Historical evolution of water resource management terminology in central asia's linguistic landscape

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Abstract

It is water that has shaped the development of East-Central Asian civilizations. This region is known to be arid and heavily reliant on sophisticated irrigation systems. The current study attempts to reconstruct the history of water terminology in the region's diverse language groups, including Turkic, Persian, Arabic and Russian. The research traces the vocabulary used in legal documents, administrative and oral histories from ancient to Soviet and post-Soviet periods, revealing the political, technological and cultural influences on rhetoric of water management vocabulary. The analysis demonstrates that words like aryk (irrigation canal), mirab (water manager) and vodokhozyaystvo (water economy) tell the story of paradigm shifts in resource governance - from stewardship to centralized planning. In addition, the paper discusses the uses of language as instruments of power and power's adaptation, where terms had been coined, blended or made to fit institutions in new forms which were intended to give enhanced flexibility. These layers of meaning provide an insight into the socio-political narrative not only in Central Asia but also on sustainable water management discourse at present. These shifts in terminology define the region's environmental heritage alongside the notion that culturally rooted concepts of water governance remains indispensable.

Keywords: Historical, Evolution, Water resource management, Terminology, Central asia, Linguistic landscape, Cultural influence

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Introduction

History about the Management of Water Resources in Central Asia

In the map, the part known as Central Asia is characterized by semi-arid and arid regions. Due to the climate, human settlements around the region of Central Asia have been developed throughout the ages. Because the people of the country needed more water, rivers such as Amu Darya and Syr Darya were built to support melt from the Pamir and Tien Shan mountains (Petrov, 2016). The historical realities of the mencius region from ancient Harizm, Sogdiana, the Golden Islamic era, until the Tsarist and Soviet times show that both practically and unnaturally water resources were controllable (Wegerich, 2010; Yang and Entebang, 2024). The prolonged diversion of water from the sea caused disastrous poorly reasoned cross-border attempts at water control, illustrating the bounded need to grasp the policies and keywords alluding to their water policy in Zonn's work (Zonn, Kostianoy, Glantz and Kosarev, 2009).

Understanding the Development of Terms and Their Relevance Within The Language Framework

Communication manifests differently in different societies in historical perspectives (Uvarajan, 2024). With regard to Central Asia, Its terminology about water reveals the flowing power relations and the administrative culture of different epochs. For example, the Turkic aryk, the Persian-derived mirab (irrigation official), and vodokhozyaystvo (water economy) in Russian denotes some sort of management Ayk (mirab), Aik (vodokhozyaystvo)—all signify different periods of management from decentralized community based control to centralized bureaucratic administration, And Ayk (mirab) denoting the extreme centralization (Schoeller-Schletter, 2008). Evolutionary analysis of such terms assists one trace changes in the society's structure and politics. Further, the interlinguistic diversity within Central Asia, such as Turkic languages (Kazakh, Uzbek), Persian (Tajik), Arabic (through Islam scholarship), and even Russian from the Soviet period, creates as ordered yet richer tapestry of terminology. Every language not only added new words, but frequently used pre-existing ones in novel and different ways. These changes in meanings are central for the disentangling of the understanding, legitimacies, and practices surrounding water governance across different times and places (Dickens 2011; Prasath, 2024). Especially during the Soviet and post-Soviet decades, ideologization shaped discourse on water not only in the syntactic, but also in the lexical, geography of the text, which suppressed the use of local words (Kudaibergenova 2015; Muralidharan, 2024).

Figure 1(a): Geographic and linguistic landscape of water resource management in central asia.

Source: AI Based Generated

This image (Figure 1(a)) contains a thematic map of Central Asia showcasing the amalgamation of geography, hydrology, and the ethno-linguistic mosaic of the area. It depicts important countries like Kazakhstan, Uzbekistan, Turkmenistan, Kyrgyzstan, and Tajikistan, superimposed with important transboundary rivers, especially the Amu Darya and Syr Darya, which are essential for the sustenance of life in the region. Stressed water zones are highlighted in orange, suggesting high resource concern regions. It also notes the leading languages in each of the countries such as Kazakh, Uzbek, Tajik, and Russian, thereby accentuating the multifaceted nature of governance over water. The need for effective water governance is further complicated by geographical fragmentation and sociolinguistic heterogeneity, which are visually represented in the map. Physio-geographical features coupled with sociolinguistic delineations bolster the argument of the paper, as these regions are shown to require substantially different approaches to water management in Central Asia due to divergent historical, infrastructural, and cultural factors.

