

## Original Research Article

### Constraints faced by Potato Contract Farmers in the Northern district of West Bengal, India: An RBQ Method Approach

#### Abstract

The present paper analyses the constraints faced by potato contract farmers in the Coochbehar district of West Bengal. It followed an *ex-post-facto* research design. The study was conducted from January 2023 to April 2023. The purposive, multistage, and random sampling method was followed. The Coochbehar II block was selected purposively. Out of thirteen, five-gram panchayats were randomly chosen, and ten villages within them were randomly selected for the study. Further ten farmers from each village, totalling to 100 respondents, were randomly selected for the study. Data was collected through personal interviews with responses gathered in Bengali and recorded in English. In this study, the “Rank Based Quotient” (RBQ) method was used to rank the constraints faced by the contract farmers in the study area. The constraints listed were inefficient organizers, low yield, no pre-fixed visits by company field executives, difficult leftover disposal, high cost of cultivation, delayed payment schedule, inclement weather, labour shortage during peak period, manipulated grading and weighing of produce, monopoly of field executives and vendors.

**Keywords: Constraints, Purposive, Rank Based Quotient, Contract Farming**

#### Introduction

Most farm operators in India are small and marginal farmers (Vinaya and Shivamurthy, 2021). They often run into problems with quality raw materials for processing, marketing, and distribution, especially for high-value perishable crops. It becomes challenging for processing and marketing firms to get them at reasonable costs, with limited availability, low quality, and delays. In contrast, market gluts make produce non-remunerative for farmers.

Contract farming refers to a formal or informal agreement between farmers and a company, in which specific conditions for production and/or marketing are outlined (Roy, 1963). With the liberalization of the Indian economy and the entry of many domestic and multinational companies into the agribusiness sector, contract farming has enlarged its scope from seed production to perishable produce and today is one of the leading methods for organizing raw material production and procurement. It is very widely used by processors, fresh produce markets, and exporters for better coordination (Desai *et. al.*, 2023).

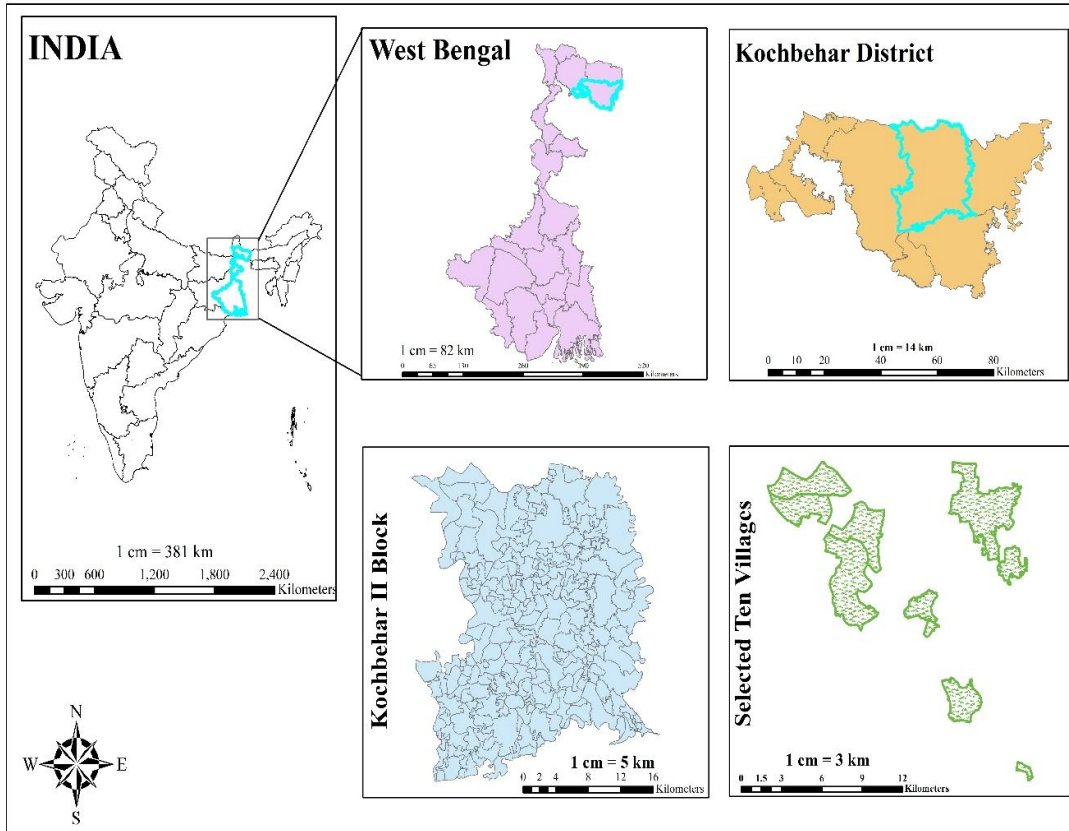
Lack of knowledge about contract farming, reluctance to deal with people connected with big traders, inability to meet the quality requirements, financial constraints, lack of credit and delayed payments, scarcity of resources, and the need to update technology are a few problems in contract farming (Pangapangaet *al.*, 2024 and Mukuchaet *al.*, 2024). Enforcing the labour laws for the contracted farmers, delayed payment for agricultural output, water deficit for irrigation, irregular electricity supply, inability to meet the standard quality, fear of communicating with big trader people-unequal playfield, unawareness of contract farming, single buyer multiple sellers (monopoly), adverse gender effects are the problems and challenges of the farmers in contract farming in India (Kamalaveni, *et al.*, 2023).

