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Perceptions, Problems and Prospects of Contract Farming: Insights from Rice Production in Vietnam

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Abstract: Contract farming (CF) is considered a relevant measure to tackle the challenges to sustainable development from the serious effects of climate change and the COVID-19 pandemic. Despite the positive effects of CF, low participation and frequent breaching of contracts remain challenges. Several studies have mentioned the advantages and disadvantages of CF but little is known about their rankings and perceptions of CF from the involved stakeholders. To address these evidence gaps, this study surveys stakeholders, ranks the perceived advantages and disadvantages of CF, and investigates the problems and prospects of CF. The study utilizes data triangulation from three stakeholders: farmers, contractors, and government policymakers. Data include twenty-seven key informant interviews (KIIs), seven focus group discussions (FGDs), and two participant observations (POs). Data are analyzed by a mixed method approach with methods of constant comparison, content analysis, and Rank Based Quotient (RBQ). The results indicate that while the main perceived advantage of CF relates to the outputs, the top three disadvantages of CF relate to issues likely to cause a breach of contract. The results also reveal that there seems to be a difference in the perception of CF's advantages and disadvantages among the stakeholders. Despite the problems such as breaching several contract terms, mistrust, or market manipulation from the local collectors, CF in Vietnam is overall promising.

Keywords: contract farming; perception; advantages; disadvantages; prospects; problems; rankings; rice; Vietnam

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1. Introduction

Up to the present day, sustainable development, especially sustainable consumption and production—sustainable development goal 12—has been challenged by the serious effects of climate change and the COVID-19 pandemic, and CF is considered a relevant solution to address these challenges [1–7]. In addition, CF has been proposed as an appropriate measure for smallholder farmers to address their problems and constraints, particularly in developing countries [8–12]. Moreover, along with an improvement in living standards, food consumption markets and consumer behaviors move towards high-quality products with sustainable certifications and safety standards [13–17].

A large body of literature indicates that CF positively affects the production and welfare of both the farmers and contractors. CF farmers have higher benefits than their non-CF counterparts in terms of yields [18–23], output quality [24], production efficiency [25–29], revenues [22,30,31], income [10,32–42], profits [43–50], food security [21,51,52] and poverty alleviation [39,53]. Similarly, the contracting companies also gain benefits from CF such as quality consistency, production cost reduction [39,54], a guaranteed supply of quality materials at a competitive price [55] and better earnings, as well as higher profit [56,57].

Despite the positive effects of CF participation, empirical studies have found that farmers often still drop out of CF after the initial engagement [58–62]. Most farmers regret their decision to join in CF, breaching and breaking of contract farming agreements (CFAs) still happen regularly, and CFAs are unsuccessful up to 70–80% of the time [34,63,64]. In fact, there are many factors affecting farmer participation in CF such as farm/household and farmer socioeconomic characteristics [32,36,49,51,65–67]; contract attributes [23,34,68–74]; and factors determining the sustainability of CF—equality, transparency, mutual benefit and mistrust [34,75]. Moreover, the farmers' decisions on participation also depend on farmers' perceptions of CF [76–78].

An extensive literature has explicitly examined perceptions on different dimensions of CF in terms of advantages [64,79–92], benefits [93–95], opportunities [95,96], prospects [87,89,94,97,98], disadvantages [79–84], constraints [64,83,85,93,97–99], challenges [95,96], and problems [86–89,94,96,100,101]. While most of these empirical studies utilized qualitative methods by simply listing the advantages and disadvantages of CF [79,82,86], Rout, Mishra, Bar and Mondal [85], Anavrat and Mokde [90], Vinod and Mamta [91], Anavrat, Bante and Mokde [92], and Anavrat and Mokde [102] applied ranking methods to order the advantages. Gabagambi [80], Martin and Mwaseba [81] compared the perceptions of the advantages and disadvantages of CF between partial and full CF. Harish and Kadrolkar [86], and Shoja Rani [88] also examined the advantages of CF and problems faced by farmers and contracting firms.

Along with the qualitative methods, the problems have also been analyzed by quantified methods through ranking [94,97,101] or Exploratory Factor Analysis (EFA) [103]. These authors examined the advantages, disadvantages, problems, and prospects of CF from the perspectives of the farmers and contractors, but they did not address the same issues for policymakers. This is important because the perceptual similarities and differences among stakeholders remain unknown. Better information on the advantages, disadvantages, problems and prospects of CF will help all related stakeholders to plan relevant strategies, to design appropriate solutions, and to participate in CF.

