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Beyond Opium: A Hexa-Helix Multi-Stakeholder Collaboration Model for Agricultural Transformation in Afghanistan

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ABSTRAK

Penelitian ini mengkaji transformasi pertanian Afghanistan pasca pelarangan opium secara nasional oleh Taliban pada tahun 2022, yang menyebabkan penurunan budidaya poppy hingga 67% namun sekaligus mengganggu mata pencaharian jutaan masyarakat. Kebijakan pelarangan tersebut, yang sejalan dengan standar internasional dan prinsip keagamaan, menyoroti berbagai kelemahan sistemik seperti rapuhnya pasar, buruknya infrastruktur, serta lemahnya dukungan institusional terhadap alternatif ekonomi. Penelitian ini mengevaluasi model kolaborasi *Hexa-Helix* yang melibatkan pemerintah, akademisi, industri, masyarakat sipil, media, dan aktor internasional sebagai kerangka tata kelola pembangunan pedesaan berkelanjutan di konteks pascakonflik. Dengan menggunakan metode *systematic literature review* dan analisis komparatif terhadap keberhasilan *Royal Project Foundation Programme* di Thailand, studi ini mengidentifikasi sejumlah hambatan utama di Afghanistan: keterlibatan pemangku kepentingan yang terfragmentasi, kebijakan yang didorong oleh donor, serta lemahnya tata kelola lokal. Dengan mengambil pelajaran dari kasus di Kolombia dan Myanmar, penelitian ini mengusulkan tata kelola pembangunan yang direkonfigurasi dengan menekankan kolaborasi horizontal, kepemilikan lokal, dan ketahanan institusional. Pendekatan ini menawarkan jalur praktis untuk mentransformasikan ekonomi pedesaan Afghanistan melampaui ketergantungan pada budidaya opium, serta memberikan wawasan berharga bagi upaya pembangunan berkelanjutan dan perdamaian di tingkat regional maupun global.

Kata Kunci: Pelarangan Opium; Model *Hexa-Helix*; Kolaborasi Multi-Pemangku Kepentingan; Transformasi Pertanian; Ekonomi Pascakonflik.

ABSTRACT

This study examines Afghanistan's agricultural transformation after the Taliban's 2022 nationwide opium ban, which cut poppy cultivation by 67% but disrupted millions of livelihoods. The ban, aligned with international and religious standards, highlighted systemic weaknesses such as fragile markets, poor infrastructure, and weak institutional support for alternatives. The research evaluates the Hexa-Helix collaboration model which engaging government, academia, industry, civil society, media, and international actors as a governance framework for sustainable rural development in post-conflict settings. Using a systematic literature review and comparative analysis of Thailand's successful Royal Project Foundation Programme, the study identifies key barriers in Afghanistan: fragmented stakeholder engagement, donor-driven policies, and lack of local governance. Drawing lessons from Colombia and Myanmar, it proposes a reconfigured development governance emphasizing horizontal collaboration, local ownership, and institutional resilience. This approach offers a practical pathway to transform Afghanistan's rural economy beyond opium cultivation, providing valuable insights for peacebuilding and sustainable development efforts regionally and globally.

Keywords: *Opium ban, Hexa-Helix model, multi-stakeholder collaboration, agricultural transformation, post-conflict economy*

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INTRODUCTION

Afghanistan's agricultural sector has long been entangled with the cultivation of opium poppies. Despite their illegality, these crops have served as a principal source of income for millions of rural households, particularly in areas where state presence is weak and alternative livelihoods are scarce. For decades, the opium economy has been deeply embedded not only in the socio-economic fabric of Afghan rural life but also in regional narcotics markets and informal governance structures. The Taliban's April 2022 decree imposing a nationwide ban on opium cultivation and trade signified a drastic policy shift with far-reaching consequences. In 2024, this ban resulted in a staggering 67% decrease in poppy cultivation from 22,693 hectares in 2023 to only 7,382 hectares reflecting intensified enforcement efforts by the de facto authorities (Byrd, 2024).

While the ban aligns with global anti-narcotics commitments and religious mandates, it has triggered a sharp contraction in the opiate economy, with an estimated income loss of USD 1.3 billion among farming communities (International Crisis Group, 2024). This abrupt transition has forced many farmers to switch to low-value crops such as wheat. However, the substitution has revealed entrenched structural vulnerabilities, including underdeveloped market systems, inadequate rural infrastructure, and the absence of long-term, coordinated support for legal livelihoods.