This emphasizes the importance of studying the various constraints faced by the potato contract farmers in the northern district of West Bengal to identify the constraints related to contract farming in terms of employment generation and poverty reduction.

### **Methodology:**

The present study used a non-experimental research method *i.e. anex-post-facto* research design. According to Tuckman and Harper (1999), *ex-post-facto* research design involves examining the effects of a naturally occurring treatment after it has taken place, rather than manipulating the treatment directly. The researcher then attempts to link this treatment to a specific outcome or dependent variable.

The study was conducted in the year 2023 in the Coochbehar district of West Bengal. The district was selected purposively for its active contract farming arrangement and the researcher's familiarity with the area. The purposive, multistage, and random sampling method was followed, focusing on the purposively selected Coochbehar II block, where farmers have been involved in contract farming for the past 10-12 years. Out of thirteen, five-gram panchayats were randomly chosen, and ten villages within them were randomly selected for the study. A comprehensive list of potato contract farmers was created with the help of local sources, and ten farmers from each village, totalling 100 respondents, were randomly selected. Data was collected through personal interviews between January and April 2023, with responses gathered in Bengali language and recorded in the English language.



**Figure 1: Research Locale**

In this study, the “Rank Based Quotient” (RBQ) technique was used to rank the constraints faced by the contract farmers in the study area. Rank Based Quotient is a scientific method of determining the relative significance of a set of constraints by an arbitrary scoring method. The following steps were followed for the calculation of the RBQ value:

- a) A list of constraints was prepared after consultancy with the subject matter experts, relevant literature, and in discussion with respondents.
- b) After listing the constraints, respondents were asked to rank a constraint as considered serious as compared to other constraints.
- c) Rank Based Quotient (RBQ) value was calculated based on the rank assigned by each respondent to each constraint.
- d) The constraint that received the highest RBQ value was identified as the most critical constraint by the respondents.

The formula to calculate RBQ is given as follows:

$$RBQ = \frac{\sum f_i(n + 1 - i) \times 100}{N \times n}$$

Where,  $F_i$  = Frequency of respondents for  $i^{\text{th}}$  rank of the attribute