Objectives of the Research Paper

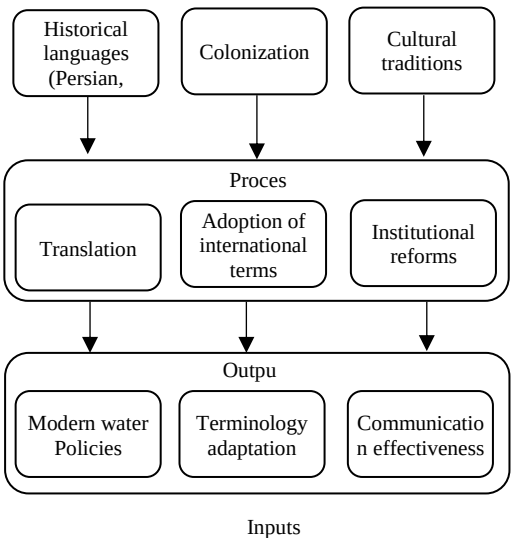

Figure 1(b): Conceptual framework of linguistic evolution and water governance.

The diagram (Figure 1(b)) presents a concept model depicting a water governance framework that fuses policy development with the history of language change. It starts with factors as inputs in the form of previous languages like Persian, Arabic, and Russian, colonization, and deeply rooted cultural

customs. These components form the basic socio-political and linguistic structure. These influences are captured into mechanisms of action through changes on translation and the adoption of international terminologies, which later institutional changes. In the end, the outcomes comprise modern water policies, contemporary governance adapted terminology, revised modern versions of policies, and enhanced communication among stakeholders. This model illustrates how and in what ways historical and linguistic factors transform water governance systems.

The aim of this research is to document the development of terminology pertaining to the management of water resources in Central Asia within its poly-linguistic setting (Raman *et al.,* 2024; Topalova *et al.,* 2024). It seeks particularly to trace the emergence, evolution, and extinction of terminologies pertaining to water governance throughout major historical periods: pre-Islamic, Islamic, Tsarist, Soviet, and post-Soviet (Unger, 2024; Veerappan, 2023). Through the scrutiny of legal documents, administrative literature, oral histories, and historiographical dictionaries, the current research positions language as a measure of, and a means to, social and institutional change. The objectives of this study are twofold: first, to give a sociopolitical context of significant hydrosophic terms in their historical development; second, to facilitate the understanding of the role of culture in contemporary water governance (Bazarova *et al.,* 2024). With this, the study adds to literature on historical linguistics and environmental governance, as it sheds light on the significance of terminology in uniting people, authority, and resources (Sehring 2009; Abdullaev and Rakhmatullaev 2016). Central Asia has become a water management failure poster child with the Aral Sea catastrophe, exposing the central planning and environmental blindness wrecks (Micklin, 2007; Nakamura and O'Donnell, 2025). This paper aims to explore the history of terminology associated with water governance to aid efforts at achieving effective sustainable management, especially with an ever-increasing climate change, and cross-border conflicts in Central Asia. Understanding the discourse on water considers sociolinguistic elements which may further improve future policies (Kimmage, 2008).

History of Water Resource Management Terminology in Central Asia

Classic Wordings Employed by Indigenous Groups

Indigenous societies in Central Asia developed complex systems for managing water resources long before foreign powers set foot in the region. These systems were expressed in a specific terminology based on Turkic, Persian, and local dialects. Within oases societies and pastoralist communities, terms such as aryk (irrigation ditch), suvchilar (water users), and mirab (water distribution officer) were prevalent (Babaev, 1985; Zhang and Rodriguez, 2023). These concepts symbolized social organization based on cooperation and customary laws tempered with social norms (Kudabaev, 2003). The mirab exemplifies this duality – a skilled practitioner and a community leader

elected for his equity and circulation knowledge. In fully nomadic or semi-nomadic cultures, bulak (spring), suv (fresh water), and tuzlu suv (salty water) are classified fresh water terms. Vocabulary was often linked to seasonal migrations and clan level governance, underscoring the importance of oral traditions to clan-centered society (Khazanov, 1994). The governance of water resources was intertwined with indigenous customary law (adat) and sharia (Islamic law), which placed authoritative linguistic traces (Snesarev, 1969).

