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Agricultural Production and Marketing Constraints in Afghanistan: A Systematic Review with Policy Implications (2010–2025)

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ABSTRACT

Agriculture still forms the largest share of the Afghanistan economy in terms of GDP and is a means of livelihood for the rural population. However, the sector has generally remained stabile due to constraints in production and marketing activities. A comprehensive synthesis that systematically integrates evidence on both production and marketing challenges over the past fifteen years is lacking. This systematic review aims to fill this gap by bringing together fragmented findings and providing a precise analytical framework for evidence-based policymaking. Systematic literature searches were conducted in Google, Google Scholar, Web of Science, and Scopus, resulting in research articles that were peer-reviewed and published between 2010 and 2025. In line with the PRISMA 2020 guideline, 40 studies were reviewed, and qualitative thematic synthesis was conducted on these studies. Market access and price-related barriers have been reported in the largest number of articles (62.5%), followed by post-harvest and infrastructural deficiencies (55%), technical and farm management issues (52.5%), natural resource and climate-related problems (50%), and institutional and financial problems (45%). The study found market access and price-related challenges to be the topmost constraint. Importantly, the analysis also reveals that these problems do not act individually but as a closely interlinked system of vulnerabilities. This systematic review develops the first integrative framework that maps the constraints of agriculture in Afghanistan. It is revealed that sustaining the agricultural transformation would require the initiation of coordinated and multi-level policy interventions tackling areas such as market governance, infrastructural development, financial inclusion, and skills upgrading among farmers.

1. Introduction

Agriculture is one of the most important economic sectors in the world; it is vital to ensuring food security, providing employment, reducing poverty, and achieving the Sustainable Development Goals. In developing countries, growth in the agricultural sector has a greater effect on poverty reduction than growth in other sectors. More than half the people who live in rural areas of the world make their living doing something related to agriculture (World Bank, 2025). Different studies show that agricultural and food systems are critical for achieving the Sustainable Development Goals (SDGs), especially the goal of

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eliminating poverty and enhancing food security. Evidence also indicates that technological innovations in agricultural production can facilitate sustainable economic development (Islam & Zheng, 2025; Pawlak & Kołodziejczak, 2020). Many recent studies about the impact of globalization on a country's economy indicate that when countries include their agricultural sectors in global trade and receive an increase in foreign investments, the value added to agriculture increases significantly in developing countries (Sansika et al., 2023). Thus, agriculture is not just a source of food for the world; it is an engine for both economic and social development.

Agriculture is an important component of the global economy because of its role as an income source for how much money communities generate through their product base, called Gross Domestic Product (GDP). Agriculture accounts for approximately 34.29% of the total GDP of Afghanistan and provides jobs for a significant portion of the rural population (National Statistics and Information Authority, 2025). Studies have shown that increasing productivity, optimizing irrigation, and strengthening local value chains will help decrease poverty and enhance food security in Afghanistan (Sarfarazi & Mohammadi, 2024). Targeted investments in agriculture, future government spending could provide jobs and promote sustainable economic development in Afghanistan (Hemat et al., 2025). Livestock and other agricultural sub-sectors have tremendous untapped potential for growth, but the tributaries prevent the full realization of agriculture's potential in Afghanistan (Azizi, 2024). Agriculture has a major role to play in creating economic stability, developing rural areas, and improving the quality of life in Afghanistan.

Production describes how we bring together the basic inputs of an economy to produce the highest possible amount or value of output with maximum efficiency or effectiveness (Pindyck & Rubinfeld, 2018). Agricultural production is influenced by climatic conditions, natural resource management, quantity and quality of inputs, and technological levels (Nicholson & Snyder, 2017). From the perspective of sustainable development, agricultural production can be said to be optimal when the output produced per unit of input increases while not degrading the earth's natural resources or detracting from the earth's ecosystem sustainability (UNICEF, 2023). Total factor productivity (TFP) is one of the best measures of production efficiency in agriculture in developing countries (Fuglie et al., 2024). Thus, agricultural production is a multi-dimensional socio-economic-environmental system that has a direct impact on food security and economic growth.

Agricultural marketing is the total series of activities involved in moving products from the farmer to the final consumer (grading, packing, storing, transporting, pricing, and distributing) (Kohls & Uhl, 2002). In the context of modern marketing theory, agricultural marketing can be defined as a process of value creation and facilitation of a mutually beneficial exchange (Philip, 2002). Marketing efficiency is critical to improving producer incomes, reducing post-harvest losses, and increasing the competitiveness of goods in the domestic and global markets (Barrett et al., 2022). The high levels of low production efficiency and inefficient marketing systems significantly reduce farmer incomes and contribute to food insecurity in developing nations (World Bank, 2025). Empirical data show that while improving productivity will provide limited benefits to farmers' welfare, reforming the structural issues related to marketing systems and value chains will provide a much greater overall benefit to farmers (Barrett et al., 2022). Agriculture plays a vital role in supporting the entire population. There are still many issues

that create challenges for the agricultural sector, including low producer incomes, weak market infrastructure, price volatility, and limited access to export markets (Bank, 2014).

2. Literature review

The agricultural sector is essential to the developing world for ensuring food security, providing jobs, and boosting economic growth; however, it faces substantial challenges when it comes to producing and selling crops. Low production efficiencies, the inability to access high-quality inputs, climate change, and poor technology are some of the main factors limiting agricultural development (Ahmadzai, 2024; Ibrahim Khil & Pervaiz, 2024; Kakar et al., 2020). The inefficiencies found within agricultural marketing systems, weak value chains, volatile prices, and lack of sufficient market infrastructure also reduce the income earned by farmers, as well as lead to an increased level of post-harvest losses (Ahmadi, 2025; Gulab et al., 2020).

In Afghanistan, agriculture plays a major role in providing jobs, contributing to the GDP, and the agricultural sector continues to have many issues. These include (a) poor management of water resources (Boz & Alamyar, 2018; Mirwais & Yamada, 2019), (b) absence of viable markets for agricultural products, (c) weak postharvest storage systems, and (4) lack of access to export markets (Ahmadi, 2025; Azimi et al., 2025; Bank, 2014; Mawladad Khairi, 2022; Mirwais & Yamada, 2019; Sarhadi et al., 2014). A review of previous research has shown that most of the research conducted regarding agriculture in Afghanistan has either focused on particular crops (i.e., tomatoes, apples, grapes, saffron, or wheat) or has been regionally/socially/temporally bound. Furthermore, challenges related to the production and marketing of agricultural products have usually been examined independently. Most development reports have been descriptive rather than using consistent guidelines, a systematic assessment of both production and market challenges in Afghanistan between 2010 and 2025 has yet to be published. There is no knowledge base to support a consolidated systematic review of the challenges faced by producers and marketers of agricultural products in Afghanistan. Such an investigation will help to consolidate the various and often fragmented findings, establish an analytical framework that could be used for further studies, and provide evidence to support the use of evidence-based policy making. Additionally, the purpose of this research is to conduct a thorough and systematic review of the production and marketing constraints of Afghanistan's agricultural sector from 2010 to 2025, including identifying the significant production and marketing challenges, to produce evidence-based policy implications. The innovative aspects of this study include conducting a systematic review using the PRISMA 2020 guidelines to synthesis data from previous studies on the production and marketing of agricultural products in Afghanistan; evaluating production and marketing issues in the context of a unified analytical framework; reviewing the period from 2010 to 2025 to assess changes in the agricultural structures and policies of Afghanistan; and providing a scientific foundation for developing and implementing evidence-based policies.

3. Methodology

3.1. Study Design and Reporting Framework

This study uses a systematic review to synthesize the empirical literature on constraints to agricultural production and marketing in Afghanistan. The systematic review was done according to the guidelines set forth by the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA 2020) to

ensure methodological transparency, reproducibility, and reporting rigor (Page et al., 2021). Due to the exploratory and thematic nature of this review and the lack of quantitative effect size aggregation, a qualitative thematic synthesis approach was employed.

3.2. Literature Source and Search Strategy

For literature sources, a comprehensive and structured literature search was conducted using the following databases: Google, Google Scholar, Web of Science (WoS), and Scopus. Google Scholar provided greater coverage and reduced the chance of omitting relevant peer-reviewed publications; therefore, the search covers material published between 1 January 2010 and 30 December 2025. The search strategy involved combining key terms that related to agricultural production and marketing constraints. The search terms included "farm production" or "crop production" or "agricultural production" and "agricultural marketing" or "market access" or "agricultural value chain" and "production challenges" or "production constraints" or "production problems" or "marketing challenges" or "marketing constraints" or "marketing problems" and "Afghanistan". Boolean operators (AND, OR) and database filters were applied to restrict results to peer-reviewed journal articles and English-language publications. The final search was completed in December 2025.

Table 1. Eligibility criteria

Criterion	Eligibility	Search Keywords
Literature Type	Peer-reviewed journal articles	"Farm production", "crop production", "agricultural production", "agricultural marketing", "market access", "agricultural value chain", "production challenges", "production constraints", "production problems", "marketing challenges", marketing constraints", marketing problems", "Afghanistan".
Language	English	
Areas	agricultural production, agricultural products, or agricultural marketing in Afghanistan	
Timeline	2010 - 2025	

Source: Developed by the author(s) based on the literature search strategy

3.3. Inclusion and Exclusion Criteria

Eligibility criteria were defined before the screening process to ensure consistency and transparency.