Empirical evidence from global alternative development experiences suggests that replacing illicit crops with legal alternatives requires more than crop substitution it demands integrated, long-term, and context-sensitive strategies. In Afghanistan, however, policy interventions have historically been top-down, fragmented, and heavily reliant on short-term donor financing. These interventions often fail to recognize the complexity of rural socio-economic dynamics, informal power relations, and local institutional fragility. Furthermore, the role of collaborative governance and multi-stakeholder engagement in fostering sustainable agricultural resilience has remained underexplored in Afghanistan's policy landscape.

This study seeks to address this gap by introducing the Hexa-Helix model as a comprehensive governance framework tailored to the specific conditions of post-opium rural Afghanistan. The Hexa-Helix approach mobilizes six critical stakeholders' government, academia, industry, civil society, media, and international organizations to foster inclusive, multi-actor development. While the model has been successfully applied in urban innovation ecosystems and public service reform, its potential in post-conflict, agrarian settings remain largely absent from scholarly discourse. This study thus seeks to extend its relevance to fragile, rural development contexts.

To investigate the model's applicability, this research adopts a systematic literature review (2021–2024), analyzing academic sources, policy documents, and development reports relevant to agricultural transitions, collaborative governance, and post-conflict reconstruction. By drawing comparative insights from Thailand's Royal Project Foundation an internationally recognized model that successfully replaced opium with high-value crops through multi-stakeholder collaboration this paper identifies key enabling conditions and structural barriers that must be addressed for successful adaptation in Afghanistan. In doing so, the paper contributes to two key objectives: First, advancing theoretical understanding of collaborative governance models in fragile, post-conflict agricultural settings, and could offering practical policy recommendations for regional and international actors seeking to foster sustainable, community-driven alternatives to illicit cultivation.

Ultimately, this study underscores the need for a paradigm shift from isolated, donor-driven crop substitution schemes toward holistic, locally embedded rural development frameworks. Such a shift requires reconfiguring

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power relations, aligning international assistance with local realities, and building resilient institutions that empower rural communities to transition beyond the opium economy.

THEORETICAL FRAMEWORK

In seeking to understand Afghanistan's complex transition from an opium-based economy toward a licit and sustainable agricultural system, this study employs the Hexa-Helix model as its core analytical lens. The Hexa-Helix framework builds upon previous iterations of innovation and governance models namely, the Triple-Helix and Quadruple-Helix by incorporating six interdependent stakeholder groups: government, industry, academia, civil society, media, and international actors. This expansion reflects the growing complexity of development challenges in fragile and post-conflict settings, where broad-based participation and coordination are essential. To contextualize the Hexa-Helix model's evolution, Table 1 below compares it to the foundational Triple and Quadruple Helix models.

Table 1. Helix Models Comparison

Model	Stakeholders Involved	Primary Focus
Triple-Helix	Government, Academia, Industry	Innovation, knowledge economy
Quadruple-Helix	Triple-Helix + Civil Society	Social innovation, public engagement
Hexa-Helix	Quadruple-Helix + Media + International Actors	Governance, development, global synergy

(Adapted from Carayannis & Campbell, 2012; Rachim et al., 2020)

The adoption of the Hexa-Helix model is particularly relevant in the Afghanistan context, where state fragility, persistent aid dependency, and international diplomatic dynamics intersect with localized agricultural systems (Rafi, 2024). The inclusion of media and international organizations reflects the critical role these actors play in shaping narratives, providing technical assistance, and influencing legitimacy in post-conflict reconstruction. Media platforms, for instance, are instrumental in disseminating information about alternative livelihoods and in shifting public perceptions toward legal agricultural practices. Simultaneously, international organizations contribute funding, research, and diplomatic leverage, yet often operate without sufficient alignment to local priorities and institutions.

Studies from post-conflict contexts such as Colombia further validate the need for durable, inclusive, and adaptive partnerships. Pfisterer (2021) emphasizes that long-term development success in fragile environments depends not merely on the presence of diverse actors but on their sustained, collaborative engagement. However, while the Hexa-Helix model has been applied extensively in urban, high-capacity systems particularly in innovation-driven economies its use in rural agricultural transitions remains a nascent area of research. This study thus seeks to fill that gap by adapting the model to the realities of Afghanistan's rural governance and agricultural redevelopment.

