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POLICY BRIEF

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Key Messages

- **Vegetable yields in Mongolia are considerably lower than in neighbouring countries.**
- **Uncertainties reduce investments into agricultural production and thus impede productivity growth.**
- **Underdeveloped supply chains make Mongolian vegetable farmers vulnerable to risks, for instance low access to production inputs, low coverage of extension services, poor storage facilities as well as high informality in marketing of products.**
- **Vegetables current risk management is very traditional; modern approaches are hardly used due to lack of locally adapted services.**
- **Digitalization could help to overcome challenges in supply chains and contribute to increasing risk resilience of vegetable producers.**
- **Mobile apps are the fastest and cheapest tools to establish online supply chains and extension services.**
- **More research is required to evaluate needs-based risk management tools and coping strategies to respond to the individual needs of Mongolian vegetable farmers.**

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Market and price risks of Mongolian vegetable producers – Increasing resilience for boosting productivity

Introduction

Increasing domestic production and reducing local prices of vegetables has become an important goal for the Mongolian government during the recent years (ADB, 2020). The Asian Development Bank reports an increasing self-sufficiency rate in terms of vegetable products, which might be the result of the mentioned policy programmes. However, despite many programmes and best intentions to develop vegetable production, both production and consumption have increased only at slow rates during the past years (ADB, 2020).

One of the main reasons for the slow production growth is the low level of vegetable yields in Mongolia as compared to neighbouring countries such as China, Kazakhstan and Russia. Further, we have not observed any, or only marginal, growth in vegetable yields for the last two decades, while other countries increased their yields by more than 200% in the same period (FAOSTAT, 2020).

Farmers' vulnerabilities to various risks may be at the root of this stagnation, as uncertainties about financial returns typically inhibit investment. This policy brief presents the results of a comprehensive analysis of risk perception as well as existing risk coming and management strategies with a special focus on market risks. The following discussion is based on a survey of 308 vegetable farmers in different regions of Mongolia, which was conducted in 2020.

Crop specialization and production endowments – limited diversification?

The surveyed vegetable producers were situated in eight different provinces of Mongolia, representing most of the major vegetable producing areas of the country. According to the overall production structure, about two thirds of the interviewed producers were household farms, one sixth production cooperatives and one sixth farming enterprises. The data shows that production cooperatives generate higher yields than household farms and farm enterprises, with a certain variation among crops. Potato and carrot are the main crops grown by vegetable producers in the sample, both in terms of numbers of producers (244 and 201 farms, respectively), as well as total harvest (25.4 thousand tons and 5.5 thousand tons, respectively). Further major crops are onion, cabbage, turnip and cucumber/gherkin.

On average, our sample farms produced two to three different vegetable crops. About 90% of the surveyed farms indicated that crop diversity can increase their revenues, which they see as the main motivation for a high level of diversification or the desired higher diversification. When asked for a subjective assessment of their crop mix, more than half of the farmers indicated that they were satisfied with their level of diversification, while 45% aspired to a higher level of diversification. The main inhibitors of more diversification were reported to be a lack of suitable machinery (65%), unstable prices (60%), credit constraints (50%) and a lack of family labour (40%). Among other reasons cited were the increased production and market risks, lack of suitable land, lack of funds for necessary investments, and lack of labour. Especially the item “unstable prices” and the open statements about an increased risk of a more diversified production show that uncertainties are inhibiting a further expansion of vegetable production, in addition to general constraints in terms of production factors.

Risk perceptions – price and market risks dominate

As illustrated in Figure 1, price and market risks are perceived as the most important risks by Mongolian vegetable producers. Price and market risks occur when producers face uncertainty concerning the prices they will receive for their products on the markets or the cost they will incur for their production inputs (Hardaker et al., 2004). Among 307 interviewed farmers, the most frequently mentioned risk were price or market risks, which were represented by “volatility of crop market prices” (79%), “labour shortage” (71%), and “inflation” (22%). The second most important group was production risk, in particular “lack of rainfall” (64%), very high summer temperature (54%) and seasonal heavy rainfall/flood (49%). Less important were financial risks represented by mortgage/loan default (13%), personal risk represented by “loss of own labour due to illness” (7%), and institutional risk represented by “changing regulations” (1%). The vulnerability of Mongolian vegetable producers to market and price risks is mainly explained by uncertainties and inefficiencies in supply chains, as will be discussed in detail below.