Table 2. Inclusion and Exclusion Criteria for Literature Selection

Inclusion Criteria	Exclusion Criteria
Peer-reviewed journal articles	Non-peer-reviewed papers
Original research articles	Conference papers, Theses, and dissertations
Review articles used for contextual background (not included in thematic synthesis)	Organizational or institutional reports and Policy briefs
Studies published in English	Studies published in Persian, Pashto, or other languages
Studies published between 2010 and 2025	Studies published before 2010
Studies focusing on agricultural production, agricultural products, or agricultural marketing	Studies not focusing on agricultural production, agricultural products, or agricultural marketing
Studies addressing production or marketing challenges	Studies not addressing production or marketing challenges
Studies focused on Afghanistan	Studies not focused on Afghanistan

Source: Developed by the author(s) based on the systematic review protocol

Only peer-reviewed journal articles were included in the final synthesis to ensure methodological credibility and academic reliability.

3.4. Study Selection Process

The process of identifying and screening studies follows the PRISMA 2020 guideline (Page et al., 2021). The records retrieved first were saved in EndNote 21 as reference software. Duplicate entries were removed before "screening" them for the next step (appraisal). The selected done in three steps: Identification, Title and Abstract Screening, and Full Text Assessment. 520 records were identified through database searching. After 83 duplicate records were excluded, 437 records remained to be screened. After the Title and Abstract screening, 301 records were excluded due to non-relevance; then 136 records were subject to Full Text Assessment, of which 96 records were excluded following the inclusion and exclusion criteria. The resulting 40 records qualified for inclusion in the synthesis. The author independently conducted the screening and assessment process. When necessary, articles were re-evaluated for compliance with established criteria when there was uncertainty regarding an article's suitability for inclusion.

3.5. The Procedure for Extracting Data

The data were systematically extracted manually from each of the studies included in the synthesis using a structured data extraction plan. The data extracted included authors, year(s) of publication, study objective, identified production constraints, and identified marketing barriers. All studies used the same approach for extracting and presenting data to ensure accurate and comparable results across all papers.

3.6. Data Composition and Theme Grouping

A qualitative approach was utilized to develop themes from studies that have differing data types and a lack of valid data types to compare. The studies have been grouped on the basis of frequently occurring and conceptually related restraints. Following an iterative coding and consolidation of themes within the studies, six major thematic categories emerged: three related to production constraints and three related to marketing constraints:

1. natural resources and climate-related constraints
2. Input-related constraints
3. Technical and farm management-related constraints
4. Access to markets and price-related constraints
5. Institutional, financial, and policy-related constraints
6. post-harvest and infrastructure-related constraints

A single study could contribute towards more than one thematic category depending on what types of constraints have been reported. Each theme has been counted according to how many times each theme has been reported by the studies.

3.7. Risk of Bias Assessment, Certainty of Evidence and Protocol Registration

There was no risk of bias in the assessment applied to this review. The included studies had little in common because they were mostly observational, descriptive or case study-based on an observational

design. Since this review was not a quantitative analysis or did not use meta-analysis, the studies were only reviewed by whether they were published in a peer-reviewed journal. No certainty of evidence assessment (i.e., no GRADE assessments) was performed on the data for this review. The aim of this review was not to calculate pooled effects or impacts, but instead to identify structural and recurring constraints throughout the literature analyzed for this review. This review was not registered with a public registry before conducting the research; however, a structured protocol, PRISMA 2020 has been followed for the methodology and reporting of this review.

4. Results

3.1. Study Selection

The literature was searched using Google, Google Scholar, Web of Science (WoS), and Scopus databases. The initial search resulted in a large amount of literature that was screened (by title or abstract) to determine if each study met the objectives of this research. The literature containing non-peer-reviewed articles, such as reviews, conference papers, organizational reports, theses, etc., was removed; the remaining studies were screened by full text for eligibility based on inclusion/exclusion criteria. The detailed study selection process is shown in the PRISMA flow diagram (Figure 1). In the end, a total of 40 peer-reviewed journal articles satisfied all the inclusion/exclusion criteria and were included in this study's final synthesis.

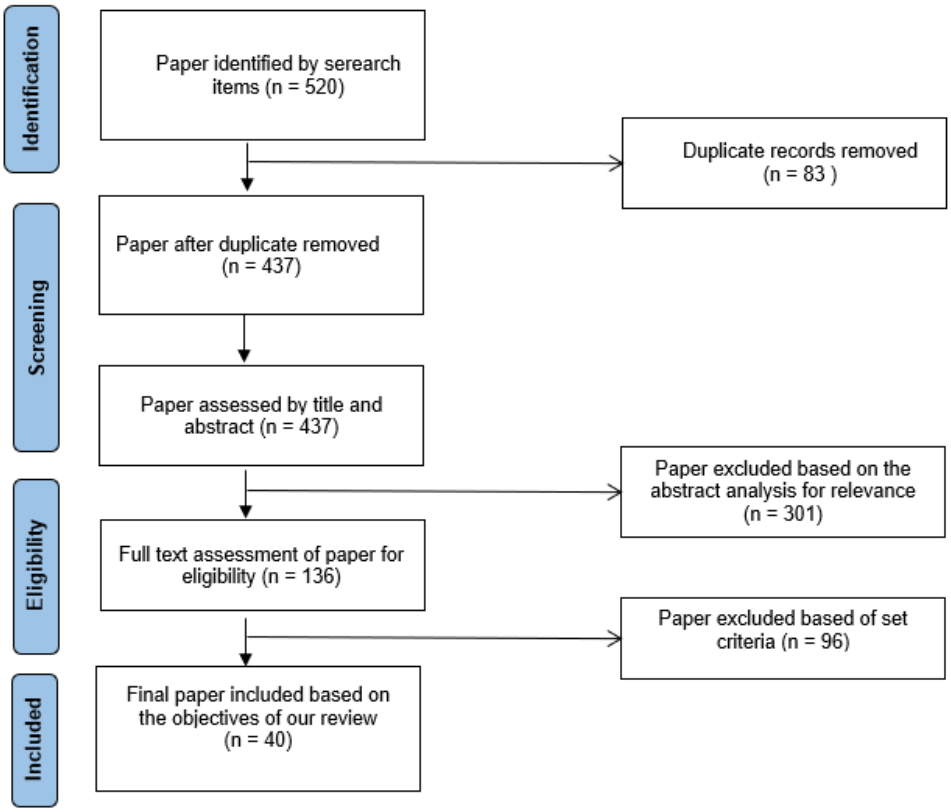

Figure 1. PRISMA flow diagram

Source: Page et al., 2021

4.2. Characteristics of Included Studies

The 40 studies included were conducted between 2010 and 2025 and provide empirical data on the agricultural production and marketing constraints within the Afghanistan context. The methodological approaches included a quantitative survey, qualitative case study, mixed-method design, and applied agricultural analysis. The majority of the studies focus on specific crops or regions; however, a few of the studies examined larger structural constraints within the agricultural system. Table 3 provides a summary of the study's authors, years of publication, and study focus. The literature indicates an increase in scholarly attention to systemic production, marketing, institutional, and infrastructure constraints on agricultural performance in Afghanistan.

Table 3. Characteristics of the study included in the review

No	Author (s)	Product	Study focus
1	Hashimi et al., (2020)	Apricot	Apricot marketing constraints
2	Elham et al., (2020)	Maize	Economic analysis of maize production
3	Muradi and Rahmani (2020)	Almond	Marketing channel efficiency of almond
4	Azimi et al., (2025)	No specific product	Challenges of market storage and income
5	Hashimi et al., (2021)	Grape	Marketing strategies and farmers' welfare
6	Naseri et al., (2025)	Tomato	Challenges of the tomato value chain
7	Lalzai et al., (2023)	Potato	Marketing issues of the potato
8	Wardak et al., (2024)	Apple	Profitability and constraints of Apple
9	Ahmadi (2025)	No specific product	Challenges of agricultural product marketing
10	Lalzai et al., (2023)	Onions	Selling problems of onions
11	Sarhadi et al., (2014)	No specific product	Sustainable agricultural development
12	Mirwais and Yamada (2019)	Grape	Constraints on grape farming
13	Khairi et al., (2022)	No specific product	Factors threatening crop marketing
14	Kazimi et al., (2018)	Wheat	Wheat market instability
15	Soofizada et al., (2023)	Wheat	Effects of pedoclimate and agronomical management on yield and quality of common wheat varieties
16	Hammas et al., (2024)	No specific product	Agricultural extension methods effectiveness
17	Gulab et al., (2020)	Tomato	Production, trade and post-harvest of tomato
18	Ahmadi et al., (2022)	Apple	Agricultural extension role in apple crop marketing
19	Lee and Mohammad (2020)	Apple	Analysis of the apple farming system
20	Moahid and Maharjan (2020)	No specific product	Access to formal and informal credit
21	Surgul et al. (2017)	Pomegranate	Problems in the production and marketing of pomegranates
22	Honaryar (2019)	Potato	Production, marketing and value chain of potato
23	Kakar et al., (2019)	Rice	Rice cultivation and production
24	Ahmadzai (2024)	No specific product	Market failures and overcoming transaction costs barriers to market participation
25	Ahmadzai et al. (2019)	Wheat	Econometric analysis of wheat production
26	Ibrahim Khil and Pervaiz (2024)	Tomato	Role of extension workers regarding tomato production