The Impact of External Forces on Vocabulary

The integration of Central Asia under a series of empires; Arabic, Mongolian, Tsarist Russian, and even Soviet, markedly shaped the region's water management vocabulary. The Islamic incursion brought along with it Arabic administrative and religious vocabulary including waqf (endowment for public benefit), which frequently accompanied the creation and upkeep of water systems (Nadzhafov, 1989). Bosworth (2007) argues that Persian's impact was mostly felt through its administrative language and terms associated with irrigation in places like Samarkand and Bukhara (Ranjkesh and Ziabari, 2016). The period of Tsarist rule saw the emergence of Russian as the formal administrative language. Russian expressions came to dominate local ones, with expressions such as kanal (canal), vodoprovod (water supply system), and melioratsiya (land improvement) officially adopted (Kalinina, 1996). This shift resulted in greater alienation of local knowledge systems and contributed to the bureaucratic gulf that existed between local water users and state administrators (Gorshenina, 2012). The Soviet era mortared this shift even further, as industrial and centralized practices dominated water management (Anand and Shrivastava, 2024). Reflecting Marxist developmental priorities, Soviet engineers and planners introduced standardized words to describe practices such as vodokhozyaystvo (water economy) and gidromelioratsiya (hydroamelioration) (Sultanov, 1981; Vasquez and Mendoza, 2024). Formal education in the Soviet Union came with a constructed scientific vocabulary that restricted the informal use of these terms and in effect, labelled indigenous terms as inadequate (Kreutzmann, 1998; HAJJAJI and M'barki, 2018).

Application of World Terminology in Contemporary World

The Central Asian republics started to actively participate in international environmental governance after the 1990s independence, which was a new wave of contextual climate terminology development (Rahaman and Varis, 2008). The United Nations, World Bank, and ICARDA water organizations brought about integrated water resources management (IWRM), climate resilience, and transboundary water governance (Castillo and Al-Mansouri, 2025). These changes present both positive and negative elements. Positively, they provide a unified approach to cooperation, which is crucial when considering the interstate nature of Central Asia's rivers (Omonov *et al.*, 2024). Negatively, the unquestioning embrace of these international policies tends to ignore local ecological, social,

and linguistic realities, resulting in a disconnect between de jure policy and de facto implementation (Horlemann and Neubert, 2007). Furthermore, now-a-days, government and NGOs documents start to be infused with hybrid terms such as ekologik xavfsizlik (ecological safety) and suv resurslarini boshqarish (water resource management), which combine local words with foreign ones (Yusupov, 2014). As a result of political domination, globalization, and cultural exchanges over centuries, the central terminological framework in contemporary Central Asia is multilayered and a hybrid. Grasping thismultilayered history is crucial for creating strategies in water management that balance contemporary requirements with respect to traditional knowledge systems (Schoeller, 2020).

Impact of language on water resource management practices

Recognizing the Cultural Implications of Terms

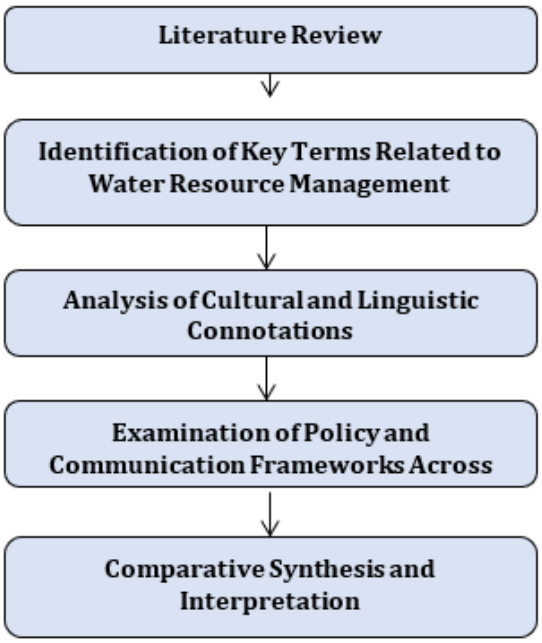

Figure 2: Methodological approach to investigating language and water resource management.