Economic transitions in post-conflict settings involve more than dismantling illicit economies; they require the deliberate construction of new institutional, economic, and social foundations. According to post-

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conflict economic theory, successful transformation hinges on the availability of sustainable, community-embedded alternatives that are both socially acceptable and economically competitive (Collier & Hoeffler, 2004; Mansfield, 2016). From the perspective of New Institutional Economics (North, 1990), this transition process depends on three interconnected pillars: First, Institutional Stability the development of predictable and enforceable rules, norms, and organizational capacity. Second, Market Access, the establishment of physical infrastructure and functional value chains linking farmers to buyers. Third, Human Capital, the provision of technical knowledge, vocational training, and agricultural extension services.

In Afghanistan, many earlier crop substitution programs designed and implemented primarily by international agencies failed to achieve durable outcomes precisely because they neglected these foundational elements. While opium production was suppressed temporarily, many farmers returned to illicit cultivation due to the superior profitability, existing social protection networks, and community-level enforcement mechanisms associated with the opiate economy (Mansfield, 2023). The failure to replace these systemic functions in the legal economy has undermined policy credibility and farmer trust.

To deepen the theoretical base, this study also integrates insights from Integrated Rural Development (Chambers, 1983) and Livelihood Diversification (Ellis, 2000). These frameworks emphasize that rural resilience is not built through isolated inputs but through holistic interventions that address social, economic, ecological, and political vulnerabilities simultaneously. The emphasis on bottom-up participation, contextual appropriateness, and systems thinking aligns well with the Hexa-Helix model's collaborative orientation.

Global experiences with illicit crop replacement efforts suggest that high-value agricultural alternatives, embedded within robust institutional support systems, are far more likely to succeed than short-term crop substitution schemes. One of the most prominent examples is Thailand's Royal Project Foundation, which over the past five decades has facilitated the transition from opium cultivation to diversified high-value crops, such as Arabica coffee, strawberries, and saffron. The success of the Royal Project rests on three pillars: Public-private-academic partnerships, Market-led innovation, and Consistent technical extension services (The Royal Project Foundation, 2019).

On the contrary, Afghanistan's substitution efforts have historically emphasized surface-level indicators such as the total hectares of wheat cultivated while overlooking deeper issues of profitability, access to inputs, and market integration. For example, in 2023, there was a 194,000-hectare increase in land cultivated with wheat, corresponding with a 188,000-hectare reduction in opium poppy (Byrd, 2024). Yet, this one-to-one land replacement masks the reality that wheat yields only around $200 per hectare, while opium yields more than $2,500 per hectare. Meanwhile, Royal Project initiatives like saffron farming have achieved income levels of $5,000 per hectare after several years of maturation.

Research by UNODC and Alcis further shows that substitution with low-value crops like wheat has pushed many farmers back into illicit production due to unmet economic needs. These insights highlight the importance of designing context-responsive alternatives that consider local agro-ecological conditions, income expectations, and transition timelines. This study thus proposes a contextual adaptation of Thailand's model using the Hexa-Helix lens to enable coordination across sectors, enhance local ownership, and ensure economic viability.

The success of post-opium agricultural policy in Afghanistan also depends heavily on governance quality, particularly the ability to coordinate multiple actors toward shared goals. Using the Good Governance Framework

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(Kaufmann et al., 1999), policy effectiveness is assessed through indicators such as accountability, transparency, regulatory quality, and stakeholder participation. In Afghanistan, governance is complicated by contested legitimacy, fragmented institutions, and overlapping mandates among donors, NGOs, and state entities. These conditions often result in duplicated efforts, low absorption capacity, and limited policy coherence. This fragmentation is exacerbated by a top-down decision-making culture, which limits community engagement and hinders adaptive feedback loops.

To address these challenges, this study argues for a governance shift toward inclusive, bottom-up policymaking, where local knowledge and community priorities inform national strategies. As Pfisterer (2021) asserts in her study on Colombia, sustainable development in post-conflict zones requires reconciling state coordination with grassroots innovation. The Hexa-Helix model provides a flexible architecture for this reconciliation, enabling diverse stakeholders to engage in mutually reinforcing roles rather than working in isolation.