No	Author (s)	Product	Study focus
27	Khaliq and Boz (2019)	Almond	Market structures and credit services for small-scale almond producers
28	Rahimi and Artukoglu (2021)	No specific product	Problems facing agricultural products
29	Jamali et al., (2023)	Onion	Marketing constraints and price perspectives for onions
30	Hammas and Khalili (2024)	No specific product	Assessment of farmers' access to informal credits
31	Ahmadzai et al. (2016)	Cereal crop	Cereal crop farm profit maximization
32	Oskorouchi and Sousa-Poza (2021)	No specific product	Floods, food security, and coping strategies
33	Qutbudin et al., (2019)	No specific product	Seasonal drought pattern changes due to climate variability
34	Pervez et al. (2014)	No specific product	Mapping irrigated areas
35	Azimy et al. (2020)	Saffron	Impacts of saffron production promotion on farmers' policy acceptance probability
36	Aliyar et al., (2022)	No specific product	Drought perception and field-level adaptation strategies of farming
37	Raoufi et al., (2024)	No specific product	Impact of climate change on agricultural production
38	Sarwary et al., (2023)	Cereal crops	Climate change and cereal crops productivity
39	Omerkhil et al. (2020)	No specific product	Climate change vulnerability and adaptation strategies
40	Akramzoi et al. (2021)	Tomato	Adaptation strategies in response to the effects of climate change on tomato production

source: Extracted data from the included studies by the author(s)

4.3. Distribution of Study Temporal and Overall Commodity

Temporal distribution of included studies shows that over the last several years, more researchers have focused their work on the production and marketing of agricultural products in Afghanistan. The temporal distribution of the studies included in this review indicates that out of the 40 studies, 29 (72.5%) were published from 2020 until 2025. Nine (22.5%) were published from 2015 until 2019, and only two (5%) were conducted from 2010 until 2014 (Figure 2). The concentration of recent publications implies increasing research interest in agricultural-related constraints, likely associated with increasing awareness of the adverse effects of climate change, uncertain markets, a weak institutional environment, and challenges with respect to food security for the country.

The recent increase in volume of studies may also indicate improved research capability, increased international involvement in agricultural development in Afghanistan, and enhanced scholarly dialogue regarding value chain and structural constraints related to agricultural development. The limited number of studies in the past highlights a lack of longitudinal evidence, suggesting that the systematic documentation of agricultural constraints has only become an important issue in the last ten years.

The analyzed literature reveals that research predominantly focuses on the following types of commodities: 9 studies regarding fruit, 8 studies regarding vegetables, and 7 studies regarding cereals (Figure 3). Consequently, research primarily focuses on high-value horticultural crops as well as staple crops. Four studies were about tomatoes 3, 3 studies about apples and wheat, in total across all studies

completed within this sample. Based on these results, researchers have focused their examination of production and marketing constraints on higher-value horticultural commodities that are produced for export purposes as well as on staple crops that are significant to the national economy.

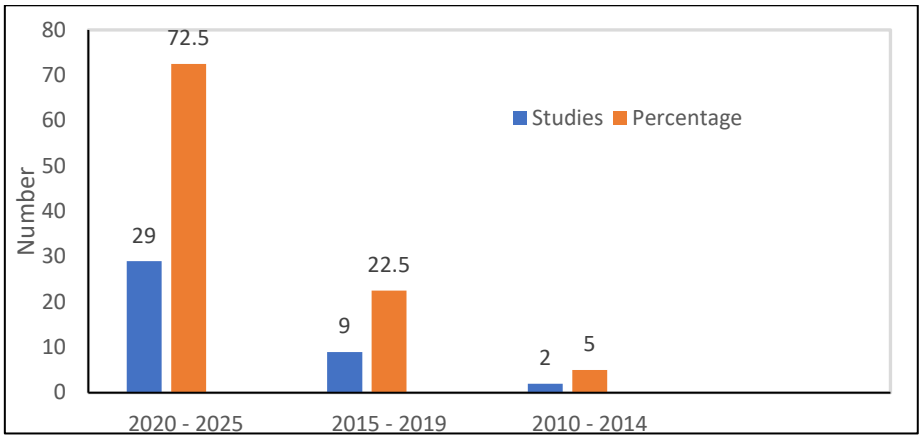

Figure 2. Temporal frequency and percentage of included studies

Source: Authors' analysis based on the included studies

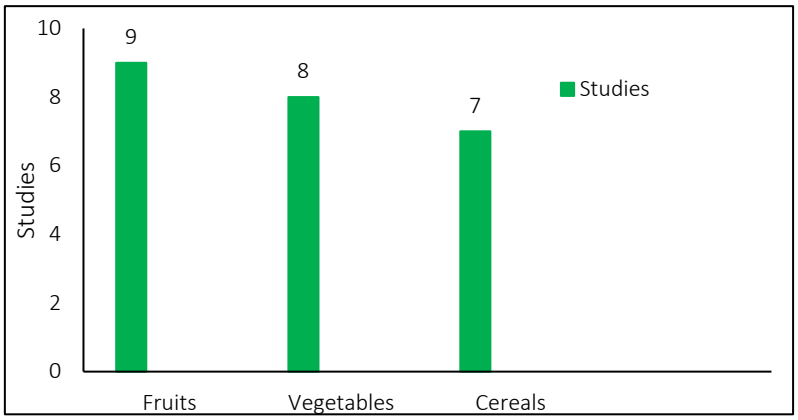

Figure 3: Commodity of included studies

Source: Authors' analysis based on the included studies

The prevalence of studies focused on fruit and vegetable production and marketing could be due to the impact they have on the economy through income generation, perishability issues, postharvest losses, and limited market access. In addition, the continued emphasis on wheat production illustrates the role it plays within the national food security framework. Overall, the distribution of commodities indicates a dual research emphasis on higher-value crops producing livelihoods and staples producing food security, which is consistent with the multidimensionality of the agricultural constraint at the national level.

4.4. Theme Synthesis of Constraints

The identified constraints were thematically categorized using qualitative thematic synthesis into (1) natural resource and climate-related; (2) input-related; (3) technical and farm management; (4) market access and price-related; (5) institutional, financial and policy; and (6) post-harvest and infrastructure. These were derived from the iterative coding and grouping of repeated limitations found throughout

the studies reviewed. The spread of constraints across the themes indicates that agricultural constraints experienced by farmers in Afghanistan are multi-dimensional and interrelated, exhibiting a structural, environmental, institutional, and market-based barrier that together affect agricultural productivity and marketing performance. Detailed results for each of the themes are presented in the following subsections.

4.4.1. Natural Resource and Climate-related Constraints

Natural resource and climate-related constraints were reported by existing studies in 20 out of the total of 40 included in this review (50%). Therefore, this is one of the most frequently cited themes. Most frequently reported as natural resource and climate-related constraints were water shortages or limitations to provide irrigation; specifically, limited access to irrigation water for crops grown in Afghanistan, seasonal water shortages at critical growth periods of crop development, inefficient use of the water, and inadequate or outdated infrastructure for the delivery of irrigation water. It was also consistently found that these constraints significantly increase production risk and decrease yields.

Climate change and ever-changing weather conditions heightened these difficulties. Many studies that looked at drought, increased temperatures, and the variability of rainfall and floods found that all of these contributed to problems with crops, as well as pest and disease emergence, and direct output loss. Environmental degradation has caused a sustained or structural barrier to sustainable agriculture, including soil fertility loss, decreased organic matter, and land degradation. Water governance and resource management issues were highlighted in several studies, including inefficient allocation of resources and poor maintenance of irrigation infrastructure. In general, all the studies reviewed show that environmental and climate-related pressures are a repeated and structurally embedded constraint within Afghanistan's agricultural system and often interact with existing institutional and infrastructural weaknesses (Ahmadzai et al., 2019; Akramzoi et al., 2021; Aliyar et al., 2022; Azimi et al., 2025; Gulab et al., 2020; Honaryar, 2019; Ibrahim Khil & Pervaiz, 2024; Kakar et al., 2019; KAZIMI et al., 2018; Lee & Mohammad, 2020; Mirwais & Yamada, 2019; Muradi & Rahmani, 2020; Omerkhil et al., 2020; Oskorouchi & Sousa-Poza, 2021; Pervez et al., 2014; Qutbudin et al., 2019; Raoufi et al., 2024; Sarwary et al., 2023; Soofizada et al., 2023; Surgul et al., 2017).