$N$  = Total number of respondents

$n$  = Number of constraints identified

$i$  = Number of rank / concerned ranks

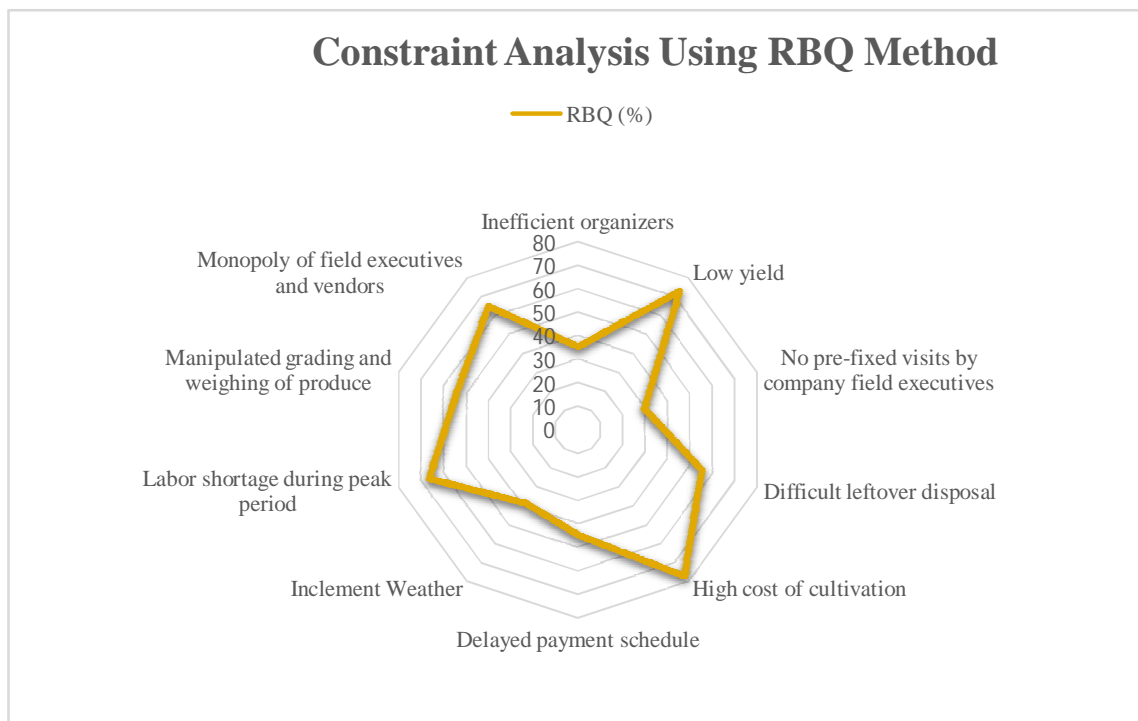
The same method was used by Santhosha and Naik (2022), Prasad and Pradhan (2023), Shivakumarappa *et al.*, (2023), and Gowdhamanet *al.*, (2024) in their studies related to constraints analysis of shrimps farming in Karnataka, identification and prioritization of challenges in accessing ICT tools by agricultural extension professionals in northern districts of West Bengal, constraints in the adoption of farm pond in drought regions of Maharashtra, and analysing agrotourism challenges in Coimbatore respectively.

### Results and Discussion:

The RBQ values of constraints faced by contract farming range from 29.50 per cent to 76.80 per cent. The most significant challenge was the 'high cost of cultivation', with the highest RBQ value of 76.80 per cent, followed by 'low yield' (73.00%) and 'labour shortage during peak periods' (66.70%). The least reported constraint was the 'lack of prefixed visits by company field executives' with an RBQ value of 29.50 % as shown in Table 1.

**Table 1:** Constraint analysis table related to contract farming in terms of employment generation and poverty reduction

Sl.No.	Listed Constraint	RBQ (%)	Rank
1.	Inefficient organizers	35.40	IX
2.	Low yield	73.00	II
3.	No pre-fixed visits by company field executives	29.50	X
4.	Difficult leftover disposal	55.30	V
5.	High cost of cultivation	76.80	I
6.	Delayed payment schedule	44.80	VII
7.	Inclement Weather	38.40	VIII
8.	Labour shortage during peak period	66.70	III
9.	Manipulated grading and weighing of produce	54.10	VI
10.	Monopoly of field executives and vendors	65.00	IV



**Figure 2:** Radar Chart Showing Constraints in Contract Farming Ranked by RBQ Method:

Figure 2 shows that the constraint ‘high cost of cultivation’ was ranked as I<sup>st</sup> (RBQ value: 76.80%), followed by ‘low yield’, ‘labour shortage during peak period’, ‘monopoly of field executives and vendors’, ‘difficult leftover disposal’, ‘manipulated grading and weighing of produce’, ‘delayed payment schedule’, ‘inclement weather’, ‘inefficient organizers’, ‘no pre-fixed visits by company field executives’ ranked as II<sup>nd</sup>, III<sup>rd</sup>, IV<sup>th</sup>, V<sup>th</sup>, VI<sup>th</sup>, VII<sup>th</sup>, VIII<sup>th</sup>, IX<sup>th</sup>, X<sup>th</sup> having the RBQ values as 73.00%, 66.70%, 65.00%, 55.30%, 54.10%, 44.80%, 38.40%, 35.40%, and 29.50% respectively.