The methodological framework illustrated in the diagram (Figure 2) outlines a systematic approach to examining the impact of language on water resource management practices. The process begins with a literature review to ground the study in existing academic discourse. This is followed by the identification of key terms related to water management, which are then analyzed for their cultural and linguistic dimensions to ascertain the extent to which meanings diverge across contexts. The next step involves an examination of policy and communication frameworks from various regions to demonstrate the role of language in governance as well as intra and intergroup communication. Lastly, drawing a cross comparative synthesis and interpretation of the analysis results enables one to meaningfully conclude how language, any means of communication, influences water management policies and strategies. This approach ensures an all-embracing analysis enriched by cultural perspectives and disparate cultures while effectively intertwining language with policies.

Words do not merely communicate a definition. They convey the way societies perceive, appreciate, or engage with a resource. In Central Asia, a lot of folklores have intertwined with cultural, spiritual and historical aspects which contain water-related words. For example, the names given to springs or the jobs of people in charge of the water's distribution might evoke associations of purification or group stewardship. Such perceptions shape attitudes toward water, responsibility, and social enforcement of norms. A phrase that suggests moral

responsibility and communal sharing tends to foster collaboration, in contrast to a bureaucratic expression which suggests control and management absent of personal engagement. External or imposed indigenous terminology can actively change this system. The policies brought about by Soviet or international development organizations tended to change the terminology to their more technical one. Many traditional communities started to experience a gap between the meaning embedded in policy language policies and culture. Such a gap most often led to little public participation or misunderstanding in relation to the objectives of water laws. Understanding local terms and their cultural significance helps narrow the divide between formal laws and informal practices and makes governance more inclusive and sensitive to context.

Obstacles to Effective Communication Among Different Language Groups

Central Asia has an ethnic and linguistic quilt that comprises diverse communities with distinct dialects, terminologies, and water-related knowledge systems. In multi-ethnic localities, communication regarding water resources, conflicts or even infrastructure development becomes more difficult if terminology is not mutually shared. Even within the same official language, regional differences in water terms may lead to confusion. For instance, the phrase rule enforcement may suggest different things—ownership in one language but stewardship in another; thus, how rules are interpreted can influence enforcement. In particular places with limited water resources shared among communities across borders, these language disagreements can contribute to rising tensions. Disagreements over language used in agreements, public announcements, or even legal documents can cause differences of opinion; this set of problems stifles implementation of agreements and can perpetuate conflict. There are also interboundary situations—between Kazakhstan, Kyrgyzstan, Tajikistan, and Uzbekistan—where presence or absence of terminology in legal or administrative documents create hurdles in negotiations and sharing data. Such environments necessitate good governance on water issues, which first and foremost requires translation of more than words—their meaning—ensuring all stakeholders receive the same messages regardless of the language employed.

Language's Impact on Policies and Regulations

Language is critically important for the communication, interpretation, and implementation of water policies and regulations. The policy language adopted reflects an ideological orientation—be it technocratic, environmental, communal, or commercial. For example, terminology like “resource management” signals a drift towards more centralized administrative control at the expense of community participation. Equally, legal texts that copiously borrow from international documents may not resonate with local audiences unless adapted to their local terminology. In addition, language determines how water rights are defined and enforced. Words such as “entitlement,” “allocation,” or “usufruct” carry different legal and cultural weight, and inconsistent translation can undermine legal clarity. Such considerations should shape the design

and governance of water law. Absence of alignment with local terminologies and framed language to illustrate well-intentioned reforms may result in obstacles rooted in perceived lack of transparency and community engagement. Incorporating local context and inclusivity in language use can improve deaf governance frameworks in terms of equity and efficiency. Language is not arbitrary. It is a means through which interactions with water systems, conflict resolution, and the integration of sustainable modalities into societal life is facilitated.

Case studies of specific countries in Central Asia

Kazakhstan: Development of Words From The Soviet Era To Now

For Kazakhstan, the terminology related to water management has changed considerably, especially after the country gained independence from the Soviet Union in 1991. During the Soviet period, the Russian language was dominant in public life, and a number of water-related words were directly taken from Russian. For example, vodokhozyaystvo (water economy) and melioratsiya (land reclamation). These terms formed part of the greater Soviet attempt to control and industrialize water usage, especially with regard to large-scale irrigation schemes for supporting collective farming and economic development. Upon gaining independence, Kazakhstan began the process of reintegrating its culture and language by looking back on its history and practices of water management. The Kazakh language has undergone a renaissance, especially at government offices and in educational institutions, where new terms reflecting local customs and concerns are now rapidly being coined for water governance. The word suv (water) has been appropriated within the context of national sovereignty, whilst aryk (irrigation ditch), remains commensurate with traditional communal water management systems. The increasing officialdom of the use of the Kazakh language—as a language of government—together with the influx of foreign concepts of water management, has led to a mixed language cocktail. This shifting nomenclature captures the spirit of Kazakhstan's movement away from the Soviet trend of super-centralized administration toward a more softly-devolved, nation-centered water resource framework.