METHODS

This study employs a mixed-methods research design, anchored in a Systematic Literature Review (SLR) and enriched by comparative case study analysis. The primary objective is to evaluate the applicability and adaptability of the Hexa-Helix collaboration model to Afghanistan's post-opium agricultural transition. To achieve this, the study draws conceptual and empirical lessons from Thailand's Royal Project Foundation, recognized globally for its success in transforming illicit agricultural economies through multi-stakeholder governance, technological innovation, and sustainable rural development.

3.1 Systematic Literature Review (SLR) Design

The systematic literature review (SLR) was designed to synthesize existing knowledge on Afghanistan's post-opium agricultural transition while drawing comparative insights from Thailand's Royal Project Model. Data were collected from three academic databases Scopus, Web of Science, and JSTOR supplemented by gray literature from international organizations such as the United Nations Office on Drugs and Crime (UNODC), the World Bank, and the International Crisis Group. To ensure relevance to Afghanistan's post-2022 context, the review prioritized studies published between 2021 and 2024, capturing shifts in counter-narcotics policies, stakeholder dynamics, and agricultural viability.

The search strategy combined four thematic clusters using Boolean operators to balance specificity and breadth. Keywords included geopolitical context terms ("Afghanistan opium ban," "Taliban narcotics policy," "post-conflict rural economy"), theoretical frameworks ("Hexa-Helix model," "multi-stakeholder collaboration," "Sufficiency Economy Philosophy"), agricultural transition concepts ("alternative crops," "crop substitution," "highland farming systems"), and economic/governance challenges ("illicit economy," "market access," "institutional fragility"). Inclusion criteria focused on peer-reviewed articles addressing stakeholder roles (e.g., government, academia, civil society), policy reports from UNODC and the World Bank detailing opium production trends, and case studies of multi-stakeholder models, such as Thailand's Royal Project, Myanmar's region development programs, and Colombia's post-conflict crop substitution initiatives.

Among the comparative cases analyzed, Thailand's Royal Project Foundation was chosen as a central reference point due to its structured, multi-phase implementation of rural development strategies aimed at eradicating opium cultivation and restoring environmental balance (Tongdhamachart, 2019) served as a critical comparative anchor, particularly its phased methodology spanning research, extension, and market integration. For

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instance, Phase 1 (Inception: 1969–1977) of the Royal Project emphasized agronomic research to identify high-value temperate crops like Arabica coffee and strawberries as opium substitutes.

This informed the SLR's focus on Afghanistan's potential alternatives, such as saffron and nuts, while underscoring the role of academic institutions like Thailand's Kasetsart University and Chiang Mai University in driving evidence-based agricultural transitions.

3.2 PRISMA Flow Diagram

The review process was guided by PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) standards to ensure transparency and replicability. The initial screening yielded 376 documents from both academic and institutional sources. After the removal of duplicates and irrelevant titles, 168 records were retained for further assessment. A subsequent rigor screening excluded 75 studies that lacked empirical grounding, leaving a final selection of 94 sources, comprising 53 peer-reviewed articles and 41 institutional reports. Data synthesis was conducted in two sequential stages, reflecting the dual qualitative-quantitative character of the study. This mirrors the Royal Project's integrative approach, which combined on-the-ground qualitative feedback with quantitative impact monitoring over time.

