

Informality, institutional inconsistency and information asymmetry as barriers for entrepreneurship and innovation in the non-wood forest products sector in Republic of North Macedonia

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Abstract

Non-wood forest products (NWFPs) are crucial for rural development, offering opportunities for entrepreneurship and innovation in forest-dependent areas. However, the NWFPs sector in North Macedonia faces significant barriers to growth, rooted in both public and private spheres. This paper explores three key challenges: informality, institutional inconsistency and information asymmetry, and conceptualizes them through an analytical framework called the 3-I's Model. Informality, prevalent among private actors, disrupts market stability and discourages investment. Institutional inconsistency, in the form of regulatory overlaps between the forestry and environmental sectors, hinder coordination. Additionally, the lack of accessible information on support programs limits opportunities for development for both private companies and public institutions. By applying a sectoral and regional innovation systems framework, the study demonstrates how outdated practices and misaligned institutional structures have hindered innovation over decades. The interplay between public and private spheres amplifies these challenges, with institutional inefficiencies and information gaps perpetuating informality and limiting sectoral growth. To overcome these barriers, the paper recommends targeted policy interventions that foster collaboration between public and private sectors, strengthen regulatory alignment, and improve access to information. The 3-I's Model thus provides a practical lens for understanding these systemic constraints and guiding reforms that can enhance the NWFPs sector's role in sustainable rural development in North Macedonia.

Key words: NWFPs; entrepreneurship; innovation; innovation system; transition economy; systemic barriers

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1. Introduction

In 2024, the global population reached 8 billion people (UN SD 2024) intensifying the demand for food and feed. This demographic surge presents a significant challenge to achieve the UN's 2030 "Zero Hunger" objective. Sustainable intensification of farming, often seen as a solution, faces considerable limitations. Thus, exploring alternative food sources and income opportunities, particularly in rural areas, has become essential. The United Nations Climate Change Conference (UNCCC) in Katowice, Poland, highlighted the crucial role forests play in achieving the UN Sustainable Development Goals (SDGs) particularly in mitigating climate change and

supporting renewable energy production (EC 2018). Forests contribute not only by providing timber but also through valuable non-wood forest products (NWFPs), supporting biodiversity, regulating water cycles, and protecting soil.

However, forest ecosystems face substantial pressures due to environmental degradation, urban expansion, and deforestation driven by agricultural activities (European Environmental Agency 2016). Policymakers are increasingly recognizing the potential of the forest sector to promote renewable resources and green economic growth (Ludvig et al. 2016a; Martínez de Arano 2021).

FAO defines NWFPs as "goods of biological origin other than wood derived from forests and other wooded

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land and trees outside forests” (FAO 1999). NWFPs offer significant opportunities for rural communities by providing food, medicine, and materials essential for livelihoods (Arnold 2002; Niskanen et al. 2007). In Europe, 90% of households consume NWFPs regularly, and 26% collect them for self-consumption or sale at least once a year (Lovrić 2020). Despite their importance, global data on NWFPs is often incomplete, hindering policymakers’ ability to make informed decisions and limiting NWFPs’ potential contribution to rural economies and biodiversity conservation (Shackleton et al. 2024).

In South Eastern Europe (SEE), including North Macedonia, the collection and trade of NWFPs has been a traditional activity vital for rural economies and cultural heritage. Despite this, the NWFPs sector in North Macedonia faces a significant lack of data on quantities of NWFPs collected, processed, and sold/exported, making it difficult to assess its economic contribution. Forest management, historically focused on timber, has overlooked NWFPs as a revenue source, contributing to the lack of systematic data collection (Glück 2000).

The absence of accurate data poses a significant obstacle for policymakers aiming to develop and support the NWFP sector. Without reliable information, designing strategies for sustainable management and commercialization remains difficult. Consequently, the sector’s potential to enhance rural livelihoods and contribute to biodiversity conservation remains largely untapped. Addressing this requires comprehensive data systems and stronger stakeholder collaboration to foster innovation and entrepreneurship within the sector (Glück 2000).

This paper seeks to deepen the understanding of the NWFPs sector in North Macedonia by analyzing actor behavior and interrelations along relevant value chains. It focuses on identifying the barriers to entrepreneurship and innovation in the sector, with particular attention to institutional and market-related obstacles. These obstacles influence both individual actors and the broader policy frameworks, shaping the sector’s development trajectory.

The research aims to answer the following research question: What are the primary obstacles to entrepreneurship and innovation in the NWFPs sector in North Macedonia? The study also proposes ways to better connect public (institutional) and private (market) spheres to support entrepreneurship and sustainable development. To address this, the study reviews the current state of the NWFPs sector, highlights key challenges, and proposes strategies to encourage innovation and entrepreneurship. The methods section outlines the research design, followed by results, discussion, and a conclusion summarizing key findings and practical recommendations. The study identifies three major challenges – informality, institutional inconsistency, and information asymmetry – conceptualized as a “3-I’s Model”, which offers a structured lens for understanding barriers to innovation

in the sector. The 3-I’s bridge public and private spheres, demonstrating how institutional and market structures are interlinked. Grounded in empirical insights from North Macedonia, the model can be applied to similar institutional contexts.

The non-wood forest products sector in North Macedonia

For many years, NWFPs have provided supplemental income for vulnerable rural communities in North Macedonia (AgBizz 2008). Despite their importance, the role of NWFPs in the national economy and their contribution to exports have largely been overlooked. As Martínez de Arano (2021), concluded, the demand for NWFPs such as cork, aromatic plants, and mushrooms is high and expected to increase. This demand is driven by current policy trends toward a sustainable circular bio-economy (EU Green Deal (EC 2019); Green Agenda for Western Balkan (EC 2021); Lovrić 2021) and a growing interest in experiential services in tourism and recreation (Weiss 2017b).

During the Yugoslav era, the NWFPs sector in North Macedonia was part of the Agricultural Industrial Combine (AIC). After Yugoslavia’s disintegration in 1991, social enterprises were privatized, along with the transformation of forest management enterprises. The NWFPs sub-sector, not dependent on agricultural land, underwent rapid privatization (Živojinović 2017). Despite these changes, the role of individuals in the value chain has remained similar.

The value chain of the NWFPs in North Macedonia consists of four parts (Fig. 1): 1. Collectors, 2. Buyers/traders, 3. Processors, 4. Exporters (Nedanovska 2012). Some companies integrate multiple roles, combining buyers, processors, and exporters. These companies often maintain collector networks (lists of collectors) and are key players in the national NWFPs market.

Research by Rusanen (2024) emphasizes the importance of integrating sustainability into forest practices, including NWFPs, to ensure long-term value creation. NWFPs are considered public goods and are harvested from nature, with governments deciding whether to grant public access (Mantau et al. 2001; Amici et al. 2020). In North Macedonia, the collection of NWFPs is limited to 1 kg per person for personal use, although enforcement of this rule is weak.

A major challenge in assessing the NWFPs sector is the lack of data on commercial and personal collection. Statistics from the State Statistical Office (SSO), are fragmented, making it difficult to compile a full overview of the quantities collected, domestically sold, and exported. The Ministry of Environment and Physical Planning (MoEPP) collect some data, but it is not publicly accessible. There is also no data on local market sales, both fresh and processed, making it impossible to estimate volumes traded locally.

Despite these gaps, available data reveal key NWFP exports: fresh, frozen, sliced, or dried mushrooms; dried

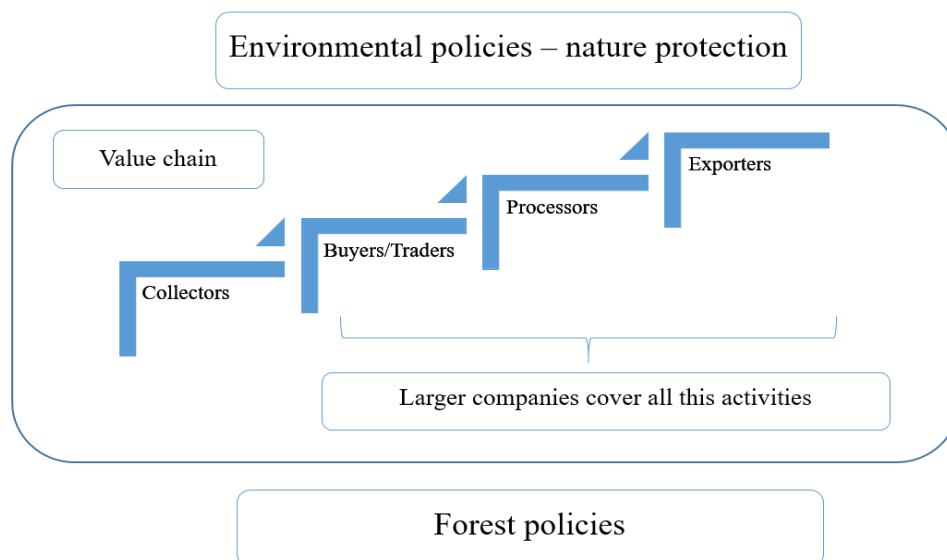


Fig. 1. The scheme of NWFPs value chain in North Macedonia (own illustration, following Nedanovska 2012).

juniper berries; blueberries; and medicinal and aromatic plants (MAPs). Between 2015 and 2020, 6,921,959 kg of berries (blueberries, blackberries, juniper, raspberries) were collected, and 5,586,695 kg exported – 81%. Blueberries made up 42% of total berry exports. In the same period, 274,884 kg of MAPs were collected, with 173,884 kg exported. For mushrooms, 6,745,034 kg were collected, mainly porcini (4,972,884 kg), of which 3,811,690 kg were exported – including 2,836,233 kg porcini mushrooms.