The high cultivation cost in contract farming is driven by specialized and expensive inputs such as high-yield seed varieties, timely irrigation, plant protection, and constant monitoring. This increases the financial strain, reduces profit margins, and limits the adoption of efficient practices. The risk of financial loss due to market fluctuations or quality issues compounds these challenges. In the study area, PepsiCo farmers had to invest heavily in seeds, purchasing the FL-2027 (commercially named as FC5 variety) at ₹ 1600/50 kg bag, compared to less than ₹ 1000 for traditional seeds. The company required farmers to use its specific low-moisture content seeds and perform regular earthing to reduce potato greening for potato chip production. Small and marginal farmers, with fragmented land, faced higher manual labour costs due to limited mechanization and labour shortages, further increasing cultivation expenses. Pandit *et al.* (2015) also ranked “High cost of cultivation” as first while in non-contract farming, he reported it as the seventh constraint. Harish (2019) reported that

high initial investment in contract farming is a constraint in contract farming, Kumaria and Maria (2024) reported it as a constraint under contract potato and potato seed production.

Low potato yield can severely impact contract farmers by reducing revenue, increasing per-unit costs, and risking penalties for failing to meet yield targets. Persistent low yields financial strains, hinder market competitiveness and threaten contract stability. These factors collectively challenge the sustainability and profitability of potato contract farming. The study revealed that traditional potato farmers in the area achieved an average yield of 13-15 tonnes per acre, while contract farmers saw a lower potato yield of 10-10.5 tonnes per acre this year. Despite using specialized inputs and practices, this disparity in agricultural productivity highlights contract farmers' challenges in potato farming, despite using specialized inputs and practices. It was also seen that out of the produced output, after grading the actual produce suitable to the contracting firms was less, making the desirable yield low. The result somewhat aligned with that of Pandit *et al.* (2015), they had reported it as the third most severe constraint. Harish (2019) also reported that high rejection rates by the contracting firm are making the actual yield of the crop low and is a constraint in contract farming.

Labour shortages during peak periods constraints potato farmers by increasing labour costs, delaying crucial tasks, and affecting crop quality. Limited availability of workers forces farmers to hire at higher rates, reducing profitability and efficiency. This shortage disrupts timely planting, maintenance, and harvesting, impacting overall farm productivity. The peak season labour shortage is a widespread issue for farmers. Many workers migrate to nearby cities in search of better income and living conditions. Due to small, scattered landholding, marginal and small farmers are unable to adopt mechanized farming, further exacerbating the labour shortage in farming. Pandit *et al.* (2015) reported it as the sixth-ranked constraint while for the non-contract farmer, it was ranked as fifth. The result also aligned with Kharumnuid (2017), where it was ranked as II<sup>nd</sup>. Van der Borgh and Gómez, 2024, stated it as a constraint for public and common interest in sustainable contract farming.

Monopoly by field executives and vendors constraints potato contract farmers by controlling produce pricing, grading, and weighing. This often results in unfair practices, such as lower payments for standard produce and reduced transparency. Farmers in the study area faced some financial losses and mistrust due to the lack of competitive pricing and oversight. Farmers in the study area had oral contracts with the company, allowing sub-

vendors and field executives to monopolize control over produce pricing, grading, weighing, and transportation. Some contract farmers reported receiving lower-than-agreed rates for produce who did not meet quality standards, despite the pre-fixed prices as the agricultural challenges. Harish (2019) reported it as a constraint in contract farming. Kumari and Maria (2024) also reported the same.

Difficult leftover disposal is a major constraint for potato contract farmers, leading to financial losses and waste management challenges. Unsold produce must be disposed of efficiently to avoid contract violations and minimize costs. Inadequate disposal options can impact profitability and compliance with contract terms. It limits their options for managing unsold or surplus produce. This often results in financial losses, as farmers must find alternative disposal methods or risk contract violations. Managing leftovers efficiently is crucial for maintaining profitability and meeting contract requirements. In the study area, the farmers engaged in contract farming typically avoid selling leftover produce in local markets to maintain the trust of the contracting firm towards the farmers. However, it may experience rejection due to greening and the firm's strict grading standards. The results completely aligned with that of Pandit *et al.* (2015).