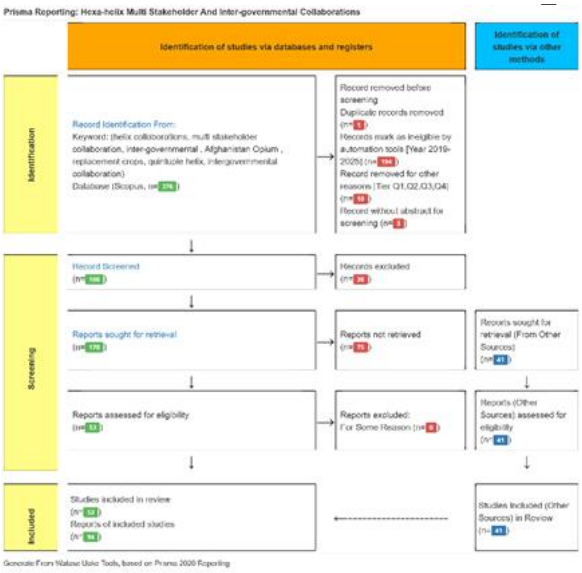


Figure 1. Prisma Flow Diagram

3.3 Thematic Analysis

Using NVivo 12 Pro, qualitative data were coded into three core themes derived from the Hexa-Helix framework because coding is analysis. (Miles et al. 2014). First, stakeholder roles were analyzed, highlighting contrasts such as Afghanistan's wheat subsidies versus Thailand's land-use zoning policies (*government*), the Royal Project's research on peach tree grafting versus Afghan universities' studies on drought-resistant wheat (*academia*), and grassroots initiatives like Thailand's "Villagers' Wood Lot Program" versus Afghan NGOs' farmer training (*civil society*). Second, economic viability was assessed through crop profitability gaps Afghan wheat yields $200/hectare compared to opium's $2,500/hectare, while the Royal Project's saffron achieved $5,000/hectare after seven years. Third, policy coherence was evaluated, revealing fragmented interventions in Afghanistan's reliance on international aid versus the Royal Project's centralized funding through Thailand's Prime Minister's Office.

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Table 1. Comparative Profitability and Infrastructure

Indicator	Afghanistan (2023)	Thailand Royal Project (2005–2015)
Avg. net profit per hectare: wheat	$200	N/A
Avg. net profit per hectare: saffron	$1,200	$5,000
Avg. net profit per hectare: opium	$2,500	(Historical benchmark)
Access to irrigation (%)	22%	78%
Years to break-even for saffron	5–7 years	3–4 years
Farmer adoption rate of legal crops	35%	89%
Access to farm-to-market roads	<30%	>80%

3.4 Quantitative Synthesis

Key trends included Afghanistan's post-ban opium price surge from $75/kg (2022) to $300/kg (2023), reflecting supply chain disruptions, contrasted with Thailand's 99% reduction in opium cultivation over 15 years. Adoption rates further underscored disparities: only 12% of Afghan farmers transitioned to saffron due to infrastructural gaps, while the Royal Project achieved 89% adoption of temperate crops by 2010 through integrated extension services. Infrastructure disparities were also noted: 78% of Afghan farmers lack irrigation, whereas the Royal Project built over 350 check dams for water conservation.

3.5 Limitations

The study acknowledges several methodological limitations. First, its reliance on secondary data limits insight into localized challenges, such as tribal resistance to crop substitution challenges that the Royal Project successfully addressed through mobile libraries and participatory training models. Second, geopolitical bias in international reports sometimes skews interpretation, with organizations like UNODC emphasizing enforcement outcomes over participatory development. Third, temporal constraints affect data comparability; while the Royal Project provides longitudinal data over 50 years, Afghanistan's data post-2022 remains fragmented due to restrictions on fieldwork. Lastly, governance divergence between Thailand's centralized monarchy and Afghanistan's fragmented, contested authority complicates direct policy transfer, though the flexibility of the Hexa-Helix model allows for context-specific adaptation.

3.6 Methodological Innovations

To address these constraints, several methodological enhancements were incorporated strategies inspired by the Royal Project. First, Triangulation cross-verified UNODC data with academic studies to reduce single-source dependency. Secondly, Stakeholder mapping use to visualized Hexa-Helix interactions (e.g., academia-industry partnerships), mirroring the Royal Project's collaborative frameworks. Third, Comparative case integration informed actionable recommendations, such as applying Thailand's success with Arabica coffee to Afghanistan's horticulture sector through value-chain development and certification programs. By synthesizing diverse forms of data and aligning them with a proven development model, this study positions the Hexa-Helix framework as a scalable, context-sensitive approach to agricultural transition in post-conflict economies.

RESULTS AND DISCUSSION

4.1 The Economic and Trade Impact of Opium Prohibition in Afghanistan

The enforcement of a nationwide opium bans by Afghanistan's de facto authorities in April 2022 brought an immediate and dramatic contraction in both opium production and regional trade dynamics. Within one year, the price of raw opium surged from an average of $75 per kilogram in 2022 to over $300 per kilogram by early 2023, reflecting severe disruptions in supply chains (Byrd, 2024). This quadrupling of market price not only indicates a tightening of domestic availability but also highlights Afghanistan's centrality in the regional narcotics economy particularly for neighbouring countries such as Iran, Pakistan, and India, which have long relied on Afghan opium as a primary source.