This graph (Figure 3) traces the evolution of the water management vocabulary in Kazakhstan from the Soviet period to the contemporary era. From the 1960s to 1980s, the Russian borrowings melioratsiya and vodokhozyaystvo were used almost exclusively, dominated the water management lexicon with over 85% usage. However, in the wake of Kazakhstan gaining independence from the Soviet Union in the 1990s, there was a gradual trend towards the adoption of modern and more domestic terms, especially in Kazakh. By the 2000s, post-Soviet and international terms start to gain traction, such as suv (water in Kazakh), sustainable development, and integrated water resources management (IWRM). This trend was stronger in the 2010s and 2020s, where modem terms now constitute roughly 85% of the discourse. This shift is indicative of Kazakhstan's more distant nationality policy, its decolonization efforts

concerning language, as well as its water governance policy.

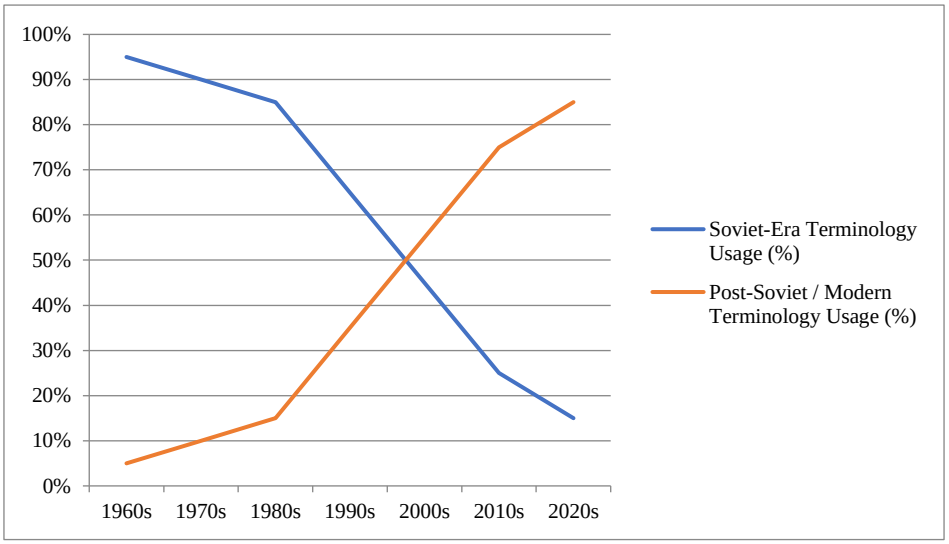

Figure 3: Evolution of water management terminology in Kazakhstan.

Uzbekistan: Impact of Persian and Arabic Languages on Terminology

Having historical and cultural ties with Persian and Arabic speaking nations, Uzbekistan has a unique blend of both languages in its lexicon, especially in the context of water management. Terms pertaining to irrigation and water usage were heavily influenced by Persian vocabulary during the pre-Soviet period. For centuries, the Uzbeks have used Persian words mirab (water manager) and qanat (an underground irrigation system) as essential parts of their water management systems. The most notable impact is with regard to Islamic concepts of water rights, justice, and stewardship where Arabic influence is most important. Often references in law, waqf (endowment for public use) and sadaqa (charitable donations) have found their way in the discourse about water especially in the areas which are arid and religious water management was practiced. Beyond serving as a witness to Islam civilization, these words capture the soul of the region's Islamic heritage by highlighting water as a precious natural gift that calls for communal stewardship. Although there was a Soviet period when Russian dominated official communication, Uzbekistan preserved these Persian and Arabic terms related to water, which still have an important place in the culture and laws associated with water usage services. In the post-Soviet period, the country has been trying to preserve its historical roots and at the same time, modernize the technical language employed by incorporating neologisms to face challenges like climate change, regional water conflicts, and other foreign issues.