From the literature review concerning perceptions on the advantages and disadvantages of CF, we notice some critical research gaps. Firstly, although many empirical studies document the advantages of CF, surprisingly little attention has been paid to disadvantages [79–82]. Secondly, many authors rank the advantages of CF [85,90–92,102], but, to our best knowledge, no one has ranked the disadvantages of CF. Thirdly, although there have been studies measuring perceptions on the advantages and disadvantages of CF and then generating a composite score [80,81], there has not been a study to include it in the model of factors affecting farmers' participation in CF as an independent variable. Finally, the majority of authors mainly define the advantages and disadvantages of CF from the perspectives of farmers, and rarely mention the perspectives of contractors and, especially, government officials.

This study examines and ranks the advantages and disadvantages of CF, and it investigates the problems and prospects of CF by using a mix of qualitative and quantitative methods. This article is the second among a series of studies about perceptions, preferences and participation in rice contract farming (RCF) in Vietnam. This study gives an empirical basis to the next article and generates a composite/index score that can be added to the model of factors affecting CF participation.

2. Conceptual Framework

Different terms have been used to describe the two opposite sides of CF such as advantages and disadvantages; pros and cons; advantages and problems; advantages and constraints; benefits and challenges; benefits and constraints; benefits and risks; constraints and prospects; problems and prospects; problems, challenges, and opportunities. Based on the results of the empirical studies, we believe that "advantages and disadvantages" terminology refers to the subjective and internal perceived characteristics of CF, whereas "problems and prospects" terminology refers to objective and external characteris-

tics. Therefore, this study uses the terms "advantages and disadvantages" in designing a conceptual framework for investigating stakeholders' perceptions on CF, while the terms "problems and prospects" are used to describe the external and observable challenges in our qualitative data.

Various advantages and disadvantages of CF have been examined by previous authors (Table 1). We consolidated these various criteria into 12 advantages and 9 disadvantages (Figure 1). Our list of advantages and disadvantages is reviewed below:

Access to advanced/appropriate technologies: Advanced/appropriate technologies have also been called "better technologies" [86]. Studying in India, Harish and Kadrolkar [86] indicated that better technologies help CF farmers increase productivity and ensure that product quality meets the demands of consumers.

Access to credit: Credit is referred to as "loans" or "finance" in the studies of Domi [82], and Arumugam and Shamsudin [104]. This advantage is also considered in terms of "Easy access to Credit" [86,89]. Access to credit is one of the advantages of CF commonly found in empirical studies [80–82,86,88–92,98,102,104,105].

Table 1. Perceived advantages and disadvantages of CF to farmers reported in previous empirical studies.