While North Macedonia has a longstanding tradition in NWFPs sector with significant export potential, especially in berries, MAPs and mushrooms, the full economic potential remains underutilized due to data limitations. Traditional rural practices also persist, with resistance to new methods (Nedanovska 2012). In low-tech sectors like NWFPs, innovation can occur through incremental improvements and simple technologies enhancing productivity and sustainability (Hirsch-Kreinsen & Jacobson 2008).

2. Theoretical framework

The formal recognition of NWFPs at the international level gained momentum in 2000's when the Food and Agriculture Organization (FAO) included them in the Forest Resource Assessment (FRA) program. Although NWFPs were acknowledged earlier, this marked a systemic effort to monitor and evaluate their role in forestry.

In recent years, NWFPs have gained increased research attention, particularly in rural development (Wolfslehner et al. 2019; Lovrić et al. 2020; Huber et al. 2023) and the bioeconomy (Chamberlain 2022; Weiss et al. 2023; Hetemäki 2024). Recognized as potential

economic drivers (de Aragón 2011), they offer livelihood opportunities in rural and forest-dependent areas (Niskanen et al. 2007). These perspectives frame NWFPs not only as ecological and cultural assets, and as innovation-rich components of forest economies.

To analyze innovation and entrepreneurship in the NWFPs sector, this study draws on policy and innovation system theories. The System of Innovation (SI) approach (Edquist & Johnson 1997) emphasizes that innovation is shaped by institutional settings, actors' networks, and market conditions that enable or constrain development (Edquist 1997). It includes organizations, rules, and knowledge flows, highlighting the need for actor collaboration (Edquist 2001). This is especially relevant in the NWFPs sector, where innovation is often constrained by weak institutional linkages and underdeveloped support structures (Weiss et al. 2017a; Živojinović et al. 2017).

Rogers' (2010) diffusion of innovation, is also central to NWFP dynamics, as a communication process where adoption depends on social networks.

Building on this, sectoral innovation systems (SIS) explore on how innovations emerge from specific configurations of actors, institutions, and technologies (Breschi & Malerba 1997; Malerba 2006). In forestry, innovation is typically incremental or process-based, not disruptive. Regional innovation systems (RIS) emphasize geographical proximity, institutional embeddedness, and cross-sectoral knowledge exchange (Braczyk et al. 1998; Asheim & Coenen 2005). These theories stress the need for context-specific policies, institutional coordination, and regional capabilities to foster NWFP innovation.

From a political science lens, innovation is not merely a technological or economic but also an institutional, shaped by actor coalitions, power dynamics, and govern-

ance frameworks (Scott 2001). Institutions do not just regulate markets but they affect entrepreneurs' ability to adapt and seize opportunities (Edquist 1997; Sabatier 1993, 1998). In forestry and NWFPs fragmented responsibilities between forestry and environmental authorities often create regulatory ambiguity. Buttoud et al. (2011) identify such market and policy constraints as key obstacles to innovation in Europe's forest sector.

Empirical studies reinforce this. Ludvig (2016b) and Weiss (2017a) argue NWFPs are disadvantaged by institutional settings that fail to recognize their economic potential. In SEE, including North Macedonia, these issues are pronounced. Živojinović (2017) found that NWFP innovation in SEE countries is highly dependent on institutional support, highlighting the role of governance in post-socialist economies.

Public policy shapes innovation ecosystems through regulations, financial incentives, and knowledge-sharing mechanisms. Institutional structures reduce uncertainty, manage conflict, and provide incentives (Edquist & Johnson 1997; Rametsteiner & Weiss 2006). For NWFPs, innovation-supportive policies must focus on regulatory simplification, access to financial instruments (e.g., subsidies), and networking support for rural entrepreneurs.

In the entrepreneurship literature, institutions are key enablers or inhibitors of entrepreneurial activity. Entrepreneurial development reflects economic motivations, individual capacity, and cultural factors (Weiss 2020). In NWFPs, entrepreneurial initiatives often come from individuals or small businesses operating outside formal institutional support system (Ludvig et al. 2016a). These rely on personal networks and products intangibility (Emery et al. 2006). Without institutional backing, innovations remain small-scale and hard to scale or formalize (Weiss et al. 2019).

The institutional landscape is not passive. It actively shapes innovation trajectory, especially in sectors like NWFPs, where formal and informal institutions interact in complex ways (Górriz-Mifsud et al. 2017). In countries with high informality, entrepreneurs face unpredictable environments. Williams (2010) notes that "irregular" activities, those deviating from formal rules or norms undermine market trust and create uncertainty. These asymmetrical behaviors hinder stable legal operation (Diaz 2002; Šalka et al. 2006). The term "irregular" refers to actions deviating from norms (Dictionary Cambridge); "asymmetrical" describes behaviors not aligned with procedures or codes. This institutional asymmetry, where informal norms conflict with formal rules, can significantly hinder entrepreneurship. The gap between societal norms and formal reforms undermines regulations (Williams & Vorley 2014), creating barriers to entrepreneurial development (Wolfslehner et al. 2019). The informal economy, operating outside legal frameworks, further complicates regulatory alignment (Williams 2009).

3. Methods

Given the diversity of perspectives among main actors in the NWFP value chain (CNVP 2020), a dual-stream assessment approach (Shackleton & Pandey 2014) was employed. This approach incorporates two streams: the first focusing on NWFP entrepreneurs, mainly small and medium enterprises (SMEs); the second examining the perspectives of NWFP collectors in rural communities. Before analyzing these key market actors, the policy frameworks governing the sector were reviewed to understand the institutional environment influencing sectoral activities.

3.1. Content analysis of policy documents

To assess the institutional framework surrounding the NWFPs sector, a qualitative content analysis was conducted on 13 policy documents (see Annex 1), categorized by their administrative affiliation with the forestry and environmental sectors. The aim was to understand how policies regulate and support entrepreneurship and innovation across NWFP commercialization stages: collection, processing, trade, and sales. The analysis examined how these activities are defined, organized, and regulated, identifying overlaps, gaps, and inconsistencies that may affect entrepreneurship and innovation.

Manual coding of the documents was conducted in Microsoft Excel. Relevant text segments were categorized by: a) activity definition (collection, processing, sales); b) regulation of access and trade; c) incentives and support for entrepreneurship and innovation; and d) barriers (regulatory, institutional, informational).

A combined deductive and inductive analytical approach was used. Initial coding categories were predefined (e.g., "formal vs. informal actors", "regulatory complexity", "lack of incentives", "market access", "institutional fragmentation"), while themes such as "limited access to information", "weak institutional cross-sectoral coordination" and "power asymmetry in value chains", emerged inductively and were integrated. This allowed for both structured comparison and context-specific insights.

The analysis identified two key actors' types in NWFP value chain: collectors on one side, and buyers, traders, processors, and exporters on the other. Policies often addressed these groups differently, and sometimes created barriers to collaboration and entrepreneurial development.

This policy review assessed how current frameworks support or hinder entrepreneurship and innovation in NWFPs. It also offered insights into institutional dynamics ("rules of the game"), information access and informality, factors that affect market stability and regulatory effectiveness. These are further elaborated in the results section.

3.2. Survey design and data collection

To complement the policy review, two structured questionnaires were developed to capture NWFP actor perspectives: one for NWFP entrepreneurs (owners/managers of SMEs) and another for individual collectors. Originally designed for the author's PhD research, the questionnaires cover broader themes than this article presents. For this study, only a relevant subset of questions was used to address the core research aims. The surveys explored themes such as socio-economic background, information flow, payment and contracting systems, formal/informal relationships, and cooperation mechanisms (Annexes 2 and 3).

From the collector survey (Annex 2), selected questions included socio-demographics (Q1–7), economic dependency and income sources (Q8–9, 22–23, 26–30), collection practices and knowledge transfer (Q10–13, 16–21) and cooperation with companies and collective actions (Q24–25, Q32). These questions were chosen to explore how collectors engage with the market, their reliance on NWFP income, and their level of formalization, key elements in understanding informality and information asymmetry.

From the company survey (Annex 3), questions were selected to capture socio-demographic information (Q1–4), company background and operations (Q5–12), procurement practices (Q13–26), and processing activities (Q 27 onward), all central to the study's analytical framework. Specifically, Q5–10 provides insights into founding histories and intergenerational elements; Q8, Q14–18 and Q22 focus on relationships with collectors, and capacity building dynamics. Additional items (Q23–25, Q50 and Q52) address pricing strategies, cooperation models, and patterns of association were included to investigate intuitional engagement and private sector coordination, both integral components of the 3-I's Model framework developed in this study.

3.3. Entrepreneurs' survey

A list of companies active in NWFPs sector was obtained from the Central Registry Office of North Macedonia. Given the small population size (35 companies), a census approach was applied, and all companies were contacted. Entrepreneur questionnaires were conducted face-to-face at company premises between February and May 2019. At the time of the study, there was no formal association of companies engaged in NWFPs.

3.4. Collectors' survey

The identification of NWFPs collectors was challenging due to the lack of formal registration and absence of an association. Initial attempts to obtain collector lists from surveyed companies were unsuccessful, as most refused to disclose this information. Those that agreed required interviews to be conducted on their premises, which was excluded to avoid potential bias.

To address this, the Public Enterprise “Nacionalni Šumi” (PENŠ), responsible for issuing licenses for NWFPs collection in state forests, provided a list of 79 licensed collectors from 2018. A census sampling was applied, with all 79 conducted via telephone or village visits. This resulted in 50 completed questionnaires, providing a more independent and representative dataset. Although unregistered, informal collectors were not included, is the sample represents the larger commercial collectors in North Macedonia.