The graph in Figure 4 portrays the evolution of Persian, Arabic, and Russian influences on water-related vocabulary in Uzbekistan. Prior to the Soviet era, Persian was the leading contributor, providing around 70% of the water-related terms, while Arabic contributed 20% of terms pertaining to religion and irrigation such as qanat and mirab. During Soviet times, Russian greatly

displaced these influences, making up 50% of water terminology as terms

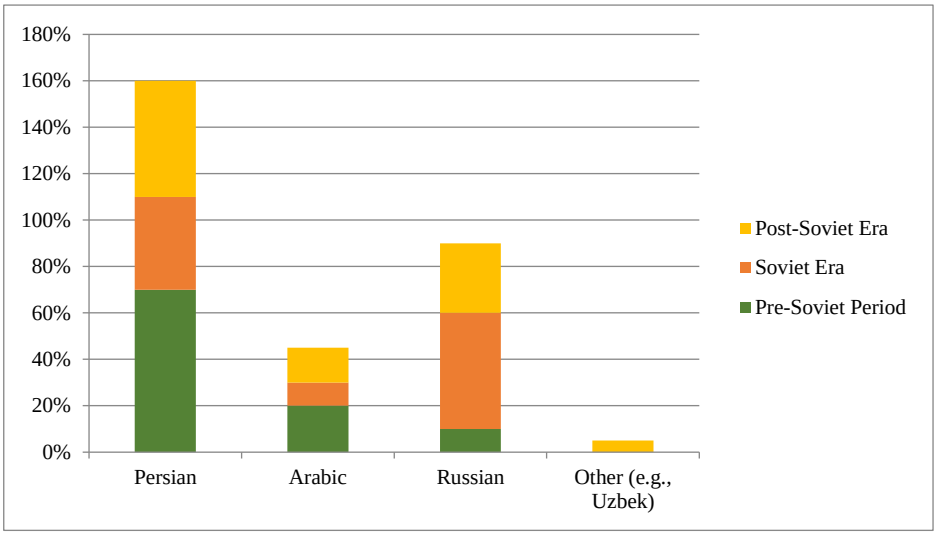

Figure 4: Uzbekistan - influence of persian and arabic languages on terminology.

and phrases were mandated by Soviet central planning. In the post-Soviet period, there is a partial resurgence of Persian and Arabic terms in everyday local cultural contexts, now making up around 65% combined as Uzbekistan embraces its Persian heritage. The graph demonstrates the impact of external political forces and, later, culture revival movements on the landscape of terminology used to communicate water management.

Tajikistan: Challenges of Translating International Terminology into Local Languages

In Tajikistan, translating international texts on water management into Tajik poses particular difficulties because Tajik is a dialect of Persian. This is especially difficult because many modern concepts of water governance simply do not exist in the local dialect. As Tajikistan continues to work actively with international bodies, integrating global systems like IWRM, it becomes more challenging to find credible translations of concepts such as water rights, sustainable development, and climate resilience. Perhaps one of the most difficult issues is that Tajik is a dialect of Persian, which lacks a robust technical vocabulary like English or Russian. Therefore, many international words are either borrowed from Russian or English, or come up with approximated phrases from more descriptive ones. For example, melioratsiya (land reclamation) is still used in Russian because there is no Tajik version readily available. Likewise, words such as ecological safety and transboundary water governance are grasped more dominantly by their Russian translations which creates gaps in understandings. Moreover, Tajikistan's water management techniques, including qanat (underground channels) have always been historical making it more difficult to introduce new concepts without local relevance. This is difficult for decision-makers because local people do not comprehend foreign language water management terminologies which are modern and sophisticated. These gaps have been attempted to be addressed through greater

emphasis on bilingual education and the creation of water-related terms in Tajik, but the gap remains too big in order for the terms to be accepted in rural areas. The bar graph (Figure 5) focuses on critical international water management terminology in Tajikistan—"Water Rights", "Integrated Water Resources Management (IWRM)", "Climate Resilience," and "Water Conservation"—and their translation results. The information indicates that "Water Conservation" has been translated to 50%, however, more complex or newer global concepts like IWRM and "Climate Resilience" face severe challenges capturing only 20-25% translation with a majority being approximated or left untranslated. This explains the gap in the discourse which stems from the absence of terminology in Tajik as well as the infrequent incorporation of water governance discourse in the local language. This gap in approximated and untranslated terms also suggests a lack of policy translation, knowledge transfer, or community involvement which in rural contexts where Russian or English comprehension is limited.