No.	Perceptions	Empirical Studies by Authors
I	**Advantages**	
1	Access to credit	Gabagambi [80], Martin and Mwaseba [81], Domi [82,86], Shoja Rani [88], Ray, Kumari, Sinha, Umrao and Nayak [89], Anavrat and Mokde [90], Vinod and Mamta [91], Anavrat, Bante and Mokde [92], RCDC [98], Anavrat and Mokde [102], Arumugam and Shamsudin [104], Ogunleye and Ojedokun [105]
2	Access to extension services and technical assistance	Gabagambi [80], Martin and Mwaseba [81], Rugimbana [83], Rout, Mishra, Bar and Mondal [85], Sarkhel [87], Arumugam and Shamsudin [104], Ogunleye and Ojedokun [105]
3	Access to inputs and services	Gabagambi [80], Martin and Mwaseba [81], Domi [82], Rugimbana [83], Rout, Mishra, Bar and Mondal [85], Ray, Kumari, Sinha, Umrao and Nayak [89], Ogunleye and Ojedokun [105], Singh, et al. [106]
4	Access to markets	Shoja Rani [88], RCDC [98], Arumugam and Shamsudin [104], Ogunleye and Ojedokun [105], Singh, Kumar, Singh and Chand [106]
5	Access to advanced/appropriate technologies	Harish and Kadrolkar [86], Sarkhel [87], Ray, Kumari, Sinha, Umrao and Nayak [89], Anavrat and Mokde [90], Vinod and Mamta [91], Anavrat, Bante and Mokde [92], Anavrat and Mokde [102]
6	Assured markets	Nhân and Hoàng [64], Gabagambi [80], Martin and Mwaseba [81], Domi [82], Rugimbana [83], Rout, Mishra, Bar and Mondal [85,86], Sarkhel [87], Ray, Kumari, Sinha, Umrao and Nayak [89], Anavrat and Mokde [90], Vinod and Mamta [91], Arumugam and Shamsudin [104], Ogunleye and Ojedokun [105]
7	Better price, fair price	Rout, Mishra, Bar and Mondal [85], Singh, Kumar, Singh and Chand [106]
8	Better product quality	Serdaneh and Jaoua [79], Anavrat and Mokde [90], Vinod and Mamta [91], Anavrat, Bante and Mokde [92], Anavrat and Mokde [102], Arumugam and Shamsudin [104], Ogunleye and Ojedokun [105]
9	Guaranteed price	Nhân and Hoàng [64,86], Sarkhel [87], Shoja Rani [88], Ray, Kumari, Sinha, Umrao and Nayak [89], Anavrat and Mokde [90], Vinod and Mamta [91], Anavrat, Bante and Mokde [92], Anavrat and Mokde [102], Arumugam and Shamsudin [104]
10	Improve farmers' skills and knowledge	Serdaneh and Jaoua [79], Bounmasith and Guanglu [84], Harish and Kadrolkar [86], Shoja Rani [88], Ray, Kumari, Sinha, Umrao and Nayak [89], Anavrat and Mokde [90], Vinod and Mamta [91], Anavrat, Bante and Mokde [92], Anavrat and Mokde [102], Arumugam and Shamsudin [104]
11	Stable or increase income	RCDC [98], Arumugam and Shamsudin [104], Ogunleye and Ojedokun [105]
12	Input and service provision	Nhân and Hoàng [64,86], Shoja Rani [88], Anavrat and Mokde [90], Vinod and Mamta [91], Anavrat, Bante and Mokde [92], RCDC [98], Anavrat and Mokde [102], Arumugam and Shamsudin [104]
13	Introduce new techniques, varieties and practices	Gabagambi [80], Martin and Mwaseba [81,88], RCDC [98], Arumugam and Shamsudin [104], Ogunleye and Ojedokun [105]
14	Lower transportation costs	Gabagambi [80], Martin and Mwaseba [81], Rout, Mishra, Bar and Mondal [85]
15	Reduce marketing and production risks	Anavrat and Mokde [102], Arumugam and Shamsudin [104], Ogunleye and Ojedokun [105]
16	Reduce pre- and post-harvest losses	Anavrat and Mokde [90], Vinod and Mamta [91], Anavrat, Bante and Mokde [92], Anavrat and Mokde [102]
17	Reliable supply of inputs	Arumugam and Shamsudin [104], Tuyen, et al. [107]

Table 1. *Cont.*

No.	Perceptions	Empirical Studies by Authors
II	**Disadvantages**	
1	Manipulation of agreed quotas and quality specifications	RCDC [98]
2	Become indebted	Serdaneh and Jaoua [79], Gabagambi [80], Martin and Mwaseba [81], RCDC [98]
3	Greater risk	Serdaneh and Jaoua [79], Bounmasith and Guanglu [84]
4	High price of inputs	Rugimbana [83]
5	Late purchase	Singh, Kumar, Singh and Chand [106]
6	Low prices	Rugimbana [83]
7	Might buy less of the product than the pre-agreed quantities or be rejected for not meeting the required standards	Gabagambi [80], Martin and Mwaseba [81], Ogunleye and Ojedokun [105]
8	Mistrust and monopoly exploitation	Serdaneh and Jaoua [79], RCDC [98], Singh, Kumar, Singh and Chand [106]
9	Reduce the household's freedom or lose flexibility in making decisions	Gabagambi [80], Martin and Mwaseba [81], Rugimbana [83]

Access to inputs and services: Inputs include various kinds such as seeds, fertilizers, pesticides, herbicides, and insecticides. Services include land preparation, planting or sowing, watering, spraying, obtaining quality certificates, harvesting, and delivery. By taking part in CF, farmers will easily access inputs for their production [81–83,85,89,106]; farmers can also easily access extension services and technical advice from the extension agents or contractors [80,81,83,85,87,104,105].

Assured markets and possible access to new markets: "Markets" refer to the product output markets. The issue of access to markets can be defined in terms of easy access to reliable markets [86,106] or new markets [98,104]; or easy marketing [106]. This advantage is quite relevant to the issue of assured markets. Most authors mentioned the term assured markets instead of market access when investigating the advantages of CF [64,80–83,85–87,89–91,104,105]. Thus, in this study, we select and name this advantage as assured markets and possible access to new markets.