3.5. Methodological rigor and limitations

The dual-stream approach, combining qualitative policy content analysis with stakeholder surveys, offers a comprehensive perspective on the NWFPs sector. However, some limitations should be noted:

Time Lag: Data were collected in 2019, which may raise concerns about current relevance. However, findings remain valid, as no significant sectoral changes have occurred since. This is supported by results from the FAO project “In-depth study on the use of non-wood forest products (NWFPs) in selected Balkan countries” (2021), conducted with the national NGO REFORD, in which the lead author participated. This study confirms that the conditions in North Macedonia's NWFPs sector remained largely unchanged.

Supplementary interviews: To address this limitation and validate the findings, face-to-face interviews with three policy makers were conducted in 2024. These confirmed that sectoral challenges and dynamics remain relevant.

To ensure transparency and reproducibility, the full questionnaires used for this study are provided in Annex 2 and Annex 3.

In conclusion, by integrating survey data, policy content analysis, FAO project findings, and supplementary interviews, this study offers a comprehensive and reliable assessment of the NWFPs sector in North Macedonia. The methodological approach ensures robustness, transparency, and relevance for policymakers and stakeholders aiming to foster innovation and entrepreneurship in the sector.

4. Results

4.1. Policy analysis

NWFPs in North Macedonia are found in forests, mountains, pastures, agricultural lands, and plantations. Jurisdiction over NWFPs is split between two administrations: the Department of Nature under the MoEPP (environmental protection) and the Department of Forestry and Hunting, under the Ministry of Agriculture, Forestry and Water Economy (MAFWE) (forest sector). The legal framework includes national laws from both administrations (Annex 1), such as the Law on Forest, the Law on Nature Protection, and the Law on Environment.

The forest administration references NWFPs in relation to forest management and harvesting rights, while the environmental administration enforces stricter rules for conserving endangered and rare species. Historically, NWFPs were managed under forestry and agricultural sectors, but following Yugoslavia's disintegration, and the transition period, their importance declined (Živojinović 2017). In recent decades, NWFPs have been re-incorporated into forestry policies in response to international discourses promoting multifunctional forests use, as reflected in the Law on Forest of North Macedonia (2009).

In North Macedonia, NWFPs are collected by both licensed and unlicensed collectors. Licensed collectors hold collection permit issued by the forest or environmental administration, as defined in the Rulebook for issuing permits for collection of threatened and protected wild species of plants, fungi and animals and their parts (Official Gazette of Republic of North Macedonia 102/09) and the Rulebook for Issuing Collection Permits, Contracts for Assignment of Collection and Purchase, and for Keeping Records on Other Forest Products (PENŠ). Private companies usually maintain their own collector lists and cover permit costs. SMEs and traders pay collection and purchase fees. National Parks charge 500 denars (8 euros) per collector annually, while PENŠ charges 400 denars (6,5 euros) (based on PENŠ, and NP information).

Due to the absence of a unified permit system, collectors or companies may need to apply to both administrations and pay fees twice. Additionally, export permits for of protected and endangered species of plants, mushrooms, animals and their parts are issued by MoEPP at 1,000 denars (16 euros) (Official Gazette of the Republic of North Macedonia, 135/10). Collection licenses are valid nationwide and not restricted to specific areas.

The Law on Forests (2009) is the only legislation specifying NWFP collection quotas. Article 13(2)(4) states that "...without a collection permit, which is issued by forest owners/users, it is prohibited to collect other forest products (mushrooms, forest fruits, medicinal plants, snails, etc.) in an amount greater than 1 kg", recognizing personal-use (own/self-consumption) and commercial collectors.

In addition to policy documents, relevant studies and projects in forestry, nature protection, and bioeconomy were considered.

The analysis revealed institutional shortcomings in NWFP governance: no single responsible authority, limited enforcement capacity, and inconsistent regulation. Overlapping jurisdictions often create confusion for collectors and companies over procedures and fees. Fragmentation and poor coordination between forest and environmental sectors increase administrative burdens and discourage formal engagement. These weaknesses contribute to gaps between official rules and on-the-ground practice, undermining effective policy implementation.

4.2. NWFPs collectors

The socio-economic analysis reveals a well-defined profile of NWFPs collectors in North Macedonia. A significant majority (88%) are men living in rural areas (80%), typically in larger households of 5–7 members. Educational attainment is modest: 60% completed secondary or secondary technical education, while 36% have only a primary education. For 32%, NWFPs collection is primary or sole income source, and 48% report no other income. In over two-thirds of households, at least one pensioner contributes significantly to the household budget.

Knowledge of NWFPs collection is usually passed down through family traditions, with all respondents having over 10 years of collecting experience. Collection is often a social activity: 40% collect with family, and 46% with friends or neighbors. It is localized near collectors' residences, typically in familiar, designated spots. Two-thirds of respondents collect NWFPs for 60–120 days annually, with some active over 150 days. Economic motivation dominates, with forest fruits and mushrooms most commonly collected. All respondents reported possessing basic collection/harvesting knowledge, gained through training from private/national companies or international organizations (USAID, UNDP).

Over 80% of collected NWFPs are sold, with a smaller share used for personal consumption. Cooperation with companies is a longstanding tradition, 98% (Fig. 2) sell NWFPs to companies, and 90% have worked with the same company for more than 15 years. Most respondents (34 out of 50) cooperate with one or two companies (Fig. 2); 15 work with three or four. None reported working with five or more companies, indicating a stable but limited market network. Collectors from the same village typically work with the same companies, often located geographically close to the collectors' place of residence. Cooperation is rated as strong (42%) or very strong (54%) (Fig. 3), reflecting long-term and trust-based relationships.

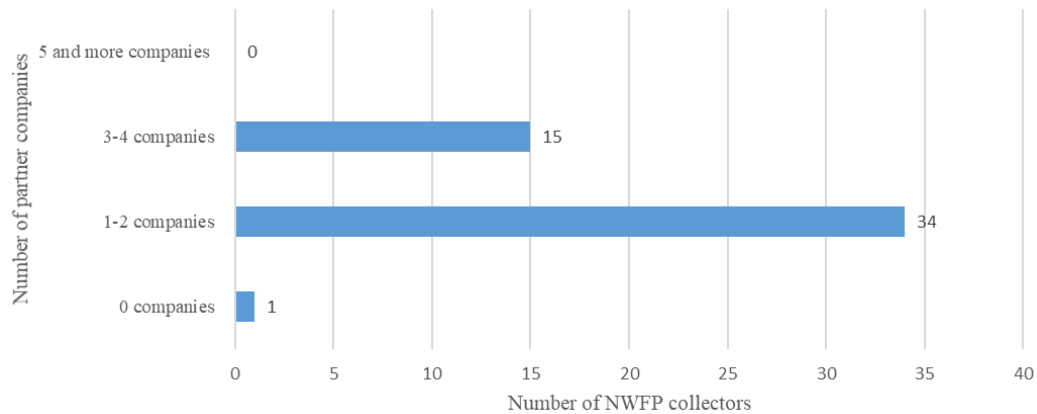


Fig. 2. Distribution of collectors by number of partner companies.

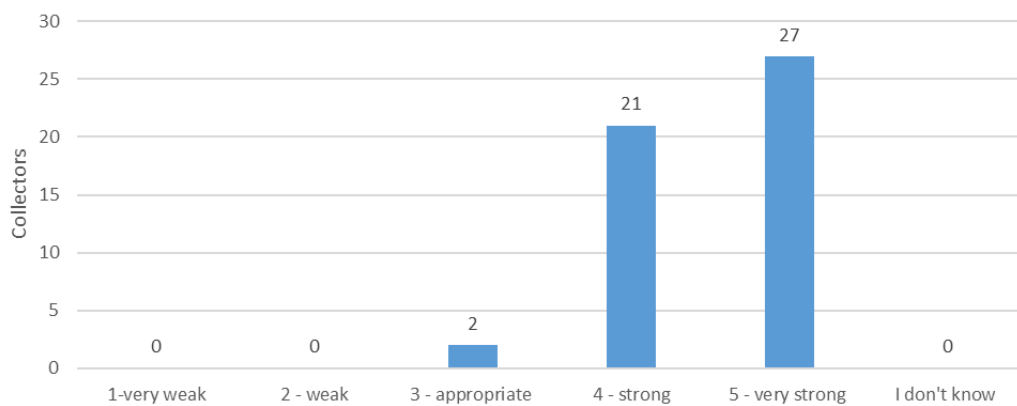


Fig. 3. Collectors' perception of the quality of cooperation with companies.

Regarding price determination, 41 out of 50 collectors reported that prices are set up by buyers (companies), with only external influence being the international market (Fig. 4). Despite this, 82% of collectors consider the price fair (Fig. 5), suggesting limited awareness of broader market dynamics. The correlation analy-

sis shows that perceived price fairness is not strongly correlated with the strength of cooperation, indicating acceptance of externally set prices regardless of relationship strength.

Notably, 62% of respondents do not perceive the need for establishing a collectors' association (Fig. 6). This

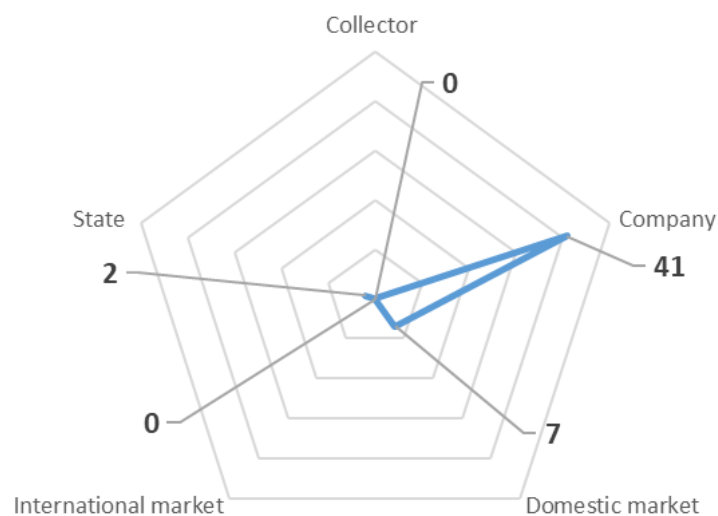


Fig. 4. Determination of the price for the NWFPs..