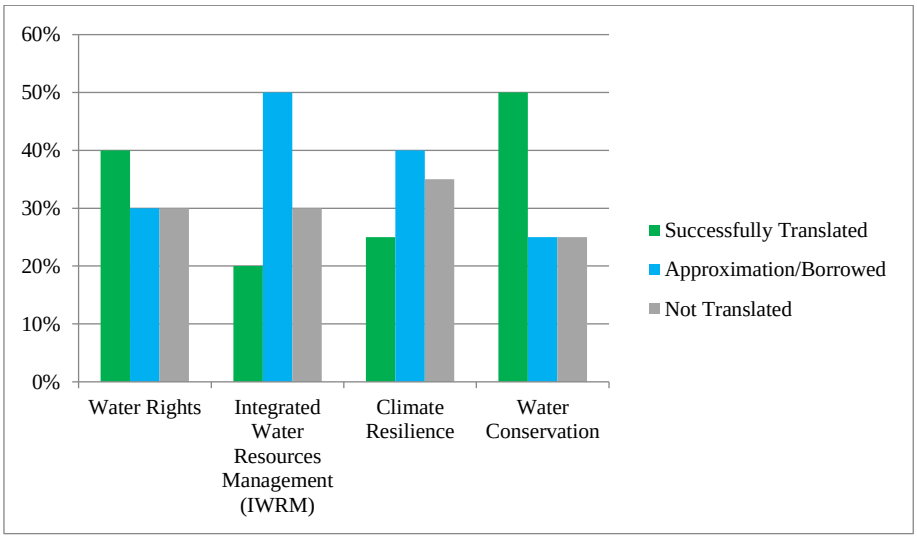

Figure 5: Tajikistan - challenges of translating international terminology into local languages.

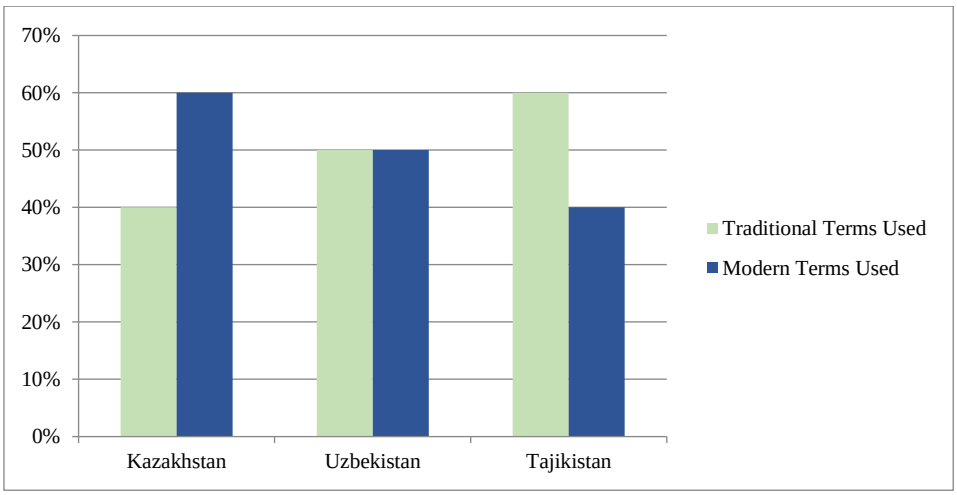

Figure 6: Regional comparison - influence of terminology on water management practices in kazakhstan, uzbekistan, and Tajikistan.

The bar graph (Figure 6) illustrates the differences in the usage of modern versus traditional water management terms by Kazakhstan, Uzbekistan, and Tajikistan. Tajikistan employs traditional terms (60%) more than modern ones (40%), indicating strong cultural preservation and lower modernization of the language. In Uzbekistan, there is an equal employment of traditional and modern terms (50% each), which is characteristic of a midway point. Kazakhstan has the highest Modern to Traditional ratio (60% to 40%) which corresponds with its greater adoption of international frameworks and proactive policy modernizations. This shift illustrates the relationship between each country's political, historical, and educational background regarding the language of water governance, as well as the regional disparities in cooperation, policy alignment, and integration.