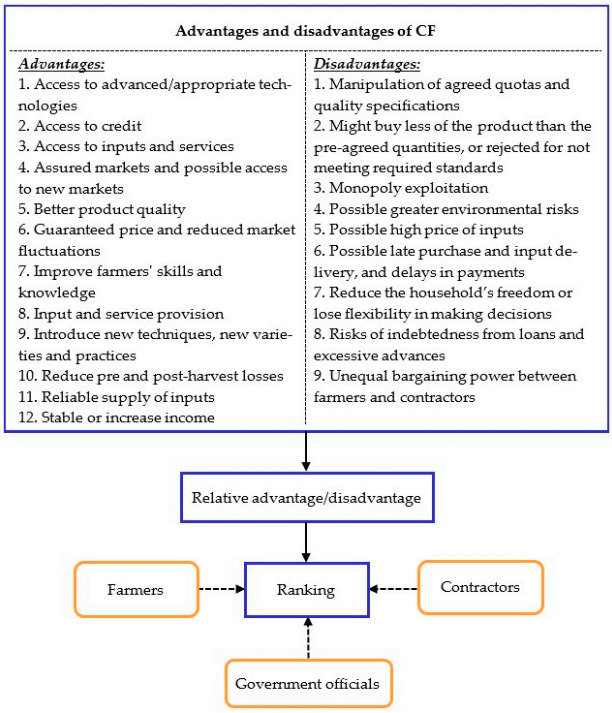

Figure 1. Our conceptual framework for perceptions of the advantages and disadvantages of CF. (Note: Solid arrows indicate associations between components. Arrows with square dots represent associations between stakeholders and components). Source: Adapted from Tuyen, et al. [108].

Better product quality: Better product quality, better quality, or better output are three commonly used terms when talking about the advantages of CF in the quality dimension. Product quality refers to the quality standards such as high quality, Good Agricultural Practices (GAPs), organic, and Sustainable Rice Platform (SRP). This advantage is shown in the studies of Serdaneh and Jaoua [79], Anavrat and Mokde [90], Vinod and Mamta [91], Anavrat, Bante and Mokde [92], Anavrat and Mokde [102], Arumugam and Shamsudin [104], and Ogunleye and Ojedokun [105]. Studying the impacts of CF in Indonesia, Angreheni et al. [109] also indicate that CF improved product quality.

Guaranteed price and reduced market fluctuations: Price—that is, the price of the farmer's output—is considered an important issue in studying CF. Concerning this advantage, while Singh, Kumar, Singh and Chand [106] utilize the term better price, Rout, Mishra, Bar and Mondal [85] utilize fair price. Nevertheless, the previous empirical studies mainly use the term guaranteed price [64,86–92,102,104]. A guaranteed price reduces price-related risks such as *marketing fluctuations* [102,104]. In some cases, marketing risk reduction can be part of the effects of insurance-based contracts [90–92,102]. Therefore, this study follows a large number of previous studies by studying guaranteed price and reduced market fluctuations—a popular term.

Improve farmers' "skills and knowledge: "Skills" and "knowledge" refer to information and activities about techniques, methods, and practices during production and management processes. This advantage is illustrated in the studies of Serdaneh and Jaoua [79], Bounmasith and Guanglu [84], Harish and Kadrolkar [86], Shoja Rani [88], Ray, Kumari, Sinha, Umrao and Nayak [89], Anavrat and Mokde [90], Vinod and Mamta [91], Anavrat, Bante and Mokde [92], Anavrat and Mokde [102], and Arumugam and Shamsudin [104]. In these studies, improving farmers' skills and knowledge are also identified as "skill transfer" and "receiving or acquiring knowledge".

Input and service provision: The provision of inputs and services is one of the regular advantages mentioned by most empirical studies [64,86,88,90–92,98,102,104]. Under CF, farmers are provided basic inputs including seed and fertilizer along with production services such as land preparation, harvesting, and another.

Introduce new techniques, varieties, and practices: "Varieties" refers to the varieties of rice for production, while "techniques" and "practices" refer to the production methods or practices such as "1 must, 5 decrease", "3 decrease, 3 increase", or high quality, GAPs, organic, SRP, and alternate wetting and drying (AWD) irrigation. To upgrade agricultural commodities to meet the market demand on high-quality standards, new techniques, and new varieties and practices are introduced and used. However, farmers' agreement to adopt them relates to the benefits, requirements, possible risks, and costs involved [88]. This advantage is mentioned in the studies of Gabagambi [80], Martin and Mwaseba [81,88], RCDC [98], Arumugam and Shamsudin [104], and Ogunleye and Ojedokun [105].

