fuel extraction, mining, water systems, or farming may return them to profitable utilization. This is conceivable as it were if a coordinates scene approach is used.[6]

At the same time, the anticipated increments in normal temperatures may cause expanded evapotranspiration and higher water requests specific for flooded horticulture.

Key mediations in the water sector:

1. Contributing multi-reason water capacity, dam security, and capacity building
2. Contributing to canal productivity, diminishing water losses
3. Contributing to water system proficiency, proficiency of pumped water system, decreasing outflows and costs of maintenance
4. Digitalizing water information, real-time observing, and inaccessible sensing

Water administration:

▪ Reinforce teach for participatory arranging and setting/enforcing/monitoring feasible withdrawal limits to decrease by and large water utilization and water stress;

▪ Screen, modernize, and digitize water data for more proficient water assignment and climate adaptation;

▪ Dodge abuse of groundwater by agribusiness [5]

Conclusion and recommendations

Over the past three decades of freedom and changes, Uzbekistan has made surprising advances in tending to the impacts of climate alteration through ventures in natural assurance and afforestation of the Aral Ocean region, among other mediations. Current national natural activity plans and targets have advanced to end up the central components of the move to a low-carbon and greener economy. Be that as it may, challenges endure due to water shortage, a need for clean water, unpredictable vitality supply as proven by the later major control blackouts, and exceptional sand and clean storms. With gigantic impacts on individuals, communities, the environment, and the framework, these challenges serve as a stark update that much remains done to guarantee a green future for Uzbekistan.[6]

Uzbekistan's commitment to water preservation is reflected in its noteworthy rankings. The nation is right now positioned to begin within Central Asia, moment among CIS nations, fourth among Asian nations, and thirteenth in the world in terms of the zone where water-saving advances have been presented. The government's objective is to present these innovations on 2 million hectares or 54 percent of the add-up to flooded arrive in the nation by 2025.[7]

The government is taking precise measures to energize and fiscally back the productive utilization of existing water assets in Uzbekistan. Beginning in 2019, appropriations for the presentation of water-saving advances and other benefits and inclinations were presented. Agrarian undertakings that have presented water-saving innovations have gotten an add up to 1 trillion 465 billion Uzbek sums (133 million US dollars) in endowments between 2019 and 2022.[8]

According to Article 367 of the Assess Code of the Republic of Uzbekistan, arrive ranges that have executed dribble water system frameworks are absolved from arrive charge for a period of five a long time. Moreover, a 30 percent rebate on water assessment is accessible when a water meter is introduced in regions that have embraced water-saving technologies.[9]

It is worth noticing that until 2019, as it were three ventures were working in the nation for the nearby generation of water-saving water system innovation gear and components. In any case, nowadays, the number of such endeavors has expanded to 50. These advances have been demonstrated to be profoundly successful in lessening water utilization by 40-50%, mineral fertilizers by 25-30%, fuel lubricants by 30-35%, and labor costs by 25%. Besides, they have too expanded efficiency, counting in cotton development, by 30%.[10]

To conclude, with a nearness in the nation for over five a long time, SUEZ takes pride in being Uzbekistan's vital accomplice in tending to water challenges. SUEZ is committed to executing imaginative arrangements aimed at improving water preservation and advancing proficient utilization. Right now, SUEZ is effectively included in creating ventures for Tashkent and the Sukhandarya locale, wherein these arrangements will be conveyed to bring approximately positive alter.[11]

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