Manipulated grading and weighing of produce constrain potato farmers by causing unfair pricing and reduced payments. When field executives or vendors alter grades and weights, farmers face financial losses and mistrust. Accurate grading and weighing are crucial for fair compensation and maintaining contract integrity. It was found that in some cases, field executives collected produce directly from the farmer's fields, and then graded and weighted it at their facilities. Farmers lost their control over the grading process at the agent's facility, which could lead to farmer's concerns about fairness. Kharumnuid (2017) also reported it as a fifth-ranked constraint while Harish (2019) also reported it as a constraint in contract farming. Kumari and Maria, 2024 cited it as a constraint in potato and potato seed production under contract farming.

Delayed Payment Schedule is a significant constraint for potato contract farmers, causing cash flow issues and financial strain. Late payments disrupt budgeting, hinder timely investment in farm operations, and increase financial uncertainty. Reliable and prompt payments are essential for maintaining operational efficiency and financial stability. It was seen that the sub-vendors and company agents promised timely payments after grading and weighing the produce in the contract farming agreement. However, in some cases, farmers faced delayed payment issues by the local vendors who were employed by the contracting

firm. Pandit *et al.* (2015) reported it as a constraint but ranked it as the nineteenth number. Kharumnuid (2017) reported it as a tenth-ranked constraint. Harish (2019) and Manuel *et al.*, (2024) also reported it as a constraint in contract farming.

Unpredictable weather patterns can damage crops and disrupt farming schedules, leading to reduced yields and financial losses. Effective weather management strategies are crucial for maintaining farm productivity and profitability. It was seen that the changing climate conditions and inclement weather are significant constraints for farmers, leading to uneven production. Unpredictable weather and rainfall patterns increase irrigation costs and impact overall farm productivity posing agricultural challenges. Muthoni (2013) reported unpredictable rainfall as one of the constraints in potato production in Kenya. The result was somewhat in conformity with that of Pandit *et al.* (2015), who ranked it as the tenth constraint. Channiyamathorn *et al.*, (2024) also reported it as a challenge in banana pepper (*Capsicum Pepper*) production.

Inefficient organizers may lead to errors in grading and weighing. Poor management by field executives results in unfair pricing and mixing of produce, causing financial losses. Effective organization and accurate processes are essential for fair contract fulfilment and profitability. The contracting firms often appoint less skilled field executives who make errors in grading and weighing farmers' produce. Farmers reported that their produce was not graded in their presence. Produce with varying rejection rates was mixed in the same truck before grading, resulting in an average rate being set for the entire consignment. This practice led to financial losses for farmers, who received lower payments due to mixing of the produce with different quality standards. Harish (2019) and Ghosh (2024) have also reported it as a constraint in contract farming.

No pre-fixed visits by the field-level executives may lead to inadequate support and oversight. Without scheduled visits, farmers may face issues with grading, production practices, and maintaining effective communication. The study area had field executives employed by the contracting firm who often failed to visit farmer's fields as and when needed, likely due to their heavy executive workloads and additional responsibilities. Kharumnuid (2017) reported it as a constraint and ranked it VII<sup>th</sup>. Harish (2019) reported the same.

The above-mentioned constraints pose light on the ineffective vendor and sub-vendor system involved in the contracting framework. This should be taken care of by the contracting firm through a grievance redressal mechanism by using a robust communication system through which the collective smallholder farmers can cite their concerns directly to

the firm about the inefficiencies on a real-time basis by using a common platform through a Whatsapp group or a grievance redressal helpline number. Conducting a general body meeting at sub-levels involving fellow contract farmers and officials at regular intervals may help foster trust among the contract farmers. Transparency in the system may be enforced by providing information on quantity, price, payment schedules, and dispatch of raw materials (seeds, fertilizers, pesticides) through SMS and blockchain technology by the contracting firm to reduce the menace caused by the sub-vendors at the local levels.

## Conclusion

The study provided comprehensive data on the practical challenges of contract farming, but a key strength lies in its quantification of constraints through RBQ analysis, offering clarity on the most pressing issues. The surprising result was the substantial cost of cultivation, which exceeded expectations despite the use of modern inputs. The study effectively highlights the economic and operational barriers that hinder contract farming's potential in the region.

Author(s) hereby declare that NO generative AI technologies such as Large Language Models (ChatGPT, COPILOT, etc.) and text-to-image generators have been used during the writing or editing of this manuscript.