4.4.2. Input-related Constraints

Of the 40 studies reviewed, 12 (or 30%) identified input-related constraints. Input-related constraints in agriculture are mostly related to the limited quantity and poor or substandard quality of input supplies, chiefly certified seed, improved crop varieties, fertilizer, pesticide and proper planting materials. The lack of quality control and certification processes has resulted in the use of substandard inputs. Many inputs used by farmers, such as fertilizers, pesticides, agricultural services, equipment and labor, have been reported in the literature as preventing farmers from using enough of these inputs correctly because they cannot afford them. Additionally, multiple published studies have indicated a problem with the timely and adequate provision of inputs at critical periods in the crop cycle due to insufficient efficiency in the systems involved in providing agricultural inputs from producers to farmers (Ahmadi, 2025; Ahmadzai et al., 2019; Ahmadzai et al., 2016; Azimi et al., 2025; Elham et al., 2020; Gulab et al., 2020; Ibrahim Khil & Pervaiz, 2024; Kakar et al., 2019; Lalzai, Jamali, Mutaleb, et al., 2023; Mawladad Khairi, 2022; Mirwais & Yamada, 2019; Surgul et al., 2017).

Input-related constraints are associated largely with deficiencies in each of the four major characteristics (availability, affordability, quality assurance, and timeliness) of agricultural input systems, all of which have a direct negative impact on the ability of farmers to be productive and to adopt new technologies in their farming operations.

4.4.3. Technical and farm management–related constraints

Limitations of agricultural production systems have also been identified as technical and farm management-related limitations. These limitations were found in over half of the included articles (21 of the 40 total; i.e., 52.5 percent). There are many ongoing gaps in agricultural production systems related to machinery, biologically-based stress mitigation, technical capabilities, and extension services, which contribute to insufficient use of new technologies and inadequate mechanization on the farm. Characteristics of limited use of new technologies and lack of mechanization include outdated or nonexistent farm machinery, reliance on traditional labor-intensive methods, and limited access to new forms of agricultural production. These issues are related to low levels of operational efficiency at the farm level and therefore limit producers' ability to respond to emerging risks.

Biotic stress factors, like pests, diseases, and weeds, are one of the greatest causes of productivity loss for farmers. In many cases, weak pest, disease, and weed management practiced by farmers is the result of not having the necessary technical guidance and support provided by extension professionals who can provide this level of assistance to farmers. Further, in some locations, shocks associated with climate change have exacerbated the effects of biotic stress factors on farms. There are significant challenges related to insufficient human capital (for example, limited vocational education and training and a lack of access to agricultural education) and institutional support for farmers. Additionally, there is insufficient extension service coverage for farmers to receive the support they require to adopt new practices and make sound farm management decisions (Ahmadi, 2025; Ahmadzai, 2024; Ahmadzai et al., 2019; Akramzoi et al., 2021; Elham et al., 2020; Gulab et al., 2020; Hammas et al., 2024; Hashimi et al., 2020; Ibrahim Khil & Pervaiz, 2024; Jamali et al., 2023; Kakar et al., 2019; KAZIMI et al., 2018; Khaliq & Boz, 2019; Lee & Mohammad, 2020; Mawladad Khairi, 2022; Mirwais & Yamada, 2019; Muradi & Rahmani, 2020; Omerkhil et al., 2020; Sarhadi et al., 2014; Surgul et al., 2017; Wardak et al., 2022).

When reviewing the literature, it is readily apparent that the management and technical constraints experienced by farmers are linked to problems with mechanization and knowledge systems, as well as inadequate advisory infrastructure, all of which contribute to significant and continuing productivity gaps within the agricultural sector.

4.4.4. Market access and price-related constraints

In this review, the most frequent type of constraint (mentioned in 25 of the 40 articles, accounting for 62.5% of the sample) is market access and price-related constraints. The findings of previous research indicate that structural deficiencies in agricultural markets directly affect farmers' ability to earn a profit and participate in these markets. Limited market access and unequal market access have emerged as important aspects of this issue. Farmers did not have access to local, national or international markets; organized wholesale or regulated market systems; weak distribution networks; and were located far from trading centers. These barriers increase the costs associated with transactions, reduce the opportunities to sell directly to consumers, and further restrict the marketplace's ability to function

properly. Additionally, intermediary control of value chains has contributed to marketing inefficiency. The reliance of producers on middlemen was associated with lower farm-gate prices and reduced price transparency and asymmetric bargaining power amongst producers, as the majority of producers received the lowest prices. These intermediary arrangements resulted in non-remunerative pricing and limited profits.

Price instability was another subtheme that continued to affect producers. Seasonal price variations, volatile market prices, and price fluctuations related to production were all identified as sources of income uncertainty and are the direct result of low and unstable domestic prices, which continue to discourage long-term investments in productivity. Producers also encounter barriers to effectively marketing their products due to asymmetries of information about the market and limited marketing capacity. Barriers to informed production and sales decisions resulted from limited access to reliable market information, little knowledge about consumer demand, inadequate marketing skills, and a lack of appropriate research and development linkages. Financial barriers, which include limited access to marketing credit, have compounded producers' challenges by increasing dependence on intermediaries and resulting in distress sales.

The interconnections between market access and price-related constraints demonstrate that there are several structural inadequacies within the governance of agricultural markets, information systems, bargaining processes, and rates of access to financial resources, resulting in severe limitations regarding agricultural commercialization processes as well as the performance of different agricultural value chains (Ahmadi, 2025; Ahmadi et al., 2022; Ahmadzai, 2024; Azimi et al., 2025; Elham et al., 2020; Gulab et al., 2020; Hammas & Khalili, 2024; Hashimi et al., 2021; Hashimi et al., 2020; Honaryar, 2019; Ibrahim Khil & Pervaiz, 2024; Jamali et al., 2023; Kakar et al., 2019; KAZIMI et al., 2018; Khaliq & Boz, 2019; Lalzai, Jamali, Mutaleb, et al., 2023; Lalzai, Jamali, Naziri, et al., 2023; Lee & Mohammad, 2020; Mawladad Khairi, 2022; Mirwais & Yamada, 2019; Muradi & Rahmani, 2020; NASERI et al., 2025; Sarhadi et al., 2014; Surgul et al., 2017; Wardak et al., 2022).

4.4.5. Institutional, financial, and policy-related constraints

In eighteen out of the 40 studies reviewed (45%), institutional, financial and policy-related constraints were typified as significant structural impediments to agricultural growth. The material identified significant concerns with finance, policy stability, inter/intra-institutional coordination, and support mechanisms provided by the government for agriculture.

Formal credit/financial services are restricted can be surmised by the limited availability of rural banking services, the number of agricultural lending programs that exist, the financial barriers associated with the high costs of initial investment, and the lack of favourable financing terms for farmers to be able to procure the resources necessary for optimal production levels by way of improved use of alternative inputs or the introduction of enhanced technologies. A weak financial infrastructure and a shortage of financing supporting institutions contribute to a lack of capital being drawn upon to make investments within the agricultural sector. Also highlighted was the lack of risk management tools (primarily crop insurance), which further exacerbated risk exposure for farmers due to climate variability and the volatility of agricultural markets. No formal risk-sharing alternatives can increase the risk exposure to production and/or income shocks that farmers experience and as a result, dissuade long-term

investment and innovation. Another important strain on the industry was weakness in Policies and Regulatory Systems: Inconsistent agricultural policies; unstable regulatory regimes; high taxes and customs-related barriers all contributed to high Transaction Costs and Low Competitiveness. Many institutions suffered from inefficiencies and weak enforcement mechanisms, which limited market integration and formal trade.

In addition, barriers to government Support and fragmentation of institutional strategies were identified as major contributors to the problems. Insufficient public investment, poor coordination between agencies, and a lack of alignment between research, extension, and policy frameworks further contributed to the poor performance of sector development. In some cases, there was some degree of political instability that resulted in a disruption of institutional continuity and the inability to engage in long-term planning (Ahmadzai et al., 2019; Azimy et al., 2020; Elham et al., 2020; Gulab et al., 2020; Hammas & Khalili, 2024; Hashimi et al., 2021; Hashimi et al., 2020; Honaryar, 2019; Ibrahim Khil & Pervaiz, 2024; Khaliq & Boz, 2019; Mawladad Khairi, 2022; Mirwais & Yamada, 2019; Moahid & Maharjan, 2020; Muradi & Rahmani, 2020; NASERI et al., 2025; Sarhadi et al., 2014; Surgul et al., 2017; Wardak et al., 2022).

In summary, institutional weakness, lack of access to finance, inconsistency in policies, and ineffective governance structures led to an uncertain investment climate and ultimately to reduced productivity, lack of market integration, and long-term resilience in agriculture.

4.4.6. Post-Harvest and Infrastructure-Related Constraints

Twenty-two of the forty (55%) studies reviewed reported Post-Harvest and Infrastructure-Related Constraints as being significant bottlenecks in the value chain and preventing Market Integration. There were systematic problems with a lack of storage capacity, a lack of processing facilities, a lack of transportation networks, a lack of energy supply, and a lack of quality assurance systems.

The main limiting factor is insufficient storage and cold chain infrastructure. The inadequacy of warehouse capacity and lack of cold storage and weak on-farm storage resulted in high losses after harvest of agricultural produce, deterioration of product quality, and inability to sell at better prices immediately after harvest. These limitations greatly impacted perishable products, which negatively affected farmers' ability to access higher-value markets. In addition, the limited capacity for agro-processing and value-added further hindered the agriculture value chain. Outdated or non-operational processing plants, inadequate grading/spatial systems, and a lack of technical expertise all contribute to limitations in the domestic value-added process and meeting export quality standards. Lack of processing capacity has negatively impacted competitiveness and impeded regional/international trade flow.