Although the prohibition has been successful in suppressing cultivation evidenced by a 67% reduction in opium poppy area it has not eradicated the broader illicit economy. Instead,

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the market has recalibrated; trafficking networks have adapted by emphasizing raw opium smuggling rather than processing it into heroin. This shift is partly due to the increasing difficulty of acquiring chemical precursors for heroin production, combined with the lower visibility and shorter value chains involved in raw opium trafficking.

Crucially, the prohibition has not dismantled the informal economic infrastructure that underpins the opiate economy. The continued dependence of rural livelihoods on narcotics-linked cash flow points to persistent vulnerabilities in Afghanistan's agricultural economy. In this regard, the opium ban may have disrupted short-term supply, but it has yet to initiate a fundamental transformation in rural income structures or economic alternatives.

4.2 Agricultural Alternatives Post-Opium Ban

The abrupt enforcement of the opium ban has compelled Afghan farmers to pivot toward licit crops. However, the transition has been fraught with economic and infrastructural constraints. Among the most commonly promoted alternatives are wheat, saffron, legumes, and tree crops (e.g., fruits and nuts). While these alternatives are technically viable, their economic returns and risk profiles differ drastically from those of opium.

In terms of profitability, opium remains unmatched in the short term. For example, opium yields an average of $2,500 per hectare, while wheat generates a meager $200 per hectare, creating a tenfold income gap (Byrd, 2024). Saffron, often touted as a high-value substitute, requires five to seven years of consistent cultivation and market access before it can rival opium's profitability (Pain, 2023). This time lag creates a disincentive for adoption, especially in economically distressed communities.

Infrastructure deficits further undermine the success of substitution programs. More than 78% of Afghan farmers lack access to reliable irrigation systems, limiting their ability to cultivate water-intensive or high-maintenance crops (UNODC, 2024). Additionally, poor rural road networks and limited cold storage capacity reduce access to markets, increasing post-harvest losses and discouraging investment in perishable or export-grade crops.

Beyond infrastructure, access to capital and agronomic knowledge remains scarce. Although international donors have introduced several initiatives to promote alternative livelihoods, these efforts are often fragmented, short-lived, and implemented without adequate coordination with local actors. Without integrated value chain support, substitution efforts risk becoming performative—focused on land area rather than sustainable income generation or long-term resilience.

4.3 Stakeholder Fragmentation in Agricultural Policies and Inter-Governmental Collaboration in Counter-Narcotics Efforts

A recurring barrier to sustainable agricultural transformation in Afghanistan is the fragmentation of stakeholder roles in both policy design and implementation. Although multiple actors are involved ranging from government ministries and international donors to civil society organizations and academic institutions their actions are often misaligned, resulting in overlaps, gaps, and inefficiencies. For instance, government-led wheat subsidies are rarely informed by academic research on agroecological suitability, nor are they aligned with private sector demand or export potential. Similarly, NGOs and civil society organizations working at the grassroots level often lack access to national policy forums, limiting their ability to provide bottom-up feedback or scale up successful pilot programs.Table 3 illustrates the varying degrees of engagement and effectiveness across sectors, as interpreted through the Hexa-Helix model.