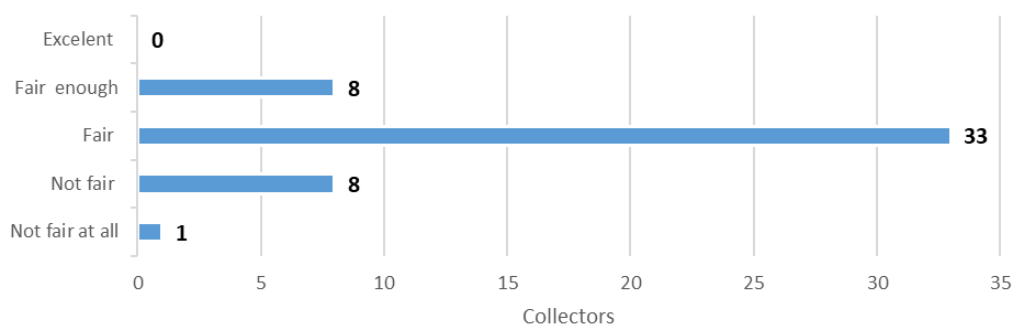


Fig. 5. Collectors' perception of price fairness.

perception is only weakly correlated with the strength of cooperation with companies. The lack of interest in collective organization may reflect satisfaction with the status quo or limited awareness of potential benefits, such as improved market access, fairer pricing, and coordinated representation.

The absence of formal organization among NWFP collectors, weak market awareness, and limited participation in decision-making indicate structural challenges. Training and certification are mostly outsourced to (domestic) companies or international organizations, which are not formally mandated to provide these services. This signals a regulatory gap and tendency toward informal practices, where formal obligations are bypassed or reinterpreted.

Interestingly, female collectors show different patterns. Among six female respondents, four reported working with multiple companies (3–4 companies), and one collects solely for household use. This may reflect diverse livelihood strategies and greater adaptability in navigating the NWFPs market.

Overall, the survey findings highlight several structural and systemic barriers to entrepreneurship and innovation in the NWFPs sector: limited collective

organization, with 62% of respondents seeing no need to established a collectors' association (Fig. 6) Second market literacy is low, despite prices being set by buyers, 82% of collectors consider them fair, and this perception shows weak correlation with the strength of cooperation; Fig. 5), indicating a lack of awareness about pricing mechanisms. Third, collectors show high dependence on a small number of companies: 34 out of 50 respondents work with only 1–2 companies, often from the same village; Fig. 2), suggesting limited market diversification. Finally, institutional ambiguity, identified through policy analysis reveals overlapping responsibilities between forestry and environmental administrations; dual permitting systems; and unclear procedural responsibilities. These issues are discussed further.

4.3. NWFPs companies

The development of NWFP companies in North Macedonia reflects strong path dependency from the former Yugoslav system. A substantial share (13 out of 19; 68%) of current owners or managers previously worked in the

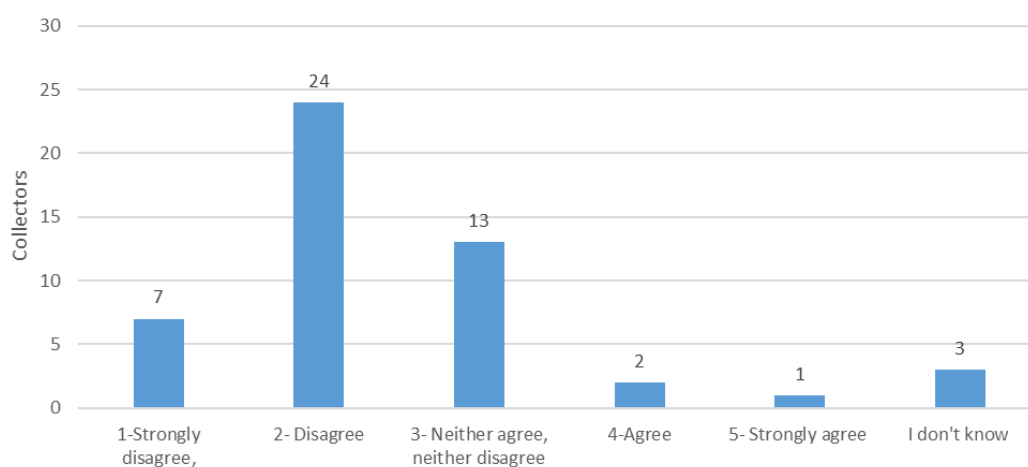


Fig. 6. Perceived necessity for establishing an association of NWFPs collectors.

NWFP value chain, particularly within AIC¹, shaping their expertise and sectoral knowledge. Most of these companies have operated for over 16 years, reflecting a pattern of historical continuity, often reinforced by intergenerational knowledge. Additionally, 26% of companies were inherited, and 10% founded by individuals who independently recognized business opportunities in the field.

Due to the seasonal and unpredictable nature of wild-growing species, 79% of NWFP companies reported facing considerable operational uncertainty, primarily due to weather-dependent availability (Q41). Companies also emphasized key factors for success: maintaining product quality, proper collector training, efficient processing, regulatory clarity, and long-term partnerships. Encouragingly, 12 of 19 surveyed companies have initiated training programs for collectors and sub-purchasers involved in processing.

A major challenge identified is intuitional fragmentation and conflicting mandates between forestry and environmental authorities. Regulatory overlap leads to legal uncertainty, permitting delays, export ambiguities, and the absence of a harmonized national NWFP strategy. These issues, also confirmed through policy document analysis, undermine formalization and sector efficiency.

In terms of market dynamics, 74% of companies (Q16) identified illegal and unregistered buyers, including socially influential individuals (e.g., police officers, doctors and teachers) as serious issue. These actors buy NWFPs at lower prices for resale. Distorting competition. Moreover, 59% of companies (Q40) reported unfair competition by registered companies that bypass fees and permit obligations. This informal activity erodes trust, competition and weakens regulatory enforcement and calls for, stronger oversight by MoEPP, national parks, PENŠ, and MAFWE.

Processing is the core business for most NWFP companies, with 73% engaged in cleaning, sorting, cutting, drying, and freezing. Despite outdated equipment, nearly half (47%) of surveyed companies plan to invest in modernization, mainly driven by EU market requirements related to quality, hygiene, and traceability standards. Long-term cooperation with trusted companies is central to business continuity 63% of companies work with over 40 collectors (Fig. 7), demonstrating the significance of trust-based relationships.

Beyond formal partnership, companies often engage informal or seasonal collectors during years with favorable yields. These collectors typically enter the network through recommendations from long-standing collaborators and are seen as strategic during high-demand periods. Notably, 84% of respondents (Q48) emphasized the importance of flexible, socially embedded networks in NWFPs (Fig. 8).

The key role of collectors in the NWFP value chain is strongly acknowledged. According to 79% of surveyed companies, collectors are the most critical actors in their operational network, followed by international partners (58%) and other national companies (42%) (Fig. 9). Despite this, no national association represents NWFP buyers and processors, limiting information exchange, policy advocacy, and coordinated market access. Only 26% of companies participate in regional (SEE) or EU trade fairs, illustrating the sector's fragmented visibility and outreach.

However, reluctance to collective organization is notable. As shown in Graph 10 and 11, the majority of companies do not support forming associations, whether for collectors (Fig. 10) or processors (Fig. 11). Notably, 53% of companies' express skepticism about the usefulness of a processor-level association, and only 5% support it. Opposition is particularly strong among larger companies, who often describe their collector network

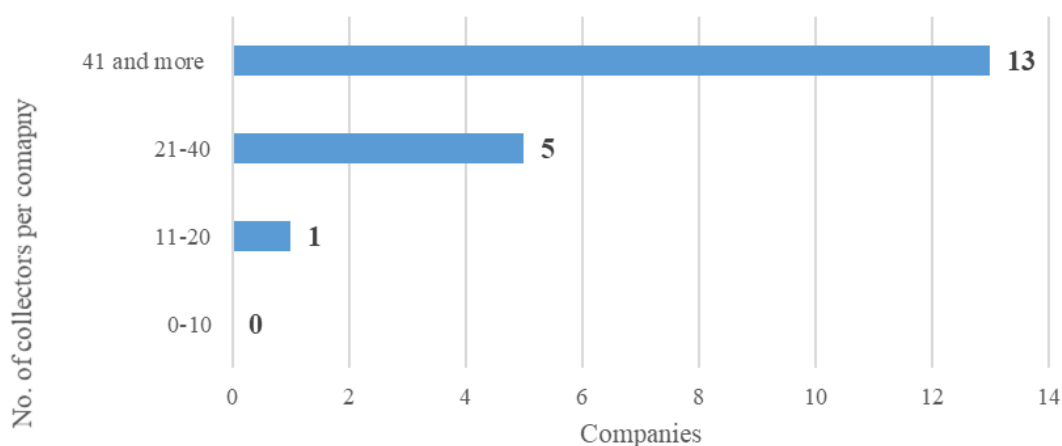


Fig. 7. Cooperation with the collectors.