## References

- Roy, E. P. (1963). Contract Farming, USA Interstate Printers & Publishers.
- Sabarashnam, V.E. (1988). Manual on Field Experience Training for ARS Scientists. Rajendranagar, Hyderabad: National Academy of Agricultural Research Management
- Tuckman, B. W., & Harper, B. E. (1999). Conducting educational research (ed.). Florida: Harcourt Brace College Publishers.
- Muthoni, J., Shimelis, H., & Melis, R. (2013). Potato production in Kenya: Farming systems and production constraints. *Journal of Agricultural Science*, **5**(5), 182.
- Pandit, A., Lal, B., & Rana, R. K. (2015). An assessment of potato contract farming in West Bengal state, India. *Potato Research*, **5**(8), 1-14.
- Kharumnuid, P., Sarkar, S., Singh, P., Priya, S., Tomar, B. S., Singh, D. K., & Pandey, N. K. (2017). An assessment of contract farming system for potato seed production in Punjab—A case study. *Indian Journal of Horticulture*, **74**(3), 453-457.
- Harish, N. (2019). Problems and Constraints of Respondents Involved in Contract Farming. *Int. J. Manag.*, **7**(1), 29-36.

- Hebbsale Mallappa, V. K., & Shivamurthy, M. (2021). Factor influencing fishery-based farmers' perception and their response to climate-induced crisis management. *Environment, Development and Sustainability*, **23**, 11766-11791.
- Santhosha, K., & Naik, A. D. (2022). Constraints analysis of shrimps farming in Karnataka-RBQ approach. *Journal of Farm Sciences*, **35**(04), 460-464.
- Desai, H. K., Thakkar, K. A., & Desai, J. D. (2023). Motivational factor and constraints in adoption of potato cultivation technology by potato growers under contract farming. *Guj. J. Ext. Edu*, **36**(1), 135-139.
- Kamalaveni, M. S., Priyanka, M., Ismail, M. U. D. K., S, D. V., N, H. R., & R, A. M. (2023). Problems and challenges of farmers in contract farming in India. *Indian Journal of Natural Sciences*, **14**(77).
- Prasad, C. V., & Pradhan, K. (2023). Identification and Prioritization of Challenges in Accessing ICT Tools by Agricultural Extension Professionals in Northern Districts of West Bengal. *Asian Journal of Agricultural Extension, Economics & Sociology*, **41**(6), 131-138.
- Shivakumarappa, G., Kumbhare, N. V., Padaria, R. N., Burman, R. R., Kumar, P., Bhoumik, A., & Prasad, S. (2023). Constraints in the adoption of farm ponds in drought regions of Maharashtra. *Indian Journal of Extension Education*, **59**(1), 142-145.
- Channiyamathorn, P., Sreshthaputra, S., Sirisanyaluck, R., & Chalermphol, J. (2024). Analyzing Food Loss in Banana Pepper (*Capsicum annum*) Production: Causes, Impact, and Challenges, A Case Study of Large-Scale Farming in the Hot District, Chiang Mai, Thailand. *Trends in Sciences*, **21**(4), 7539-7539.
- Ghosh, M. (2024). Institutional reforms and spatial efficiency in agricultural supply chains in India. *Journal of Asian and African Studies*, **59**(5), 1698-1711.
- Gowdhaman, P., Devi, M. N., Karthikeyan, C., Sriram, N., & Selvi, R. G. (2024). Analyzing Agrotourism Challenges in Coimbatore: A Rank Based Quotient (RBQ) Approach. *Journal of Scientific Research and Reports*, **30**(8), 735-743.
- Kumari, P., & Maria, S. (2024). Potato and potato seed production under contract farming—a study from empirical evidence of case studies. *Potato Research*, 1-16.
- Manuel, M. M., Lee, C. K., Bujna, M., & Ooi, H. L. (2024). Identification Of Contractual Issues In Agriculture Process: A Dematel-Based Model. *International Journal of Industrial Management*, **18**(2), 72-81.

- Mukucha, P., Tsekea, S., Jaravaza, D. C., & Jaravaza, N. (2024). Contract farming: a comparison of production and marketing contracts as sourcing strategies in the fast food restaurant industry. *Journal of Foodservice Business Research*, 1-18.
- Pangapanga-Phiri, I., Mungatana, E., & Mhondoro, G. (2024). Does contract farming arrangement improve smallholder tobacco productivity? Evidence from Zimbabwe. *Heliyon*, **10**(1).
- Van der Borght, K., & Gómez, J. F. M. (2024). Public and common interest in sustainable contract farming. *World Development Perspectives*, *33*, 100564.