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Table 3. Stakeholder Roles

Stakeholders Aspect	Thailand	Afghanistan
Government Role	Thai Royal Family, Government (Agriculture, Interior) Central driver via funding, policy alignment (Sufficiency Economy Philosophy). Government-funded research stations, agricultural cooperatives, and infrastructure development	De-facto Authorities (DfA) enforced poppy ban but lacks capacity for alternative livelihoods; reliance on international aid. Strict ban with penalties, but trafficking persists due to economic desperation
Society Involvement	Participatory approach: Hill tribes engaged in crop substitution, cooperatives, and education	Farmers marginalized; most stocks held by traffickers; limited community agency
Private Sector	"Doi Kham" social enterprise for value-added products; market linkages	Methamphetamine supply unaffected; private sector absents in licit alternatives
Academia Role	Universities (Chiang Mai, Kasetsart) conduct crop science, GAP certifications, market studies. Farmers trained in sustainable agriculture, post-harvest tech. Developed high-value temperate crops (strawberries, coffee, cut flowers)	Limited local research; UNODC relies on remote sensing/surveys due to access constraints. No structured training; farmers left vulnerable after poppy ban. No agricultural innovation reported; shift to methamphetamine production suspected
Media Role	Awareness Campaign, promotes success stories of hill tribe farmers via documentaries, royal endorsements. Media highlights sustainability, SDG alignment, and economic benefits. Positive framing: "Royal Project = National Pride"	Minimal media engagement; focus on seizures/ban enforcement rather than solutions. Media (if any) focuses on crisis narratives (opium ban fallout, methamphetamine rise). Negative framing: "Afghanistan = Narcotics Hub" (despite ban efforts)
International Actors	Technical/financial support from USDA, Taiwan, and UN agencies. Integrates international economic linkages more effectively, leveraging foreign investment and partnerships. Greater emphasis on international economic cooperation, foreign investment, and global market integration.	Reliant on UNODC and international aid. Weak inter-agency coordination; reliance on external actors (Iran/Pakistan for seizures). UNODC monitors trafficking; Iran/Pakistan report price hikes; global coordination urged.

While some sectors have shown promising outcomes for example, agricultural cooperatives that transitioned to saffron or pomegranates with up to 180% return on investment these success stories remain isolated due to poor horizontal integration. Similarly, the media has achieved 65% dissemination reach in rural areas, helping to promote awareness of legal alternatives, but this has not been matched by infrastructure investment or market linkages. The fragmented approach is further complicated by inter-governmental dynamics. Though international actors like UNODC advocate for integrated strategies, in practice, global initiatives often emphasize short-term suppression targets over structural transformation. Proposed initiatives such as judicial cooperation, knowledge-sharing platforms, and monitoring systems—lack a coherent, long-term strategy rooted in rural development. Effective agricultural reform must be embedded within a cohesive, multi-level governance system, wherein stakeholders co-develop, implement, and monitor policy. Without such synergy, Afghanistan remains trapped in a cycle of suppression and relapse, rather than moving toward sustainable transition.

4.4. The Application of the Hexa-Helix Model in Alternative Agricultural Development

The Hexa-Helix model provides a compelling framework to address the governance and coordination challenges that have historically hindered agricultural reform in Afghanistan. By involving six mutually reinforcing sectors government, academia, industry, civil society, media, and international organizations this model promotes inclusive governance, cross-sector innovation, and institutional sustainability. Comparative insights from Thailand's Royal Project Foundation offer valuable guidance. The Royal Project demonstrated that combining academic research, industry partnerships, and community engagement enables long-term livelihood transformation. For instance, Thai universities spearheaded agronomic innovation, while private companies facilitated market access, and civil society actors ensured cultural and social alignment.



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Figure 2. Hexa-helix Collaboration Model

Each sector plays a distinct yet interconnected role in this transformation: Government, Establishing supportive policies and economic incentives for alternative agriculture. Academia, Conducting evidence-based research on high-value alternative crops and technological innovations in farming. Industry/ Private sector, Facilitating supply chain development and market for alternative agricultural products. Civil Society, Encouraging local tribe/religion leader and farmer community participation in legal agricultural programs and promoting local ownership of initiatives. Media, Raising awareness about the benefits of alternative agriculture, promoting and advocating for policy reforms. International Organizations/ Actors, Providing technical and financial assistance to support rural development efforts. International support could focus on rural development including rural infrastructure, income generation support, water projects, and investments in agro-processing and marketing. (Byrd, 2023)

Table 4. Role in Hexa-Helix Model

Actor	Role in the Hexa-Helix Model
Government	Policy formation, regulatory framework, and diplomatic coordination
Private Sector	Investment, value-chain development, and supply chain innovation
Academia	R&D for crop alternatives, capacity-building, and agricultural extension
Civil Society	Grassroots mobilization, accountability, and social legitimacy
Media	Public awareness, transparency, and behavioral change narratives
International Actors	Aid coordination, international legitimacy, and technical expertise

For this model to be effective, these stakeholders must move beyond isolated interventions and work collaboratively. Lessons from successful agricultural transition models such as Thailand's Royal Project Foundation demonstrate that a comprehensive, multi-stakeholder approach is necessary to create long-term economic stability for farmers transitioning away from opium cultivation.