¹ In ex-Yugoslavia Agricultural Industrial Combines were clusters for agriculture (Земјоделски Индустриски Комбинати)

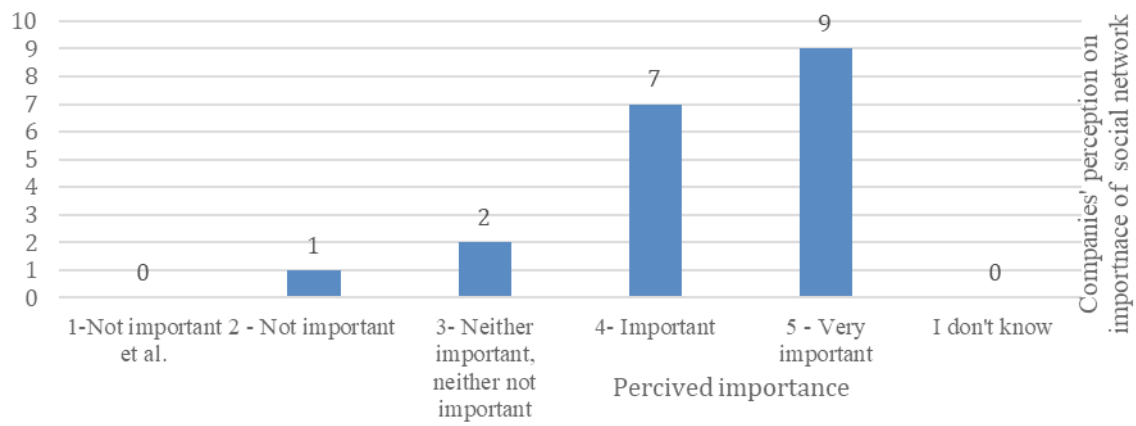


Fig. 8. Importance of the social network.

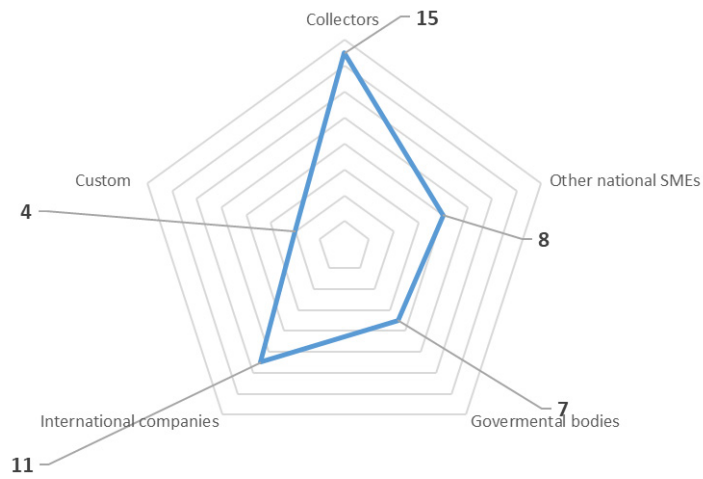


Fig. 9. Key actor types identified as important in social network.

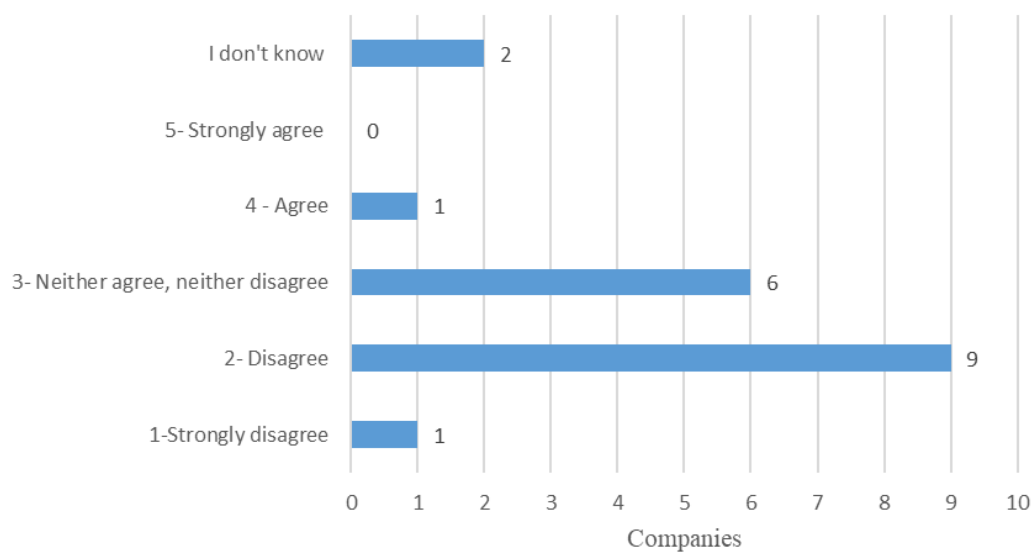


Fig. 10. Perceived necessity for organization of collectors as seen by the companies.

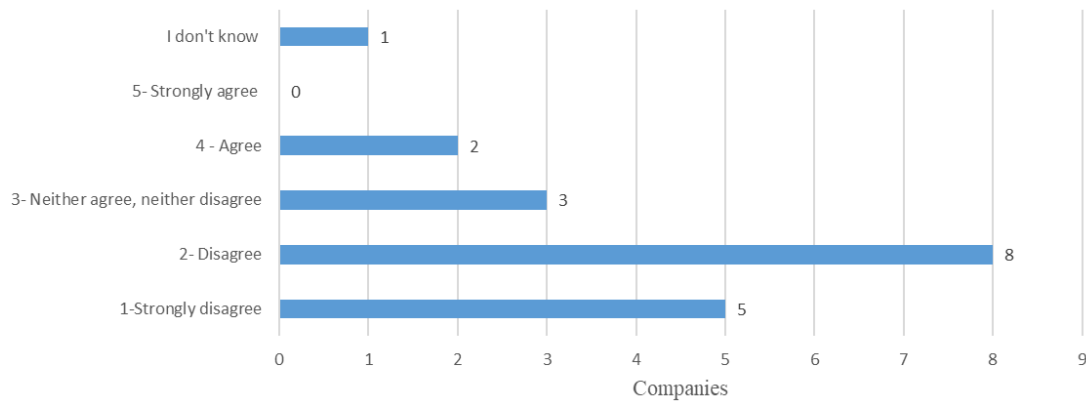


Fig. 11. Perceived necessity for organization of processors as seen by the companies.

as a “family”, a term suggesting collaboration, but also implying control and hierarchy.

Correlation analysis provides additional insights into sector structure, revealing links between company size, business practices, and attitudes toward associations. Larger companies, especially those involved in buying, processing, selling/exporting NWFPs, demonstrate strong opposition to any form of associations, indicating a negative correlation between company size and support for collective organization. Conversely, companies with extensive networks (over 41 collectors) often implement training programs (on collections and quality), indicating a positive correlation between number of collectors and investments in capacity building. Companies that recognize collectors as key actors in their network also tend to resist association, reinforcing a top-down hierarchical governance model.

Although only one female manager was surveyed, she expressed support for establishing both collector and processor associations. This observation may point to gender-related differences in governance preferences, though broader data is needed to draw robust conclusions.

Overall, the survey findings reveal several structural and systemic features within the NWFPs business landscape that hinder innovation and entrepreneurship. First, there is hierarchical governance, larger companies dominate collectors’ networks. Second, there is strong resistance to collective organization, only 5% of companies’ support forming a processor association (Fig. 11). Limiting coordination and joint representation. Third, there is a high dependence on informal actors usually relaying on seasonal or unregistered collectors, especially during high-yield years, with 84% emphasizing the importance of social networks. Fourth, there is limited institutional support. Companies report problems such as regulatory overlap, permitting delays, and weak enforcement against illegal buyers and unregistered traders, revealing systemic governance gaps. These interrelated issues reduce transparency, weaken competition, and constrain opportunities for innovation, entrepreneurship, and equitable market access in the sector.

4.4. A 3-I’s Model for addressing systemic barriers in the NWFPs sector in North Macedonia

The North Macedonian NWFPs sector operates within a complex interplay of formal and informal practices. Development is significantly constrained by the absence of collaborative associations, (Brodrechtova 2024), while informal, cash-based transactions dominate market interactions, undermining transparency and deterring innovation. This persistent informality, combined with unclear regulations and weak institutional support, reduces the sector’s resilience and innovation potential. Institutional and organizational analysis reveals multi-layered barriers to entrepreneurship and innovation. Institutional fragmentation manifests in overlapping responsibilities and poor coordination among public bodies, while informal networks dominate market outside formal policy frameworks. Although formal institutions exist, their impact is limited by weak human resources, absence of strategic planning, and poor private sector engagement.

Based on policy analysis and survey data, we identified three core barriers: informality, institutional inconsistency, and information asymmetry. These interlinked and systemic challenges form the foundation of the 3-I’s Model, an analytical framework that we developed to understand and address the root causes of stagnation in the NWFPs sector.

Informality: Informality remains deeply embedded in the sector. Numerous unregistered companies and widespread informal transactions among collectors, traders, and companies, undermine transparency, reduce legal oversight, and deter innovation and formalization. It limits access to finance, impedes participation in long-term development initiatives, and reinforces institutional mistrust.

Institutional Inconsistency: This extends beyond regulatory fragmentation to broader governance failures. Conflicting mandates between forestry and environmen-

tal authorities create confusion, while enforcement gaps and unclear responsibilities further complicate compliance.

The sectors also suffer from weak inter-institutional coordination, inconsistent decision-making, and policy instability. Rooted in the bureaucratic legacies of socialism, reforms remain incomplete and policy frameworks fragmented. Limited access to state funding, lack of strategic investments, and poorly developed innovation policies prevent businesses scaling or integration into broader value chains.

Information Asymmetry: A major obstacle to inclusive development. The absence of transparent, state-provided information on grants, subsidies, and financial support disconnects small actors from available opportunities. Larger companies, often resistant to associations, tend to monopolize access to policy and market information, worsening inequity.

This disconnect, between public institutions and private actors, reflects the enduring influence of centralized, top-down governance from the socialist era. Poor coordination among ministries and agencies responsible for SMEs, and limited collaboration with the scientific community deepen the asymmetry, hampering evidence-based policymaking.