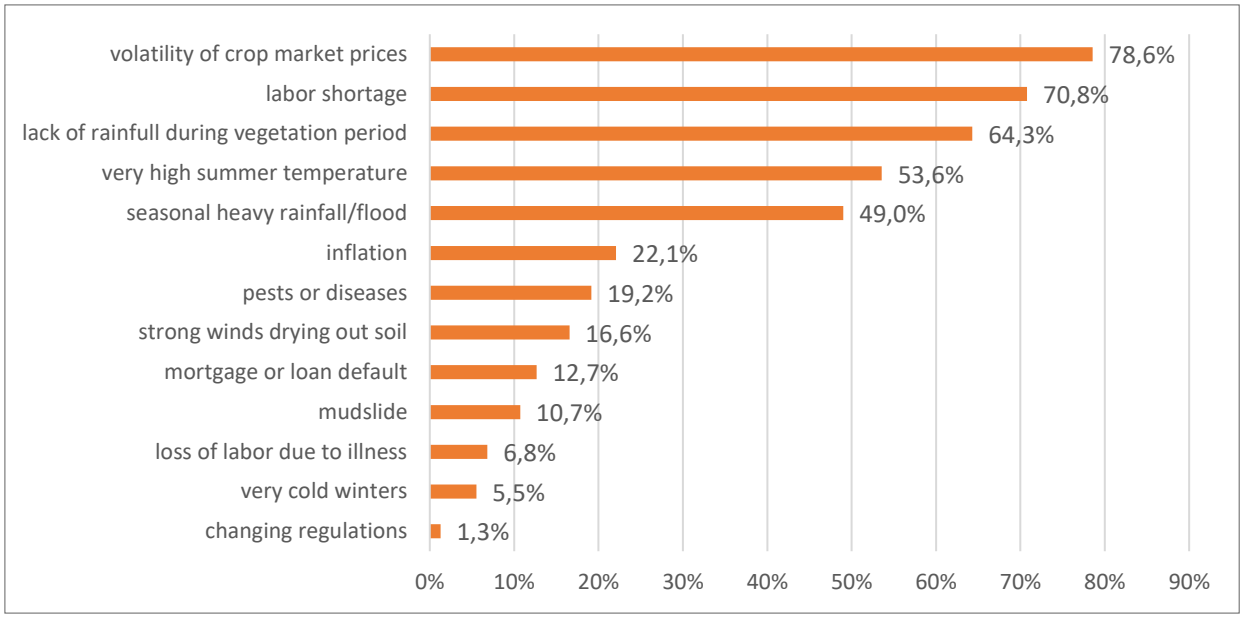

Figure 1: Experience of risks in the last 10 years
Source: Own survey

Supply chains – modernization could reduce uncertainties

Following harvest, the most crucial and risky task for farmers is the marketing of their production. Around half of the surveyed farmers sold their products directly to the local markets mainly with informal rules, which bears a significant risk of losses due to the low shelf-life of vegetable and lack of cooling facilities at traditional markets (Table 1). Customer pick-up (11%) relieves farmers of transportation cost, but not of time pressure when cutting the deal. It requires storage expenditure and leaves a certain risk of the customer rejecting the product upon pick-up. Contract farming, which is an important safeguard against fluctuations of spot-market prices, remains rare and is used only by 8% of farmers. This pattern is typical for underdeveloped market structures: For instance in China, case studies in the 2000s showed that 70% of the products were delivered to markets by farmers themselves and the majority of the products were distributed across wholesale markets (Yuman et al., 2004). In more recent years, meanwhile, direct sourcing from farmers seemed to become more important in China due to higher transparency on the quality of the products for the buyer (Lu, 2007). A similar development would strengthen the position of vegetable farmers in Mongolia who could shift at least part of their risk to buyers.

When differentiating between farm types, it becomes obvious that contract farming is mostly an option for farming enterprises (28%), but hardly for the other farm types. About 24% of the farmers chose to join a marketing cooperative, which passes the burden of contacting a buyer on to another entity. However, this option was predominantly practiced by members of production cooperatives, but very rarely by farm households (10%) or farming enterprises (12%). For farm households, the predominant method to control a part of the risk was to sell their production via a middleman (62%), which shifts the risk of cutting a deal with customers in time on to another actor. Similar patterns could be found for China where large farmers

were using contract farming as a means to secure higher prices and reduce transaction cost rather than a tool of risk management (Holly Wang et al., 2011).

Other than this, farm households did barely use other methods of risk sharing. Overall, formal contractual agreements (written contract) are underdeveloped across all farm types, thus being in use only by 15% of the sample farms. The highest rate of formal contracts was observed for farming enterprises (33%), the lowest for household farms (7%). The low level of formality again made farmers vulnerable to market risks and short-term price fluctuations or payment delays of business partners, in particular small household farms with low market power and few means of enforcing informal agreements.

Only a limited number of farmers (7%) have storage facilities with temperature control. All other farmers have no means to secure themselves against delays in making a deal and their product losing value in the process. Simple storage was available to 69% of sample farms, which allows farmers to wait out spot-market fluctuations for some products and store a part of the harvest for their own consumption, but does not help to retain the value of all of their production over a longer period.