In contrast, Afghanistan's policy environment is still largely donor-dominated, with limited roles for media in narrative-building or local governance in agenda-setting (Rachim, 2024). This imbalance weakens policy ownership and sustainability. When implemented in a coordinated manner, this model can enhance policy coherence, foster local ownership, and reduce the dependency on external actors. A decentralized, adaptive Hexa-Helix governance structure could allow for localized experimentation, tailored to specific agroecological zones and cultural contexts, while still aligning with national objectives.

In summary, the application of the Hexa-Helix model in Afghanistan holds transformative potential. Yet, its success depends on the shift from siloed interventions to integrated, participatory governance, rooted in both local legitimacy and cross-sector collaboration. If appropriately customized, this model can serve as the backbone of a resilient, inclusive post-opium agricultural economy.

CONCLUSION

This study reveals that Afghanistan's 2022 opium ban caused profound disruption in the rural economy, drastically reducing poppy cultivation by 67% but exposing the deep dependence of rural livelihoods on illicit crops. The abrupt ban lacked adequate institutional, infrastructural, or market support, leaving farmers vulnerable and discouraging adoption of legal alternatives. Persistent challenges include fragmented stakeholder collaboration, donor-driven policies, and weak local governance, limiting the success and sustainability of substitution efforts. Drawing lessons from Thailand's Royal Project, the study proposes applying the Hexa-Helix model—which integrates government, academia, industry, civil society, media, and international actors—as a holistic framework to foster inclusive, coordinated, and locally rooted agricultural development in Afghanistan's fragile post-conflict context. Effective rural transformation requires sustained investment in

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infrastructure, institutional capacity, market integration, and human capital, moving beyond enforcement to address root causes of illicit agriculture through multi-stakeholder engagement. International cooperation must align more closely with Afghanistan's realities, fostering durable economic alternatives rather than fragmented, short-term measures.

The study's limitations include reliance on secondary literature, potential bias from donor-focused reports, and the challenge of generalizing from comparative cases, which may influence the interpretation of applicability in Afghanistan's unique context. These factors affect the study's external validity and call for cautious adaptation. Indonesia, with its strong Muslim-majority democratic framework and long-standing ties to Afghanistan, is well-positioned to support Afghanistan's post-opium transition. Guided by constitutional principles mandate to uphold global peace and social justice as articulated in the Preamble to the 1945 Constitution ("...to participate in the establishment of a world order based on freedom, lasting peace, and social justice") aligned with the 1961 Single Convention on Narcotic Drugs emphasizing development-oriented alternatives. As an OIC member, Indonesia can champion Islamic values like maslahah (public welfare) by proposing multilateral assistance, supporting halal-certified agricultural exports, and promoting interfaith policy dialogues to reinforce Afghanistan's reintegration with the global Muslim economy.

Indonesia's ASEAN and BRICS memberships allow it to advocate for regional cooperation in counter-narcotics efforts and mobilize financial support for Afghanistan's rural infrastructure, microfinance, and vocational training, focusing especially on marginalized women and youth. Utilizing its South-South and Triangular Cooperation framework, Indonesia can provide some technical missions on sustainable, high-value crops like saffron, dates, and nuts, and also capacity building for Afghan agricultural extension workers and cooperatives. Another contribution can be provided by research partnerships between Indonesian and Afghan universities on drought resilience and land management. Finally, pilot projects inspired by Indonesian rural development models adapted to Afghan needs while philanthropic support targeting vulnerable rural populations.

Parallel efforts should promote inclusive governance, peace education, and civic engagement through educational exchanges between pesantren and madrasah, amplification of women's and youth voices in policymaking, and community media countering misinformation about agricultural alternatives and drug ethics.

Indonesia's balanced embrace of secular and religious values equips it to mediate between global norms and Afghanistan traditions, fostering pluralistic governance while respecting sovereignty. Collaborating with international partners to establish transparent, technology-enabled monitoring of development outcomes will ensure accountability and learning. Indonesia's engagement must be substantive and strategic, leveraging its constitutional mandates and multilateral platforms to champion a dignified, locally owned, and resilient rural development path for Afghanistan, contributing to lasting peace and economic stability in the region.

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