This pattern is not unique to North Macedonia; similar dynamics are observed across other post-socialist economies, where weak enforcement and incomplete market reforms perpetuate informality.

Relating the 3-I's Model to systemic approach to innovation barriers

By structuring these three distinct but interrelated barriers into a cohesive framework, the 3-I's Model illustrates how these constraints reinforce one another (Fig. 12). For example, institutional inconsistency can push

actors toward informality, as they bypass burdensome or unclear regulations. Similarly, limited access to relevant information reduces incentives for formalization, as actors remain unaware compliance benefits or available support schemes.

The 3-I's Model builds on the broader innovation systems perspective by identifying context-specific institutional and market failures that hinder innovation. It aligns with Lundvall (2010) and Malerba (2006), who stress the importance of contextualized analysis in resource-dependent and transitional sectors.

The model serves not only as a typology of systemic barriers but also as a conceptual bridge between public (institutional) and private (market) spheres. It highlights key leverage points for policy reforms, including: a) Addressing institutional inconsistency through harmonized regulations and improved inter-agency coordination; b) Reducing information asymmetry via transparency and platforms for knowledge exchange; c) Tackling informality through association-building, incentives for formalization, and improved access to support mechanisms.

In doing so, the 3-I's Model offers a roadmap for a more inclusive, innovative, and resilient NWFPs sector. It also provides insights for other transition economies facing similar structural challenges.

Fig. 12 summarizes the 3-I's Model, illustrating how informality, institutional inconsistency, and information asymmetry interact to reinforce inefficiencies in North Macedonia's NWFP sector. These elements are not isolated. They form reinforcing cycles that shape the operational environment and limit sectoral progress.

Informality and Institutional inconsistency: Overlapping regulations between forestry and environmental authorities create compliance challenges, pushing many NWFP enterprises into informality. In turn, this

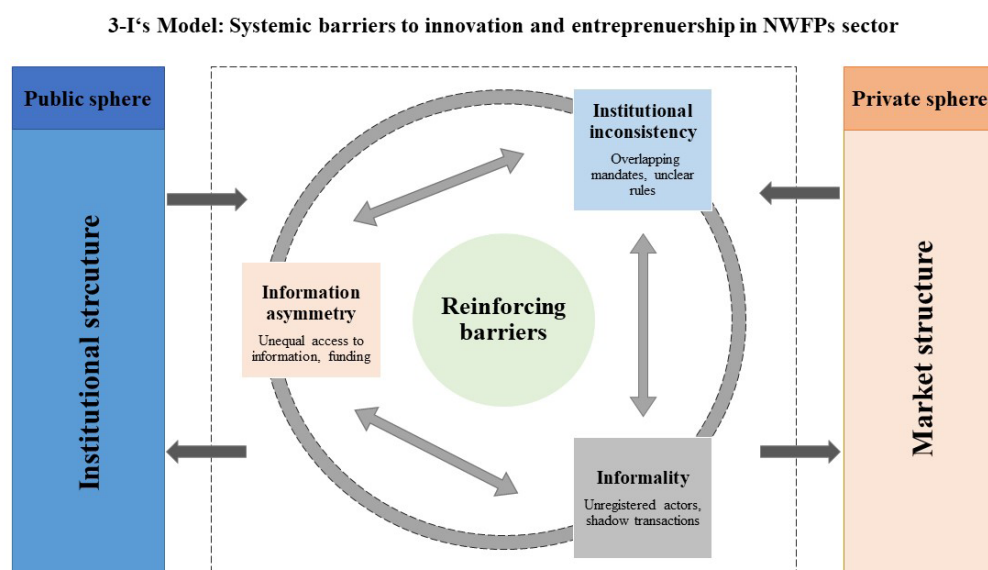


Fig. 12. The 3-I's Model.

reduces regulatory oversight and sustains institutional inefficiencies.

Informality and Information asymmetry: Informal actors lack access to official information on grants and support, reinforcing their exclusion and limiting pathways to formalization.

Institutional inconsistency and Information asymmetry: Fragmented institutions and poor communication exacerbate information gaps, particularly for smaller companies, hindering compliance and access to development programs. These interactions influence not only companies and regulatory bodies but also the broader relationship between the public (institutional) and private (market) spheres. In the public sphere, institutional inconsistency and information asymmetry prevail, leading to mistrust and weak public-private cooperation. In the private sphere, informality dominates, driven by regulatory burdens and limited access to information – undermining business legitimacy and reinforcing marginalization. In the public sphere, institutional inconsistency and information asymmetry prevail, leading to mistrust and weak public-private cooperation. In the private sphere, informality dominates, driven by regulatory burdens and limited access to information – undermining business legitimacy and reinforcing marginalization. The boundary between public and private spheres are porous: policy failures drive informality, while widespread informality weakens regulatory capacity, creating a feedback loop that impedes reform.

While grounded in the case of North Macedonia, the 3-I's Model has broader relevance for post-socialist and transition economies, particularly former Yugoslav republics facing similar legacies of institutional fragmentation and policy incoherence. It offers a useful lens for identifying and addressing structural barriers to innovation in NWFPs and related sectors.

5. Discussion

Significance and Visibility of NWFPs

NWFPs play a vital role in supporting livelihood, preserving cultural practices, and contributing to national and global economies. According to the Millennium Ecosystem Assessment, over 150 types of NWFPs contribute notable to global trade (Forest Europe 2015). In Europe, the total value of NWFPs is estimated at €2.28 billion, with plant products accounting representing 73% (Forest Europe 2015). NWFPs in Europe, generate economic value equivalent to 71% of the value of the annual roundwood harvest (Lovrić et al. 2020) – illustrating their often-underappreciated economic significance. However, their utilization and economic significance differ significantly across Europe (Vacik et al. 2020).

In North Macedonia, NWFPs have long supported rural communities, providing both subsistence and

income. Despite their socio-economic and ecological relevance, their contribution remains under documented and undervalued in policy and practice. Although national documents such as the National Biodiversity Strategy and Action Plan 2018–2023 recognized their importance (CNVP 2020), practical support for the sector has been minimal. Shifting traditional forest practices to accommodate innovation is difficult, as deeply rooted values and customs act as barriers (Weiss 2013). NWFP entrepreneurs in North Macedonia face similar resistance, limiting adoption of new strategies and technologies.

Institutional inconsistency and fragmented governance

The study reveals a fragmented and incoherent institutional landscape in North Macedonia, where forestry and environmental authorities operate with overlapping mandates and poorly aligned regulations. This creates a confusing, burdensome environment, particularly for smaller actors who lacking capacity to navigate complex administrative procedures.

Instead of fostering innovation, institutional fragmentation hinders it. Entrepreneurs report regulatory uncertainty, permit delays, and limited state support tailored to NWFPs sector needs. These issues stem from deeper systemic dysfunctions, including weak institutional coordination, legacy governance, and a lack of post-socialist reforms. The marginalization of NWFPs in national rural development programs exacerbates the sector's stagnation and disconnect from innovation policy agendas.

Institutional inconsistency also fuels informality. When formal compliance is costly or unclear, actors naturally gravitate toward informal arrangements, undermining regulatory authority and public trust in institutions.

Information asymmetry and market power imbalance

A major constraint identified is the unequal access to market and institutional information. Larger, well-connected companies dominate the NWFP value chain as information gatekeepers. They are more aware of public funding (e.g., IPARD), better understand regulations, and have greater access to export markets.

In contrast, smaller companies and individual collectors are often excluded from critical information and support mechanisms. This asymmetry is not incidental but structurally maintained. Larger companies frequently resist the forming associations or platforms that could democratize information and redistribute market power, fearing the erosion of their dominant positions.

The state has failed to address this imbalance through inclusive outreach, targeted communication, or transparency tools. A top-down governance model leaves little space for dialogue, feedback, or capacity building, especially for the most vulnerable actors. As a result, isolated examples of innovation remain disconnected from broader networks, limiting knowledge exchanges and scaling potential across the NWFPs sector.

Informality: a symptom and cause of systemic weakness

Informality is pervasive in the NWFPs sector, with unregistered businesses, undocumented transactions, and informal marketing arrangements. For many actors, informality is not a deliberate strategy but a necessity, driven by high regulatory costs, administrative complexity, and absence of legal recognition or support.

While informality offers short-term flexibility, it imposes long-term costs: informal actors are excluded from financial instruments, subsidies, and certification schemes, and lack incentives for quality improvements, innovation, or strategic planning. The informal nature of the sector also undermines reliable data collection, hampering evidence-based policymaking and justifies continued neglect.

Informality further deepens institutional inconsistency and reinforces information asymmetry. Operating outside formal systems makes actors invisible to decision-makers, perpetuating a self-reinforcing cycle of marginalization.

Interaction and Reinforcement among 3-I's

The three dimensions of the 3-I's Model form a mutually reinforcing system of constraints: a) informal practices obstruct data collection, reinforcing information asymmetry and limiting transparency; b) institutional inconsistency drives informality, weakening public governance; c) information asymmetries, exploited by dominant actors, sustain informality by resisting transparency and collective organization.

This systemic entanglement is illustrated in Fig. 12, where the 3-I's form a dynamic triangle of constraints. Policy efforts that target only one element, e.g., promoting formalization without addressing institutional incoherence, are unlikely to succeed. Ultimately, innovation in the NWFP sector is not hindered by a lack of ideas or entrepreneurship, but by a fragmented, exclusionary, and unstable environment.

Toward systemic change

Unlocking the innovative potential of NWFPs in North Macedonia requires an integrated approach that simultaneously addresses the three core barriers:

- a) Institutional reforms: Clarify mandates and strengthen coordination among forestry, environmental and agricultural agencies;
- b) Transparent and inclusive communication: Develop outreach strategies tailored to rural actors and smaller enterprises;
- c) Support for formalization: Simplify regulations and incentivize formal participation through credit access, training, and public procurement.