Table 1: Supply chain characteristics

	Member marketing cooperative	Market access					Written contract	Storage		
		Direct market sale	Contract farming	Middlemen	Customer pick-up	Via another cooperative		Simple	Temperature control	No storage
Household farm	10.2%	55.8%	3.4%	62.1%	8.7%	4.4%	7.3%	69.9%	3.4%	27.2%
Farming enterprise	11.8%	43.1%	27.5%	64.7%	11.8%	2.0%	33.3%	54.9%	25.5%	19.6%
Production cooperative	90.2%	35.3%	5.9%	60.8%	17.6%	25.5%	29.4%	76.5%	3.9%	19.6%
Total	23.7%	50.3%	7.8%	62.3%	10.7%	7.5%	15.3%	68.5%	7.1%	24.7%

Source: Own survey

Furthermore, access to inputs remains another challenge in the supply chains. About 66% of farmers reported problems associated with input purchase. The main reasons given were a complete lack of physical access to stores (32%), a lack of required inputs in accessible stores (41%) and high prices of required inputs (24%). While production inputs usually serve to increase yields and thus profits of agricultural production, they can also support the production of new, more drought tolerant varieties. With the observed problems of purchasing suitable inputs however, we can assume that this form of risk management was no option for most of our sample farms. In addition to uncertainties associated with input purchase, there are many uncertainties determined in marketing of produced products.

A final important characteristic of vegetable production is the adoption of greenhouse technology, which reduces the exposure to certain natural hazards. In comparable farming systems like in China, greenhouses covered 11% of the vegetable farming area already in 2000 (Liu et al. 2004). In Mongolia, a similarly low number of farmers in the sample used this technology. Overall, only 40, mainly large farms used greenhouse production, mostly for cucumbers and gherkins. This adoption pattern is hardly surprising since the switch to greenhouse production requires considerable investment, which is most likely possible for enterprises with higher capital stocks or better access to credits. This finding underlines the impression that capital is positively connected with better farm-based risk management such as crop diversification and investment in technologies such as greenhouse production.

Risk coping and management strategies

The most frequently stated risk coping options were to borrow money from relatives and friends, borrow money from a bank, selling livestock and selling farm assets. Less frequent options were selling livestock, farm or household assets. Reduction of consumption only took place in exceptional cases while families avoided at all costs a cut in education expenditure for their children. The role of commercial credits as the most widely used risk coping technique is also confirmed by the high rate of outstanding loans. 42% of farmers in the survey indicated to have outstanding loans at the time of the interview. The average interest rate was reported at 22%, a level which is typical of countries with underdeveloped credit markets and also a level at which financial pressure on farms and potential credit default are high.

Most farmers chose rather traditional risk management strategies like storing part of the harvest, investing in lower yielding but safer crops or irrigation, or producing several crops (crop diversification), searching off-farm employment and building up savings to increase their risk resilience. Other risk management measures did not seem to be very relevant to Mongolian vegetable producers, either because they did not provide sufficient protection or because they were too costly or not accessible. Strikingly, agricultural insurance was barely used as risk management technique among our sample farmers, a finding which may be also explained by the lack of offers from insurance companies. Further, market-based risks management strategies, such as forward contracting, were also used very rarely, which might be explained by the lack of formal agreements in supply chains as discussed in the previous chapter.

Recommendations for increasing the resilience of the Mongolian vegetable sector

Low market integration and underdeveloped and informal supply chains make the Mongolian vegetable sector rather susceptible to production and market risks. These deficiencies lead to high transaction cost and low resilience against price fluctuations or inflation. Furthermore, access to inputs also remains a big challenge in almost all provinces of Mongolia, reducing for instance the ability to diversify the production

or invest into more stress-resilient varieties. The lack of storage facilities in general or the lack of required inputs in the existing stores seems to be a deficit that would need to be dealt with in order to develop the vegetable sector in the country. Underdeveloped supply chains therefore make farmers rather vulnerable to market and price risks than to climate related risks. A potential solution for decreasing inefficiencies and uncertainties in supply chains and market access might be digitalization. Most farmers are equipped with the necessary technology. By providing digital services, in particular mobile apps, in Mongolian language, one could reduce transaction cost and improve access to information such as market prices also for farmers in more remote areas. Further results of this study support the need for establishing insurance markets. While earlier pilots on the Mongolian livestock sector have shown a strong demand for this financial risk management tool, also vegetable farmers have shown great interest, in particular in connection with access to credit or other financial resources. Moreover, for studying the opportunities for improvements in the points mentioned above, further scientific studies will be required. In particular, it will be necessary to study and develop needs-based risk management tools and coping strategies to respond to the individual need of Mongolian vegetable farmers.

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