Transportation and logistics inefficiencies compounded these issues. Network-related transport cost barriers and damage to roads, limited all-weather transportation networks, and increased transit-related transaction costs; affected the efficiency of transportation for agricultural goods. Regulatory and customs inefficiencies experienced by shippers and trade participants also added to these inefficiencies. Energy shortages and unreliable electricity supply are cross-cutting infrastructure-related barriers to storage, processing, and quality control. Weak food safety systems, limited access to quality certification and standardized laboratory testing services prevent or limit agricultural producers from participating

in formal markets and reduce the export potential of their products (Ahmadi, 2025; Akramzoi et al., 2021; Aliyar et al., 2022; Azimi et al., 2025; Gulab et al., 2020; Hashimi et al., 2020; Honaryar, 2019; Ibrahim Khil & Pervaiz, 2024; Jamali et al., 2023; Kakar et al., 2019; Lalzai, Jamali, Mutaleb, et al., 2023; Lalzai, Jamali, Naziri, et al., 2023; Mawladad Khairi, 2022; Mirwais & Yamada, 2019; Muradi & Rahmani, 2020; NASERI et al., 2025; Omerkhil et al., 2020; Pervez et al., 2014; Qutbudin et al., 2019; Rahimi & Artukoğlu, 2021; Surgul et al., 2017; Wardak et al., 2022).

Alleviating post-harvest and infrastructure deficiencies is not simply about what happens on the farm. The interaction between insufficient storage and processing capabilities, poor logistics, lack of energy, and scarce quality control contributes to an increase in the number of items that are damaged or wasted after being harvested, thus reducing their value and making them unmarketable.

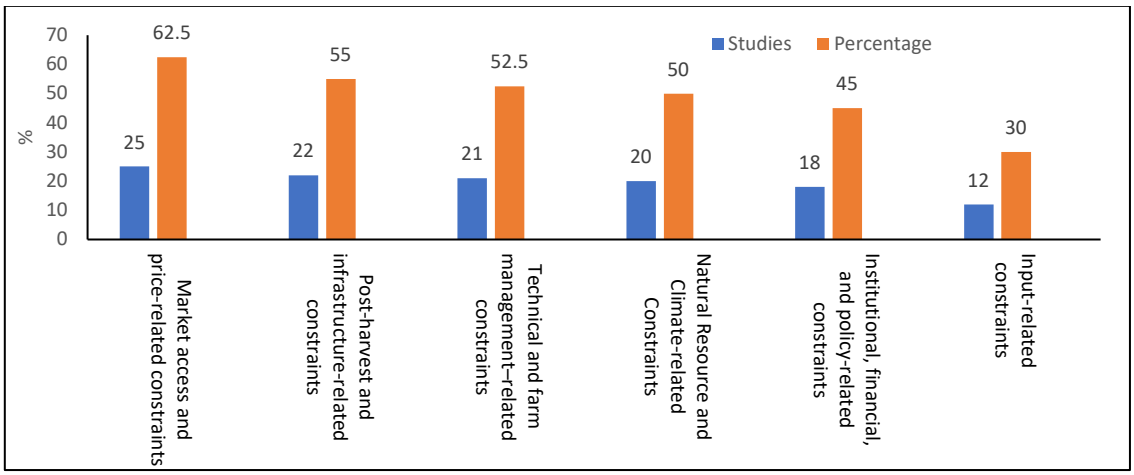

Figure 4. The frequency and percentage of constraints identified across the six themes.

Source: Authors' analysis based on the included studies

The final synthesis comprised 40 peer-reviewed journal articles published between 2010 and 2025 that satisfied the predefined eligibility criteria and were reviewed in their entirety by using a systematic extraction and thematic analysis process. The constraints associated with agricultural production and marketing have been synthesized into six analytically distinct but structurally interrelated categories. The constraints fall into the following categories: natural resource and climate-related; input-related constraints; technical and farm- management related constraints; market access and price-related barriers; and finally, constraints due to international, financial and policy barriers, post-harvest and infrastructure challenges. Market access-related barriers and pricing difficulties were reported most frequently (62.5%). Regional bottlenecks due to post-harvesting conditions and infrastructure network failures (55%) and barriers related to farm management and technical development at 52.5%. Natural resources-related and climatic stressors were present in half of the studies reviewed (50%), while barriers to institutional, financial, and policy access were identified in 45% of the studies reviewed. Input-related considerations, while only 30% of the relevant literature reviewed have been brought to light through systematic review and were documented at least somewhat within the broader systemic consideration related to their impact (Figure 4).

Analysis indicates that agriculture is underperforming not just because of isolated production deficits but rather as a result of cumulative structural distortions throughout the different components involved

with agricultural production (e.g., value chain, governance, and market institutions). The co-occurrence of climate variability, inadequate irrigation, low mechanization, fluctuating pricing, dominating supply chains, inadequate access to financial resources, and lack of infrastructure demonstrates the existence of mutually enforcing barriers affecting several aspects of agriculture. The interdependence and interaction among barriers increase risk exposure, limit productivity increases, limit value added to products, and limit long-term recovery of agriculture.

The consistency of themes across independent studies lends significant strength to the internal validity of the synthesis; the identified barriers are not isolated occurrences based on research but are systemic in nature throughout the agricultural environment. Although a formal quantitative probability-of-bias assessment or certainty level grading was not conducted because of the methodological differences between research studies included in the synthesis, all research studies were included only if they were peer reviewed; thus, all studies are credible and can be trusted.

Collectively, these research findings show that barriers to agriculture operate holistically as an interrelated structural system of vulnerability as opposed to isolated operational challenges. Therefore, it is essential that multi-level coordinated policies and institutions address the threats of environmental stress, governance of the market, development of infrastructure, access to finance and capabilities of technical systems simultaneously.

5. Discussion

The constraints to agricultural commercialization are not only embedded systematically and mutually reinforcing but also extend beyond farm inefficiencies to include failures at the market, institutional, financial, and infrastructural levels.

4.1. Natural Resource and Climate-Related Constraints

50% of studies included in this review cited natural resource and climate-related constraints as significant barriers to agriculture in Afghanistan. This shows that the environmental constraints within the country are a structural rather than a temporal issue. Majority water resources consumed by agriculture, the country's deteriorated irrigation infrastructure, and high levels of conveyance loss contribute to a large reduction of effective water productivity (Food and Agriculture Organization, 2023). Research by Jamalzi et al (2026) demonstrates increasing frequency of droughts has caused decreased crop yields and increased volatility in agricultural production (Jamalzi et al., 2026). (Sarwary et al., 2023) show that an average temperature increase of one degree Centigrade results in a weight decrease of 271 kg/ha for wheat and 221 kg/ha for barley (Sarwary et al., 2023). Water scarcity and climate change have implications for agriculture that persist over time with respect to both productivity and also create structural risk in the production system. Soil degradation and declines in soil organic matter have been identified as long-term constraints to production (Lal, 2020). The loss of soil organic matter results in a direct reduction in factor productivity. In developing countries, the combination of unstable soils and increased frequency of climate shocks contributes to reduced yields (Quddus & Kropp, 2020). The use of scientific crop rotation practices, moderate use of organic fertilizers, and both wind and water erosion are all conditions that have perpetuated this trend in Afghanistan. These observations support the argument that the source of environmental constraints extends beyond simply

being due to a lack of resource availability; there are also issues related to ineffective management and policy frameworks.

In fragile economies, the lack of modern irrigation systems, agricultural insurance, and climate-adaptive technologies compounds the effects of drought (Intergovernmental Panel on Climate Change, 2022; World Bank, 2021).

The effect of climate pressure on agriculture is only worsened by the interaction of climatic pressures with both institutional and infrastructural limitations within Afghanistan, creating an associated negative feedback loop. Arid and semi-arid regions such as Afghanistan are particularly susceptible to increases in temperature and fluctuations in precipitation (Intergovernmental Panel on Climate Change, 2022; Pörtner et al., 2022).

5.2. Input-Related Constraints in Agricultural Production Systems

One of the most important structural constraints faced by agricultural production systems is input-related constraints, which are a primary reason for yield gaps as well as low total factor productivity (TFP) in agriculture. Limited access to improved seeds, quality fertilizers, or suitable pesticides can reduce farm-level productivity (Jack, 2013). In developing countries, there are weak input market structures that prevent agricultural productivity growth(Food and Agriculture Organization, 2021; World Bank, 2021). There are also structural impediments to agricultural productivity growth created by a lack of affiliate outlets for input supplies (Food and Agriculture Organization, 2021; World Bank, 2021). From a quality standpoint, insufficient seed certification procedures and poor-quality control procedures are major barriers. Poor oversight of the seed and fertilizer markets also results in an increase in counterfeit inputs and a decline in productivity overall (UGANDA et al., 2017). Due to the uncertainty of seed quality, farmers have less motivation to purchase complementary technology (Emerick et al., 2016).