Empowering associations can also promote formalization and information exchange: Facilitating collective platforms would improve information flow, reduce market concentration, and foster innovation through cooperation. This integrated approach addresses all three

barriers by creating formal structures, improving communication, and standardizing institutional interactions.

Using the 3-I's Model as both an analytical tool and strategic roadmap enables interventions that target root causes rather than symptoms. It offers a path toward a more inclusive, dynamic, and sustainable NWFP sector aligned with national and EU rural development goals.

Theoretical reflection of the results

The empirical findings, analyzed through the 3-I's framework, align with contemporary innovation systems theory, especially in peripheral, resource-dependent, or transition economies.

Which views innovation as a non-linear, interactive process embedded in institutional and socio-economic contexts (Edquist & Johnson 1997; Lundvall 2010). The sectoral innovation systems (SIS) framework (Malerba 2006) is particularly relevant, emphasizing actor configurations, knowledge flows, and institutional settings. NWFPs, as a low-tech, resource-intensive sector, are especially vulnerable to institutional voids, weak coordination, and limited policy support.

The regional innovation systems (RIS) perspective (Asheim & Coenen 2005) further shows how localized governance failures constrain innovation, particularly in rural areas. In North Macedonia, forest governance decentralization has not been matched with capacity-building or inter-agency coherence, resulting in overlapping mandates and fragmented services.

The sector illustrates what Khana & Palepu (2010) term institutional voids, contexts lacking regulatory clarity, information transparency, and intermediaries, across both public (institutional) and private (market) spheres.

Public (institutional) sphere: NWFPs are not fully recognized in statistical systems, and data from the State Statistical Office are fragmented and inconsistently categorized (Živojinović 2017; Štěrbová et al. 2019; Stojanovska & Stojanovski 2022). Regulatory frameworks are diffuse, with forestry and environmental authorities operating under separate, sometimes conflicting mandates (Nedeljković 2013; CNVP 2020; FAO 2021). Similar dysfunctions occur in other post-socialist countries, including Serbia and Slovenia (Živojinović 2023) and even some EU member states (Wolfslehner 2019), though institutional capacities in North Macedonia appear more constrained. Entrepreneurs often experience confusion regarding applicable rules, leading to the systemic marginalization of NWFPs in national strategies on forestry, agriculture, and environmental protection (Weiss et al. 2019).

Private (market) sphere challenges: The sector is characterized by high informality. Most collectors operate seasonally and sell directly to buyers for cash. Processed products are exported, while lower-quality goods are self-processed by collectors (e.g., drying or cutting) to add value (Nedanovska 2012). Larger companies dominate higher-value segments, controlling buying, processing,

and export. Financial support for innovation remains minimal. Although the EU IPARD program offers funding – mainly for upgrading storage and processing – only a few companies benefit due to bureaucratic hurdles and poor outreach. Broader financial mechanisms are scarce, with limited access to early-stage financing or incubator support (Ludvig 2018; Živojinović 2020).

These overlapping institutional and market failures severely constrain the development of a supportive entrepreneurial ecosystem and suppress innovation. This reflects theoretical expectation that institutional voids and market asymmetries reinforce each other, particularly in resources-dependent and transitional economies. Without reforms in governance and market structure, the sector is unlikely to overcome fragmentation and stagnation.

In this context, the 3-I's Model offers both a diagnostic lens and a heuristic tool for addressing key barriers. Its strength lies in its dual role: first, enabling predictive insights, for example, anticipating greater innovation among smaller actors if access to information, funding, and formalization improves. Second, it serves as a communication tool, translating complex, system-level barriers into actionable concepts. For policymakers, it identifies where targeted structural interventions are most needed. For researchers, it provides a framework for analyzing similarly fragmented, informal sectors. In doing so, the model supports this study's broader goal: bridging public (institutional) and private (market) domains, and informing strategies for a more inclusive, innovative, and resilient NWFP sector in North Macedonia.

6. Conclusions

This study examined the systemic barriers limiting innovation and entrepreneurship in North Macedonia's NWFPs sector. This paper develops the 3-I's Model as a structured framework to understand interlinked challenges of informality, institutional inconsistency, and information asymmetry that shape both actor behavior and sectoral dynamics.

Addressing these constraints requires a coordinated approach across policy and market domains. First, clarifying institutional responsibilities and streamlining governance would reduce overlaps, resolve jurisdictional ambiguities, and create a more predictable environment. Equally important is improving data collection and monitoring. The current lack of reliable data undermines policy design and obscures the sector's economic and ecological relevance. A strong evidence base is essential for positioning NWFPs within rural development and bioeconomy agendas.

Formalization efforts must also be strengthened. Many actors remain informal due to regulatory complexity, limited support, and weak incentives. Financial tools,

simplified registration, and targeted capacity-building could ease this transition. Supporting associations for collectors and producers would further strengthen collective bargaining and facilitate institutional engagement.

Finally, ensuring equitable access to information – on markets, regulations, and funding – is crucial. Transparent communication, particularly with smaller and peripheral actors, would reduce asymmetries and support a more inclusive innovation ecosystem.

Though rooted in North Macedonia, these findings have wider relevance for transition economies with resource-dependent rural sectors. Tackling structural barriers can unlock NWFPs' potential as drivers of rural entrepreneurship, sustainable resource use, and local development. By combining theoretical insight and practical guidance, this study contributes to strengthening innovation systems in under-researched, policy-neglected sectors.

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Annex 1

List of analysed policy documents per administration

Policies from Environmental protection administration

- Law on Nature Protection, Official Gazette of RM 67/04
- Law on Environment, Official Gazette of RM 53/05
- Rulebook for issuing permits for collection of threatened and protected wild species of plants, fungi and animals and their parts, Official Gazette of RM 102/09
- List of threatened and protected species of plants, animals and their parts, Official Gazette of RM 15/12
- Fifth National Report to the Convention on Biological Diversity of RM, MoEPP, 2014.
- Rulebook on the structure and contents of the application form, license and certificate for trade in endangered and protected species of plants, animals and their parts as well as the necessary documentation attached to the application, Official Gazette of RM 134/10
- Decree on the requisites and procedure for issuing the license or certificate, and the type of license or certificate and determination of border crossing points where trade in endangered and protected species of plants, animals and their parts is allowed, Official Gazette of RM 135/10
- National Strategy for biodiversity with Action plan, MoEPP, 2018–2023 (adopted 2015)
- National Strategy for nature protection MoEPP, 2017–2027 (adopted 2016)
- Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), Law for Ratification (Official Gazette of RM 82/99)

Policies from Forestry administration

- Law on Forests, Official Gazette of RM 64/09
- Strategy for Sustainable Development of Forestry in the RM, MAFWE, 2006–2026
- Rulebook of non-wood forest products, Official Gazette of RM 155/11

Annex 2

Questionnaire for collectors

1. SOCIO-DEMOGRAPHIC QUESTIONS

1. How old are you? _____
2. Gender
 1. Female
 2. Male
3. Education
 1. Primary or less than primary
 2. Secondary
 3. University
 4. Postgraduate degree
4. How many people live in your household? _____
5. How many children do you have? _____ 99 – I do not have children
6. Employment status?
 1. Yes
 2. No (skip to question 8)
7. Where?
 1. Public administration
 2. Private sector
 3. Own business
 4. Retired
 98. Other specify _____
8. Explain the main sources of income in your household? _____
9. Can you explain the importance of NWFP collection in your household income? _____

10. Which NWFPs do you collect? (multiple answers)

1. Mushrooms
2. Truffles
3. Berries, nuts, fruits,
4. Aromatic and medicinal herbs
98. Other (please specify) _____

11. For how many years have you been collecting NWFPs? _____**12. How do you perceive NWFPs?**

1. Products with poor quality, bought only because of the low price
2. Medium quality products
3. High quality products

13. How often do you collect NWFPs, and with whom?

		1 once per month	2 once in season	3 1–2 times per week	4 3 times per week	5 almost always	99 I don't know
1	Individually	1	2	3	4	5	99
2	With family	1	2	3	4	5	99
3	With friends	1	2	3	4	5	99
98	Other	1	2	3	4	5	99

14. Are you organized as collectors?

1. Yes
2. No
99. I don't know

15. Do you have an Association of collectors at national level?

1. Yes (if Yes, please provide more details: name, location, structure, etc.) _____
2. No (if No please evaluate the following statement): There is necessity for establishing Association of collectors
- 1-Strongly disagree 2-Disagree 3-Neither agree, neither disagree
- 4-Agree 5-Strongly agree 99-I don't know

16. Can you tell us how the NWFP collecting started? _____**17. What equipment do you use while collecting NWFPs? _____****18. Have you ever attended a training course on NWFPs collection?**

1. Yes (if Yes)
2. No (go to Q. 16)
99. I don't know

18a. Who organize the training? _____**18b. What was the topic of the training? _____****19. Approximately how many days per year do you spend on NWFPs collection? _____****20. Approximately How much Kg on average of NWFPs you collect?**

1. Within one season _____ kg
2. Within one day _____ kg

21. What is the average distance you travel to collect NWFPs? _____ (km)**22. How do you use the collected NWFPs (Provide average quantities in kg or %)?**

	Household consumption kg / %	Selling kg / %
Mushrooms		
Medicinal and aromatic plants		
Berries and other fruits		
Other		

23. What are the most important problems in collecting NWFPs?

		1 very unimportant	2 unimportant	3 neutral	4 important	5 very important	99 I don't know
1	Lack of forest road	1	2	3	4	5	99
2	Too much time spent on collection	1	2	3	4	5	99
3	Low price of NWFPs	1	2	3	4	5	99
4	Lack of buying points	1	2	3	4	5	99
98	Other	1	2	3	4	5	99

II. MARKET CONDITION

24. How many companies do you cooperate?

- a) Not cooperating at all b) 1–2 companies c) 3–4 Companies d) 5 and more companies

25. Evaluate the cooperation with the companies

- 1-Very weak 2-Weak 3-Appropriate 4-Strong 5-Very strong 99-I don't know

26. How important are NWFPs for your household income?

- 1-Unimportant at all 2-Unimportant 3-Neither important nor unimportant
4-Important 5-Very important 99-I don't know

27. Who determine the price of NWFPs and how?

- a) Collectors, b) State c) Companies d) Domestic market e) International market

28. How fair is the price of NWFPs?

- a) Very fair b) Fair c) Appropriate d) Not fair e) Not fair at all

29. Which factors in your opinion influence in determination the price of NWFPs? _____

30. What is the price for 1kg NWFPs on the market in your country (average price)?

1. Mushrooms _____
2. MAPs _____
3. Berries and other fruits _____
4. Other _____

31. Do you think there are enough buyers for NWFPs?

1. Yes 2. No 99. I don't know

32. Do companies buy all your NWFP?

1. Yes 2. No 99. I don't know

33. Do you sell raw NWFPs or processed NWFPs?

1. Raw NWFPs
2. Processed NWFPs
3. Both (if both) Can you tell me in % Raw _____ %, Processed _____ %

Thank you for your cooperation.