Future Implications and Recommendations

Significance of Advocacy for Multilingualism in Management of Water Resources

Efficient water resource management, especially in areas like Central Asia with many languages intermingling, multilingualism is of utmost significance. The intermingled ethnic groups and their languages have unique cultural associations and historical relationships with water. The promotion of multilingualism solves the problem of lack accessibility by community to policies, legislations, and technical documents thus lowering the chance of misinterpretations, misunderstandings or exclusion. In cases where regional languages are dense in contrast with the national or official language, multilingual methods foster better interaction and engagement from the community. Additionally, promotion of multilingualism in the water sector enhances the appreciation of indigenous knowledge systems. Water is an important resource in any society, and its management is surrounded by intricate sets of context-specific information that relatives bequeath to descendants. Such communities are more likely to have their water management technology accepted and incorporated into formal governance systems if expressed in their mother tongue. Multilingualism thus goes beyond serving practical communication needs into the realm of safeguarding and revitalizing invaluable traditional knowledge essential for sustainable water management, particularly in responding to climate change and population growth.

Collaboration Between Linguistic Experts and Water Resource Management Professionals

At intersections of language and water management, relationships can be established with water resource professionals and linguistic specialists. They can ensure that the terminology used in policies, legal documents, and management plans reflect both local cultures and modern technology. Water managers rely on linguists to make accurate translations of intricate technical concepts and water professionals offer guidance concerning the practicality of those terms in the field. Such collaboration is highly needed in Central Asia where the technical aspects of water governance have to be explained to various stakeholders which include

farmers, engineers, policymakers, and even local communities. For example, important policies at the global level such as water conservation or sustainable development need to be modernized for locals to understand the concepts relationships. Furthermore, linguistic specialists can help policies with the accurate water traditions and customs of the locality. In addition, stimulating a discussion between experts in linguistics and water management may assist in finding the missing gaps in existing terms possessing relevance to contemporary as well as traditional knowledge through coining new terms. This amalgamation of knowledge can help in bridging the divide between international water governance policies and local policies to make sure that these policies are scientifically formulated, culturally considerate, and pragmatically sound.

The Need for Other Studies Relating Language with the Region's Water Management Issues in Central Asia

Some studies have focused on the interrelations between language and water management in Central Asia, but this region needs far more studies done on these aspects. The relation between language and water management, especially in the context of Central Asia, is increasingly important amid climate change and resource depletion. Research is required in exploring how local dialects impact the decision-making processes, communication protocols, and conflict mitigation strategies implemented within the framework of water governance. More culturally based studies need to be done on how different ethnolinguistic groups perceive water ownership and governance because such perceptions define how a given resource will be allocated and managed. Also, research on the consequences of translating water management concepts internationally into Central Asian languages will be vital in determining the obstacles toward the effective execution of these policies. These include how local languages may promote or inhibit the adoption of modern practices like water-saving technologies and legalistic frameworks concerning water sharing. This analysis would assist in creating water management policies by integrating local knowledge that is largely absent in formal governance systems. Concepts, practices, and local languages pertaining to water stewardship and care are insufficiently integrated into governance systems which results in the loss of sustainability-enhancing knowledge. There is a need for more ethnographic, linguistic, and interdisciplinary studies to aid in developing better water governance frameworks for the region.

Conclusion

Examination of the water resource management vocabulary in Central Asia reveals the multifaceted impact of history, culture, and politics on its development. The multitude of languages in the region has influenced the community's perception and management of water, with many traditional terms signifying important cultural and ecological knowledge of the area. The Soviet and Post Soviet periods added other layers of terminology due to centralization and globalization of governance, which present modern challenges to water management. Language in its many forms remains an important vehicle for conveying

contemporary and ancient knowledge systems, sharpening policies, and mitigating conflicts while modern day policies strive to reconcile such dichotomies. Researchers and policy makers are called upon to adopt a multi-lingual paradigm regarding water governance and policy development while working with gone- linguistic specialists to ensure considered socio-cultural inclusivity. More work is needed on Language and culture intersections with water management in central Asia as well as the transnational scope of concepts versus local knowledge and approaches inclusive of traditional wisdom. Research in this area should prioritize the creation of regionally appropriate contemporary terminology which balances traditional methods with modern ecological sustainability to provide comprehensive policy frameworks for the equitable management of the region's water resources.

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