The high costs of inputs represent another structural constraint. Increases in global fertilizer and chemical input prices have caused smallholder farmers to lose considerable amounts of purchasing power (World Bank, 2021). Jayne et al.'s (2018)(Jayne et al., 2018) research indicates that demand for fertilizer is very price-responsive among smallholders; as input and output price ratios increase, the use of fertilizers declines. The increase in costs associated with inputs has increased the difference between potential yields and actual yields by a greater degree than before (Food and Agriculture Organization, 2021). Delayed access during sensitive planting or growing stages can substantially reduce yields (Duflo et al., 2011). Overall, input-related constraints can be categorized into four dimensions: supply shortages, low quality, high cost, and untimely access

5.3. Technical and Farm Management Limitations

Technical and farm management constraints are one of the most prevalent structural barriers to agricultural production systems and contribute significantly to ongoing productivity gaps (Foster & Rosenzweig, 2010; Fuglie & Rada, 2013). The low level of mechanization and the limited use of modern technologies restrict technical efficiency at the production farm level (Foster & Rosenzweig, 2010; Fuglie & Rada, 2013).

Limited access to agricultural machinery and advanced technologies reduces a farm's responsiveness to market and climate-related shocks (World Bank, 2021). Biotic stress management, pests, diseases, and weeds are all factors that contribute to yield losses from crop production. Between 20% and 40% of potential crop production is lost to biotic stresses (Savary et al., 2019). The impact of biotic stresses on crop production will be aggravated due to the weak implementation of Integrated Pest Management (IPM) strategies and a lack of technical advisory services in the management of pest diseases and weeds (Oerke, 2006).

Climate change further increases the impact of biotic pressures on crop production because of the increasing geographic range of pests and diseases (Food and Agriculture Organization, 2021; Intergovernmental Panel on Climate Change, 2022).

This will ultimately increase production risk. Human capital constraints and a weak agricultural extension system also limit effective farm management. Technology use and technical efficiency are directly affected by education and extension service (Genius et al., 2014; Krishnan & Patnam, 2014).

5.4. Market Access and Price-Related Constraints

At the core of the challenges facing agricultural systems are limitations in market access and price. Consequently, a remote location relative to markets, a poorly developed and insufficient transport system, and the lack of a regular market raise the costs of transaction and thus, restrict participation in the high-value markets (Barrett, 2008; Fafchamps & Hill, 2004). Poorly developed distribution networks and the lack of a regulated wholesale system act as market integration barriers in the developing countries (Food and Agriculture Organization, 2021; World Bank, 2021). Moreover, farmers are limited by the fact that intermediaries control value chains. If farmers rely heavily on local traders, then this means farm-gate prices will be low, price transparency limited, and farmers' bargaining power weakened (Shiferaw et al., 2011). Price instability is another major factor. A combination of seasonal variations and supply and demand shocks leads to the generation of substantial income uncertainty (Gilbert & Morgan, 2010). Price volatility in domestic markets in developing countries tends to be higher than the global average (Food and Agriculture Organization, 2021). A lack of access to consistent and trustworthy information on prices, demand, and quality standards skews production and marketing decisions. Furthermore, if farmers are prevented from accessing marketing credit, this will result in them being forced to undertake distress sales right after the harvest (World Bank, 2021). reveal that a smallholder farmer's income and resilience can be significantly raised through participation in higher value-added markets. However, such participation necessitates better access to market information, infrastructure, and financial services (Claude et al., 2025; Huka et al., 2024; Saparova et al., 2024).

5.5. Institutional, Financial, and Policy Constraints

Institutional and financial constraints are a significant part of the major structural barriers to agricultural development in developing countries. The lack of access to formal credit, banking services, and insurance limits the farmers' capability to use improved technologies (Food and Agriculture Organization, 2021). Commercial banks tend to consider agriculture as a sector with a high level of risk due to the lack of sufficient collateral; thus, farmers have to rely on informal money lenders with high-interest rates. When farmers are given easier access to credit, their agricultural investment, input use, production, and value addition are enhanced (Moahid et al., 2022; Reyes et al., 2023). Without credit,

adopting new technology is almost impossible, but in the case of agriculture, the major issue is the type of collateral that is acceptable (Girma, 2022). The agricultural credit guarantee schemes have a great impact on the overall performance improvement in several cases (Osabohien et al., 2022). Agricultural insurance is one of the crucial financial instruments that help stabilize production by spreading the risk over time (Zhichkin et al., 2023). The effective and viable insurance schemes motivate farmers to take up risk-mitigating and productivity-enhancing practices (Chaiyawat et al., 2023). The inconsistency in policy, for example, tariffs, subsidies, and export regulations, keeps changing, raises transaction costs, and acts as a deterrent to investment (Organisation for Economic Co-operation and Development (OECD), 2023).

5.6. Post-Harvest and Infrastructure-Related Limitations

Post-harvest and infrastructure deficiencies are the main challenges of agricultural value chains. During post-harvest operations, a substantial portion of agricultural products is lost or deteriorates, directly affecting farmers' earnings and the competitiveness of agricultural exports (Food and Agriculture Organization, 2021). A crucial constraint is the lack of adequately equipped storage facilities and cold chain infrastructure. Not having cold storage and temperature control systems causes a loss of a lot of fruits and vegetables, and to be sold immediately at a very low price (World Bank, 2020). Building cold storage facilities not only helps maintain the freshness of the produce but also opens the door to high-value markets (Aung & Chang, 2023). The inadequate processing and packaging facilities limit the possibility of raw materials being processed into finished goods in the local market, as well as the ability to meet the standards required for exports (United Nations Industrial Development Organization, 2023). Investing in processing technology not only saves raw materials but also makes the factory more profitable (Galanakis, 2024). Vehicle inefficiencies also add to the cost of doing business and decrease the connectivity of markets (Organisation for Economic Co-operation and Development (OECD), 2023). Making the roads in the countryside accessible not only increases the ability of farmers to sell their produce but also enables them to produce a variety of products (Foster et al., 2023). Cross-border trade problems also lessen competitiveness (World Trade Organization, 2025). Post-harvest storage and processing can be significantly affected by unreliable electricity (power) supply (International Energy Agency, 2025). Inadequate food safety standards and a lack of certification schemes limit the opportunities to enter the formal and export markets (World Health Organization, 2022).

Overall, the six thematic domains show that the disastrous results in agriculture are not just because of the lack of technology but, more importantly, of the interplay of the following structural deficiencies: market access, institutional governance, financial inclusion, infrastructure provision, post-harvest systems, and farm-level management. These constraints limit the production capacity of the system and create a vicious circle. They increase the costs of trading, limit value creation, increase vulnerability to shocks, and, in the long run, decrease the attractiveness of private investment. In light of the foregoing, policy responses should no longer be limited to piecemeal interventions but should instead be coordinated structural reforms that simultaneously strengthen market institutions, broaden the range of risk-sharing financial instruments, modernize post-harvest infrastructure, and stabilize regulatory environments. If these domains remain unsystematically aligned, policy measures taken incrementally will hardly lead to sustainable commercialization or inclusive agricultural transformation.

5.7. Policy Implications

5.7.1. Develop Regulated Market Systems and Price Information Mechanisms

Withholding the focus on market systems development and price information mechanisms strengthening could be an effective structural measure to address agricultural marketing inefficiencies, and is currently referred to as a reform accommodation in the sector. This suggestion involves the formation of wholesale markets under the supervision of a governmental or non-governmental authority, the introduction of universally recognized grading standards and pricing schemes, and the availability of real-time market information services to farmers and traders, among other things. The farmers who form the backbone of agriculture find themselves operating in disconnected and non-transparent markets where the way prices are set is a mystery and contract enforcement is a challenge. With growing commercialization and production shifting more and more towards the market, the lack of structured market governance mechanisms is increasingly viewed as a threat to income stability and investment incentives.

62.5% of the studies analyzed for the review pointed to market access and prices as the major bottlenecks. The findings of the research have shown that the structural issues largely concern the lack and limited access to organized markets, seasonal price fluctuation, lack of bargaining power, and over-dependence on intermediaries. The synthesis of the findings points to suboptimal farm-gate prices and income instability resulting from poor price transparency and the lack of access to reliable market information, which the report eventually attests to as being the principal causes thereof.

The research supports the call for regulated market systems and price information mechanisms with a market-oriented approach, since such systems are instrumental to, among other things, better market regulation, improved agricultural marketing, and increased rural incomes. At the household level, producers who have the required skills and resources to engage in direct marketing of their products to consumers could double their income. At the village or town level, farm products could be sold to the community store at a fairly stable price, and the consumers would also be able to turn to the very same store for their needs without having to worry about fluctuating prices too frequently. The community would also be able to organize irrigation schemes and marketing facilities together with the technical and extension services more efficiently. At the institutional level, a trading system where compliance with the quality standard is not only a pride but a norm and non-compliance inevitably results in penalties, could eventually become one of the key factors for the national marketing system to attract both domestic and foreign investments in the upgrading of agro-processing industries and the marketing logistics. In the long run, at the national or regional levels, a price discovery mechanism is very significant in that it not only improves the efficiency of the market but also influences investment decisions in the production of higher-value crops and enhances the competitiveness of agricultural commodities in both domestic and regional markets.