Date: _____

Place: _____

Annex 3

Questionnaire for companies

I. Socio-demographic questions

1. How old are you? _____

2. Gender a) Female b) Male

3. Education

- a) Primary and less b) Secondary school c) Undergraduate (2 years)
d) Faculty level e) Postgraduate degree

4. Position in the company

- a) Owner b) Manager c) Employee d) PR e) Consultant f) Other

II. General information about the company

5. Location

- a) City b) Village c) Both

6. When your company was established?

- a) 0–5 years b) 6–10 years c) 11–15 years d) More than 16 years

7. Number of full-time hired people in company

- a) 0–10 b) 11–50 c) 51–250 d) More than 251

How many, seasonally hired workers do you have? _____

8. Do you have own collector list?

- a) Yes (if Yes go to 8.a) b) No 99 – I don't know

8.a) How many collectors do you have in your list?

- a) 0–10 b) 11–20 c) 21–40 d) 41 and more collectors

9. Does your company deal with NWFPs from the beginning?

- a) Yes b) No (if No) What was the reason for changing main activity? _____

10. Main company's activities (multiple answers)

- a) collecting NWFPs b) buying NWFPs c) processing NWFPs d) selling NWFPs

11. Does your company cooperate with local population?

- a) Yes b) No

12. Can you evaluate this cooperation?

- 1 2 3 4 5

III. Buying NWFPs**13. Can you tell me with which NWFPs you dealing and in what quantities**

NWFPs Quantities (in kg)

Mushrooms _____

Berries _____

Herbal plants _____

Other (specify) _____

14. What type of supply of NWFPs you use

- a) Own buying points b) Use other buying points c) Collectors come in our company
-
- d) Own collectors list and contact them e) Village visit f) Other _____

15. How you evaluate the cooperation with collectors

- 1 2 3 4 5

16. What are the main problems that arise in cooperation with the collectors? _____.**17. Have you ever offered training course to the collectors?**

- a) Yes, for how many people _____ b) No

18. What are the main reasons for buying NWFPs from collectors?

Long tradition in cooperation with them	1	2	3	4	5
Good quality of NWFPs	1	2	3	4	5
Mobile communication and cooperation	1	2	3	4	5
Less wasted time for buying	1	2	3	4	5
They can wait 1 month for payment	1	2	3	4	5
There are no other collectors except them	1	2	3	4	5
Other (please give details) _____.					

19. How often do you go the collecting points within the season?

- a) Every day b) Few times per week c) Once a week d) Once per month

20. What kind of transportation means do you use when you buy the NWFPs

- a) Van b) Car c) Truck d) Other (please specify) _____

21. What is the average distance from your company to the buying points? _____ km.**22. Can you tell me with how many people/companies do you cooperate, when buying NWFPs _____****23. Can you tell me: What is the price per NWFPs product that you pay and sell the products?**

Type of NWFPs	Buying price / kg	Selling price / kg
Mushrooms	_____	_____
Aromatic and medicinal herbs	_____	_____
Berries and other fruits	_____	_____

24. Did you change the prices of your product in last period?

- a) Yes (If Yes), what is the reason? _____ b) No

25. How do you pay for NWFPs

- a) In cash b) On transaction account c) Other please specify _____

26. What are the main problems of buying NWFPs

Lack of forest road	1	2	3	4	5
Too much time spent on the buying can have negative impact on NWFPs	1	2	3	4	5
High price of the NWFPs	1	2	3	4	5
Lack of buying points	1	2	3	4	5
Other (please give details) _____.					

IV. Processing of NWFPs

27. After buying NWFPs what are the next operations that your company do?

- a) Selling the NWFPs b) Just drying NWFPs c) Brining
d) Freezing e) Packaging f) Other type of processing (specify) _____

28. According to your opinion which activity influence most on the product price

- a) Buying b) Transport c) Packaging
d) Marketing activities e) Other (specify) _____

29. From the list, please numerate the equipment that your company have at the moment

- a) Van with refrigerator b) Van without refrigerator c) Weigh machine
d) Drying machine e) Machine for processing NWFPs f) Packaging machine g) Other

V. Selling and trade in NWFPs

30. Do you export NWFP?

- a) No b) Yes (if yes than) In which countries and which quantities

Type of NWFPs	Country	Quantities (in kg)
Mushrooms	_____	_____
MAPs	_____	_____
Berries	_____	_____
Other (please, specify)	_____	_____

31. To whom to do you sell your products (multiple answers)

- a) Own shops, (if, then - How many do you have and where are they located) _____
b) Shop owners (retail), c) Supermarkets in the country, d) Export
e) other processors, f) Other (specify) _____

32. Is the market of NWFPs stable at the moment

- a) Yes b) No, why? _____

33. Have you been changing your products through the time

- a) Yes (if yes, then)
i. Assortment ii. Type of processing iii. Packaging iv. Other
b) No

34. According to your opinion evaluate the importance of the marketing tools

Developed canals of distribution	1	2	3	4	5
Familiar product/name (brand)	1	2	3	4	5
Advertising	1	2	3	4	5
Paying period up to 30 days	1	2	3	4	5
Trustworthiness of the buyers	1	2	3	4	5
Other (please give details)	_____				

35. Which marketing tools to you use at the moment?

- a) PR b) Advertising c) Branding d) Other (specify) _____

36. Which tool is most successful and why _____

37. Do receive any financial incentives?

- a) Yes (please tell us which) _____
b) No

38. If you have financial means, in which segment you will invest and why _____

39. Have you been to international fairs

- a) Yes (please tell us more) _____
b) No (why) _____

VI. Business analysis

40. Capacity of the company and percentage of capacity utilization

Type of NWFPs	Capacity (kg)	% of utilization
Mushrooms	_____	_____
MAPs	_____	_____
Berries	_____	_____

41. Main problems in business

- a) Unqualified labor b) Insufficient labor c) Lack of trainings
d) Unfair competition e) Lack of export f) Undeveloped national market
g) Non efficient utilization of the capacities h) Payments i) Clients
j) Cooperation with other enterprises k) Other (please, specify) _____

42. Business conditions

- a) old equipment and mechanization b) dependence on weather conditions
c) inadequate legal framework (permissions and licenses) d) other (please, specify)

43. Do you have cooperation with other enterprises (both private and public enterprises)?

- a) Yes b) No

If Yes, please, describe that cooperation

- a) Sharing equipment b) Buying raw materials c) Selling products
d) Education/trainings e) Other (please, specify): _____

44. Do you cooperate with the Public Enterprise Nacionalni Šumi?

- a) Yes (If Yes, please evaluate and describe that cooperation)

1 2 3 4 5 _____

- b) No

45. Do you cooperate with the Ministry for agriculture, forestry and water economy?

- a) Yes (If Yes, please evaluate and describe that cooperation)

1 2 3 4 5 _____

- b) No

46. Do you cooperate with the Ministry environment and spatial planning?

- a) Yes (If Yes, please evaluate and describe that cooperation)

1 2 3 4 5 _____

- b) No

47. How important is the social network?

- 1-Not important et al. 2-Not important 3-Neither important, neither not important
4-Important 5-Very important 99-I don't know

48. Which actor is most important for the social network?

- a) Collectors b) Other national SMEs c) Governmental bodies (Ministries)
d) Custom e) International companies

49. Do you have an Association of collectors at national level?

Yes (if Yes, please provide more details: name, location, structure, etc.) _____

No (if No please evaluate the following statement)

50. There is necessity for establishing Association of collectors

- 1-Strongly disagree 2-Disagree 3-Neither agree, neither disagree
4-Agree 5-Strongly agree 99-I don't know

51. Do you have an Association of processors at national level?

Yes (if Yes, please provide more details: name, location, structure, etc.) _____

No (if No please evaluate the following statement: There is necessity for establishing Association of processors)

- 1-Strongly disagree 2-Disagree 3-Neither agree, neither disagree
4-Agree 5-Strongly agree 99-I don't know

52. What documentation is necessary for the whole process of buying, processing, selling and export of NWFPs?

53. Is the number of necessary documents large? _____

54. According to your opinion does the costs for issuing the necessary documents are?

- a) High b) Reasonable c) Low

55. What is the time that you spent for collecting necessary documents?

- a) Long b) Reasonable c) Short

56. What can be done for development of NWFPs sector _____

Thank you for your attention.

Date: _____

Place: _____