In the short run, improved access to information can be a means to bring about the suppression of opportunistic pricing behaviors and the stabilization of farm incomes. Nonetheless, the changeover to regulated market systems might be hampered by technical and institutional issues. To set up digital price information systems, there is a need for a reliable telecommunications infrastructure, data management capacity, and institutional coordination. Politically, there could be resistance from

intermediaries who derive their profits from opaque market structures. The limited digital skills of rural producers in using information platforms might be a constraint. In order to tackle these problems, the government should implement a phased approach to the rollout where the building of infrastructure is combined with the farmer training programs. Through public-private partnerships, it is possible to improve technological capacity as well as the continuity of information systems. To develop trust and deter market manipulation, regulatory bodies must have a clear set of rules and discharge their duties effectively.

From a strategic point of view, placing regulated market systems and transparent price mechanisms is a way of achieving the overall objectives of economic efficiency, equity, and inclusive growth. Transparent markets provide the necessary institutional base for the adoption of new technologies, value chain upgrading, and investment confidence. Thus, by eliminating information asymmetry and strengthening regulatory oversight, governments can generate a trading environment that is more predictable and fair, which in turn lays a solid foundation for the agricultural sector transformation. In fact, reforming market governance is not an add-on but a major change that is needed if we want to use agriculture as a source of rural income stabilization, competitiveness, and sustainable development.

5.7.2. Invest in Post-Harvest Infrastructure and Agro-Processing Capacity

Apart from correcting existing structural inefficiencies along the agricultural value chains, investing in post-harvest infrastructure and agro-processing capacity can be a strategic intervention. In this connection, the public and private sectors at a coordinated level) need to invest in cold storage systems, grading and packaging facilities, agro-processing enterprises, rural road networks, and reliable energy infrastructure. The aim is to fix a deep-rooted problem in the production and market realization continuum, where a huge portion of agricultural output loses its value mostly because of insufficient storage, poor logistics, and the lack of processing facilities. Whereas in many developing agricultural systems, policymakers have primarily focused on the production side of things, they have hardly paid any attention to post-harvest management and value addition. With the increasing sensitivity of the markets to quality and the growing trend of exports, it has become imperative to strengthen the post-harvest system so that it can be a vehicle for income growth and competitiveness, coupled with productivity improvements.

The study's results offer powerful arguments for policymakers to adopt the proposed policy direction. Post-harvest and infrastructure-related issues were found in 55% of the reviewed studies; thus, they are one of the most recurring bottlenecks for different commodities. The evidence continuously pointed to a lack of sufficient cold storage capacity, poor warehouse management systems, unstable electricity supply, bad rural road conditions, and a lack of grading and packaging infrastructure as some of the major factors leading to post-harvest losses and distress sales. These problems were particularly severe in the case of highly perishable horticultural products, as the delay and lack of proper storage result in a drastic decline in the product quality and market value. The synthesis also reveals that current policy measures do not sufficiently consider post-harvest management when planning agricultural development. Consequently, the gains in production are often neutralized by physical losses, a drop in quality, and a rise in transaction costs, which exposes a fundamental mismatch of the present investment priorities.

Through the establishment of cold storage facilities and the improvement of logistical services, farmers can minimize spoilage, postpone sales, and secure better prices. The availability of grading, packaging, and processing facilities will not only open up employment doors for the local dwellers but also breathe life into the local economy. The compliance with quality standards will be facilitated by the improved infrastructure, and production chain coordination will also be strengthened. The net effect of these changes at the national level is a greater domestically generated value, less food waste, higher food availability, reduced import demand, and elevated exporter competitiveness.

On the other hand, upgrading the infrastructural facilities entails execution challenges of a different nature. The execution of the project can be hampered by inadequate funds, an overly stretched government budget, and a lack of inter-agency coordination. These operational and governance inefficiencies, coupled with energy shortages, could ultimately jeopardize the sustainability of the initiative. Moreover, the private sector and investors see agro-processing as a high-risk sector due to market fluctuations and policy changes. Policymakers, therefore, need to devise a blended financing strategy that largely depends on public investment but at the same time raises private capital through a combination of concessional credit lines, tax incentives, and risk-sharing mechanisms. Institutional investor confidence can be greatly boosted by transparent procurement systems and regulatory clarity, along with energy supply reliability. Besides, separating the infrastructure development plan into smaller projects that are consistently aligned with specific commodities value chain strategies will not only cut the costs but will also enhance the efficacy of the utilization of resources, thus ensuring sustainability.

From a broad strategic standpoint, investing in post-harvest infrastructure and agro-processing complements the economic modernization, resource efficiency, and inclusive growth. Such interventions, by minimizing the losses and maximizing the value addition, lead to higher productivity without additional land and water use, therefore, solving the environmental sustainability dilemma. Innovation, entrepreneurship, and integration into regional markets become possible when the logistics and processing facilities are strong enough. After all, tackling the post-harvest constraints is not just a matter of refining the operations but rather a comprehensive restructuring that improves resilience, competitiveness, and the fair sharing of value across the agricultural sector. Consequently, decision-makers and stakeholders must perceive post-harvest investment not as a complementary agricultural intervention but as a baseline to sustainable agricultural development.

5.7.3. Expand Agricultural Extension and Farmer Training Programs

Agricultural extension and farmer training programs need to be expanded and strengthened as a main intervention for technical and farm management. guidance for farming and farming-related management issues. The recommendation implies renewal of public extension services, increasing coverage of agricultural advisory services at the field level and establishing formalized training platforms, e.g., farmer field schools and demonstration plots. The problem is that most farmers' knowledge still lacks updated and modern technical knowledge, advisory services are hardly available, and farmers hardly use new technology, all of which are the direct cause of low productivity. With climate change happening rapidly, pests and diseases increasing, and market requirements getting stricter, farmers need updated technical guidance all the time. Upgrading the extension system should

be regarded as something mandatory and necessary, which basically means that agricultural development strategies will now lead to practices on farms and productivity gains.

According to the study, the recommendation is highly desirable. There were technical and farm management difficulties in more than half (52.5%) of the studies reviewed that made these two types of problems the most common ones. The findings of the studies systematically emphasized low mechanization, poor pest and disease control, a limited number of farmers adopting new technologies, and less than adequate extension services as the leading factors contributing to the yield gap. A couple of the studies pointed to the lack of enough training and the weak connection between research and field-level application as being the main reasons. That is the present extension system is not covering sufficient area, is short of the necessary resources, and is not coordinated well enough to be able to spread innovation efficiently. In most instances, the approaches combine fragmented or project-based advisory services that are not sustained by the institutional frameworks. The diffusion of knowledge is done very unevenly and the effect does not last as long.

Significantly increasing extension and training programs would undoubtedly bring great benefits on many fronts. Through access to technical advice, farm-level decisions would become more efficient, input use would be optimized, and integrated pest and disease management practices would be reinforced, thereby directly increasing yields and reducing losses. Demonstration plots and farmer field schools, at the community level, would be the main vehicles for peer learning, collective problem-solving, and thus the capacity for innovation locally would indeed be strengthened. Effective linkages between research institutions and extension services would facilitate the rapid transfer of climate-smart technologies and adaptive practices. Enhanced human capital in agriculture would lead to higher productivity, better food security, and stronger resilience to environmental shocks. In the long run, continuous farmer education investment will accelerate innovation adoption, higher-value crops diversification, and the sector's structural modernization.

Undoubtedly, extension reform, which is critical to further developments in agriculture, is beset by several implementation challenges. The extension services, due to limited public funding, staff shortages, and ineffective institutional coordination, may produce low outreach. Besides the pretty high costs of reaching the scattered rural populations, illiteracy could also be a factor in the limited uptake of technical information. To address these problems, extension pluralistic models should be embraced through which public services can be combined with private advisory providers, non-governmental organizations, and the use of digital platforms. 'Training of trainers' programs' investments will enhance local capacity, whereas the use of mobile-based advisory tools will increase geographical coverage. Instituting evaluation mechanisms based on performance that are targeted at extension agents will surely bring about improved accountability and delivery of services. Lessons learnt from similar reform settings demonstrate that participatory approaches, like farmer field schools, when they have institutional support, increase adoption levels and therefore result in lasting sustainability.

From a strategic standpoint, raising the level of agricultural extension service is perfectly in tune with the broader objectives for innovation-led growth, sustainability, and development that are more inclusive. Human capital development is indeed one of the main pillars of resilient agricultural systems that can adapt to climate variability and can handle market shocks. Equipping farmers with technical knowledge and the ability to make informed decisions, essentially policymakers, can achieve production

increase and competitiveness without extra pressure on natural resources. Reenergizing extension services goes beyond being a mere supportive measure; it is a fundamental investment in the intellectual infrastructure of agriculture. Therefore, extension reform ought to be considered a long-term strategic initiative that is indispensable for sustainable agricultural transformation and rural well-being by the government and all other actors.

5.7.4. Strengthen Climate-Resilient Agricultural Infrastructure and Water Governance

Following the study's main findings, the government should highly prioritize strengthening climate-resilient agricultural infrastructure and reforming water governance frameworks. A central part of this recommendation is the selective technology upgrade of irrigation, water harvesting, and construction capacities that can adapt to and withstand repeated climate shocks. The reform call also includes institutional changes to enhance water allocation efficiency, maintenance, and fair distribution among users. This policy direction is fundamentally about addressing the environmental vulnerability of agricultural systems in areas where climate variability and water scarcity limit productivity. Since climate change will further exacerbate droughts, irregular rainy seasons, and other extreme weather events, ramping up irrigation resilience and governance now serves as a timely and necessary step to protect food production, rural ways of living, and the viability of the sector in the long run.

The paper offers a solid empirical base for this type of intervention. It was found that climate-related and natural resource limitations featured in half of the studies reviewed, thereby indicating their environmental status. Droughts, inefficient irrigation systems, water shortages in the dry season, soil degradation, and poor water management were some of the main causes of yield fluctuation and production risks. Upstream failures in governance, including poor infrastructure maintenance and inefficient water allocation, were largely responsible for these problems, which were also considered as limiting factors rather than environmental events. Irrigation systems that are already in place are old, and governance mechanisms often lack transparency, accountability, and involvement of the users.

The installation of climate-resilient infrastructure and governance reform can have a range of advantages and benefits that are manifested at different levels. At the level of the farm, crop losses due to drought will be minimized and water-use optimized if farmers have access to irrigation that is reliable and efficient. Besides income generation, this in turn stimulates community cohesion as shared water resources are managed better and the potential for conflicts is reduced through strengthened water governance mechanisms. When production is less affected by weather conditions at the national level, the country can afford to have better food security, fewer imports of foodstuffs, and an economy that is more resilient to the impacts of weather fluctuations. Short-term losses caused by drought could be limited with modernized irrigation and water collection installations, and over time, resilient water facilities would lead to increased investments in more lucrative crops, sustainable land use practices, and overall enhancement of agricultural capacity.

Effective governance and the realization of the accountability principle should be guaranteed by the capacity-building programs aimed at water user groups and local officers. Participatory forms of management coupled with legal adjustments of water rights increase compliance and legitimacy. Implementation risks can be minimized, and sustainability can be improved when infrastructure development is combined with institutional strengthening. On the strategic level, ramping up of climate-

resilient infrastructure and water governance, the ultimate goals of sustainability, risk reduction, and equitably managed natural resources. Technical solutions and institutional arrangements for resource management are the two sides of the same coin by which environmental vulnerability is tackled. Turning climate risk from a chronic constraint into a manageable challenge is thus the very essence of this transformative reform. In fact, production is only stabilized following the reforms, but the structural foundations for innovation, diversification, and long-term agricultural transformation are actually established.

It is clear that an investment in resilient water systems goes far beyond a mere adaptation strategy to environmental changes; these systems represent the very foundation for ensuring productivity, stability, and inclusive rural development even with the advent of climate-related uncertainties.

5.7.5. Enhance Access to Formal Agricultural Credit and Risk Management Instruments

Giving farmers easier access to formal agricultural credit and developing risk management tools are the best points of a structural reform agenda for rural financial systems. One part of their proposal is to expand rural banking outreach, another part to design local agricultural lending products, smallholder production cycle-appropriate, and still another part to roll out crop insurance schemes that help farmers face climate and market shocks. The plan is to reverse financial exclusion in agricultural economies since the lack of access to formal finance in agriculture has become a bottleneck for productivity increase and at the same time, a factor of vulnerability perpetuation. The farming households are mainly dependent on local informal credit sources that come with the worst terms and deepen the dependency relationships. The worsening of climate-related risks and the rise of market integration are the two reasons for which the strengthening of rural financial systems is quite a timely and necessary move to sustain investment, resilience, and inclusive economic development. The results of this research can be viewed as a strong and quite direct ground argument for such a policy.

The studies on Institutional, financial and policy constraints were identified in 45% of the reviewed papers; these constraints are very significant at the systemic level. Much of the evidence points to the lack of rural banking services, a poor variety of loan products for agriculture, strict requirements of collateral, and the absence of formal risk-sharing mechanisms as factors that prevent people from investing in inputs, mechanization, and technology upgrades. The unavailability of crop insurance was considered very disadvantageous in areas prone to droughts, price fluctuations, and production uncertainties. So, according to these studies, financial policies at present are not really in line with agriculture's risk profile, and they do not integrate lending with seasonal incomes and climate-related hazards. This is why farmers, who are not only undercapitalized but also very cautious, hardly ever get to raise their productivity through innovations.

Apart from the direct impact on the farmers themselves, which is quite clear, rolling out formal credit and insurance to the rural clientele would also bring benefits of a different nature and scale. After all, farm-level credit products that are developed with the end-users' characteristics in mind will be effective in facilitating the acquisition of quality inputs, mechanization, and technology upgrades. Having insurance really helps to smooth income fluctuations, thereby ensuring that if there are any changes in income arising from the market and production conditions, the farmer can still make money and that the big losses are averted.

The strengthened financial inclusion at the local level may bring about rural entrepreneurs and a growing movement of agribusinesses. Consequently, well-kempt rural finance systems can work to the advantage of the whole economy by making money markets more efficient and at the same time increasing the agricultural and banking policy panels' collaboration. To go even further up the value chain, investments in agriculture that are agrarian-enhanced would result in nothing less than increased yield levels, food availability, and the opening up of the economy to new activities. Looking from the production period perspective, in the short run, working capital will solve the problem of cash shortage. Whereas, in the long run, the implementation of well-structured risk management frameworks will be instrumental in building the capacity of farmers to withstand shocks, which is the main driver behind the reduction of poverty and strengthening of the sector at the same time.

The reality is that the execution of the plan runs into technical and institutional impediments. When it comes to the agriculture sector, banks may be reluctant to get involved due to the high-risk perception resulting from weather-related changes, lack of sufficient collateral, and weak data management systems. Correspondingly, the enormous expenses of attending to widely scattered rural clientele can also be a deterrent to banker interest. Besides, the farmers' low level of understanding of how financial products work may be a factor in the drop of product usage. One of the proposed recipes is for governments to set up risk-sharing facilities, credit guarantee schemes, and pilot insurance programs with state subsidies, which will serve as an incentive for the financial sector. The combination of weather-indexed insurance and better agricultural data management can lead to less cumbersome administration, and moral hazard will be minimized.

Capacity-building initiatives focused on increasing financial literacy and cooperative-based lending models can lead to better repayment and inclusion. The public support mechanisms combined with private financial services raise both sustainability and outreach.

Intensifying the rural financial system goes hand in hand with the aim of achieving economic inclusion, resilience, and sustainable development. Through financial reform, the sector is open to innovation, productivity is improved, and the value chain is better connected by lessening the capital constraint and controlling the risk factor. In addition, credit and insurance facilities help promote justice by providing small farmers with the required opportunities, who are mostly left out of the formal markets. The reform of agricultural finance is a key issue in agricultural transformation, leading to a resilient sector capable of attracting investment. Therefore, policymakers and stakeholders should consider rural financial inclusion as an essential aspect of agricultural modernization and economic stability.

6. Conclusion

This systematic review synthesized evidence from 40 peer-reviewed studies published in the academic literature for the period from 2010 to 2025 to determine structural constraints that hamper agricultural production and marketing in Afghanistan. The results show that agricultural underperformance is a result of six interlinked constraint domains: natural resource and climate-related pressures, input-related limitations, technical and farm management deficiencies, market access and price-related barriers, institutional, financial and policy constraints, and post-harvest and infrastructure bottlenecks. Market access and price-related constraints were the dominant issue amongst the studies, reflecting 62.5% of cases. Secondly, there were post-harvest and infrastructure deficiencies (55%) and technical

and farm management gaps (52.5%), which means that agricultural commercialization and resilience are fundamentally limited by systemic distortions in value chains and governance systems rather than by isolated production shortages.

The conducted review in the form of a synthesis adds to the already existing literature by offering a clear analytical framework that brings together previously scattered pieces of evidence and shows the mutually reinforcing character of production and marketing constraints. In a practical sense, these findings highlight the essential nature of coordinated multi-level interventions that concurrently handle environmental stress, market governance, infrastructural development, financial inclusion and technical capacity. Considering the structural interdependencies revealed by the studies, fragmented policy responses that focus only on individual constraints will most likely not be able to reach a sustainable impact.

Some limitations should be taken into consideration. The selection of the studies was limited to English-language studies, which are published in peer-reviewed journals and thus may not represent the most comprehensive set of data, as relevant findings published in local languages or grey literature could have been omitted. Furthermore, the focus of the synthesis is on constraints as reported rather than on quantitatively measuring their relative economic significance and due to the lack of meta-analysis, it is not possible to determine the size of the effect across different commodities and regions.

For future research, it is advisable to focus on the longitudinal studies that can provide information on how constraint dynamics change over time and also assess the differential impacts of these barriers on different crop types, farm sizes, and agro-ecological zones. Comparative analyses between countries and a better involvement in primary data collection activities at farm and value chain levels will even more increase the strength of causal inference and help policy design in specific contexts. Resolving the agricultural challenges in Afghanistan will ultimately require a continuous empirical dialogue with the structural complexity that has been exposed by this synthesis.

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