Reduce pre- and post-harvest losses: "Pre-harvest losses" refers to losses during production such as growing environment, cultural practices, pest and disease attraction, weeds, and ripening stage problems, while "post-harvest losses" happen during harvesting, threshing and winnowing, transportation and handling, and packaging and storage. Anavrat and Mokde [90], Vinod and Mamta [91], Anavrat, Bante and Mokde [92], and Anavrat and Mokde [102] indicate the advantage of CF in reducing pre- and post-harvest losses. Using study results on red chili farms in Indonesia, Angreheni, Darma and Asrul [109] showed that CF reduced post-harvest losses.

Reliable supply of inputs: Regarding input provision, a *reliable supply of inputs* is considered an advantage of rockmelon CF in Malaysia or RCF in Vietnam [104,107]. "Reliable inputs" refers to the quality and origin of inputs. Despite the fact that few previous studies address this advantage, this study included this issue for the sake of completeness.

Stable or increased income: This advantage is mentioned by RCDC [98], Arumugam and Shamsudin [104], and Ogunleye and Ojedokun [105]. CF farmers have a higher income than non-CF farmers, even though they can know the amount of money they will receive soon [98,104].

Manipulation of agreed quotas and quality specifications: "Quality specifications" refers to output quality. "Agreed quotas" refers to the quantity accepted to be bought by the contractors. Studying in India, RCDC [98] indicates that the contractors or the staff of contracting organizations may manipulate quality control, particularly in the quota allocation.

Might buy less of the product than the pre-agreed quantities, or rejected by not meeting required standards: Studying in Nigeria, Ogunleye and Ojedokun [105] document that contractors might buy less cassava production than the pre-agreed quantities. In addition, farmers also indicate that their harvested products might be rejected to purchase because of them not meeting the required standards [80,81]

Mistrust and monopoly exploitation: "Monopoly" refers to a monopolistic purchase of farmer's outputs by contractors. This disadvantage is examined by Serdaneh and Jaoua [79], RCDC [98], and Singh, Kumar, Singh and Chand [106]. Singh, Kumar, Singh and Chand [106] indicate that farmers dealing with a sole contractor in the market have been forced to store malt barley grain. This study chooses the term monopoly *exploitation* for this disadvantage.

Possible greater environmental risks: This disadvantage refers to environmental risks because of a monocrop (one type of variety). Serdaneh and Jaoua [79], and Bounmasith and Guanglu [84] indicate that CF farmers may face the risk of yield losses.

Possible high price of inputs: The contracted price of inputs may be high in comparison with the market price. Rugimbana [83] indicates that the high price of inputs is a disadvantage of CF tin tobacco production in Tanzania.

Possible late purchase and input delivery, and delays in payments: "Late purchases" refers to delays in harvesting or extended harvesting time. "Late input delivery" refers to late input supply compared with the agreement, crop season, or planting calendars. "Delay in payments" refers to extending the payment period, and late payment in comparison with the payment schedule of the CFAs. Late purchase is a disadvantage of malt barley CF in India as examined by Singh, Kumar, Singh and Chand [106].

Reduce the household's freedom or lose flexibility in making decisions: "Making decisions" refers to decisions during the production process including choosing the varieties to plant, selection of fertilizers, fertilizing plan, pest spray, harvesting, etc. Gabagambi [80], Martin and Mwaseba [81], and Rugimbana [83] show that CF farmers lack autonomy and have limited freedom of choice or decisions on farm management.

Risks of indebtedness from loans and excessive advances: This is a common disadvantage of CF in the results of the empirical studies. Serdaneh and Jaoua [79], Gabagambi [80], Martin and Mwaseba [81], and RCDC [98] indicate that farmers can be indebted due to production problems and excessive advances.

To summarize, after a review of the literature and considering the guidelines from FAO [110], we selected 12 advantages and 9 disadvantages of CF for which to investigate the stakeholders' perception (shown in Figure 1).

A key research question arising from our focus on the perception of advantages and disadvantages is: *whose perceptions are we considering?*. Therefore, in Figure 1, we included three stakeholders: farmers, contractors, and government officials. We collected data that allow us to study the perceptions of each stakeholder.

3. Materials and Methods

3.1. Study Sites

Multi-stage sampling method was utilized for study site selection. Firstly, we selected the Mekong River Delta (MRD) because it is the largest and most strategic region of rice cultivation and exportation in Vietnam, and popular in CF adoption [111–114] (Figure 2). In MRD, we chose An Giang, Can Tho, and Kien Giang provinces for studying RCF because An Giang is "the rice bowl" of MRD and the first province to apply RCF [56,115], Can Tho is the main location of rice exporters [111], and Kien Giang is the largest cultivated area of rice [113]. Secondly, we selected two representative districts in each province, and finally

two representative communes in each selected district based on the KII results at provincial and district levels.

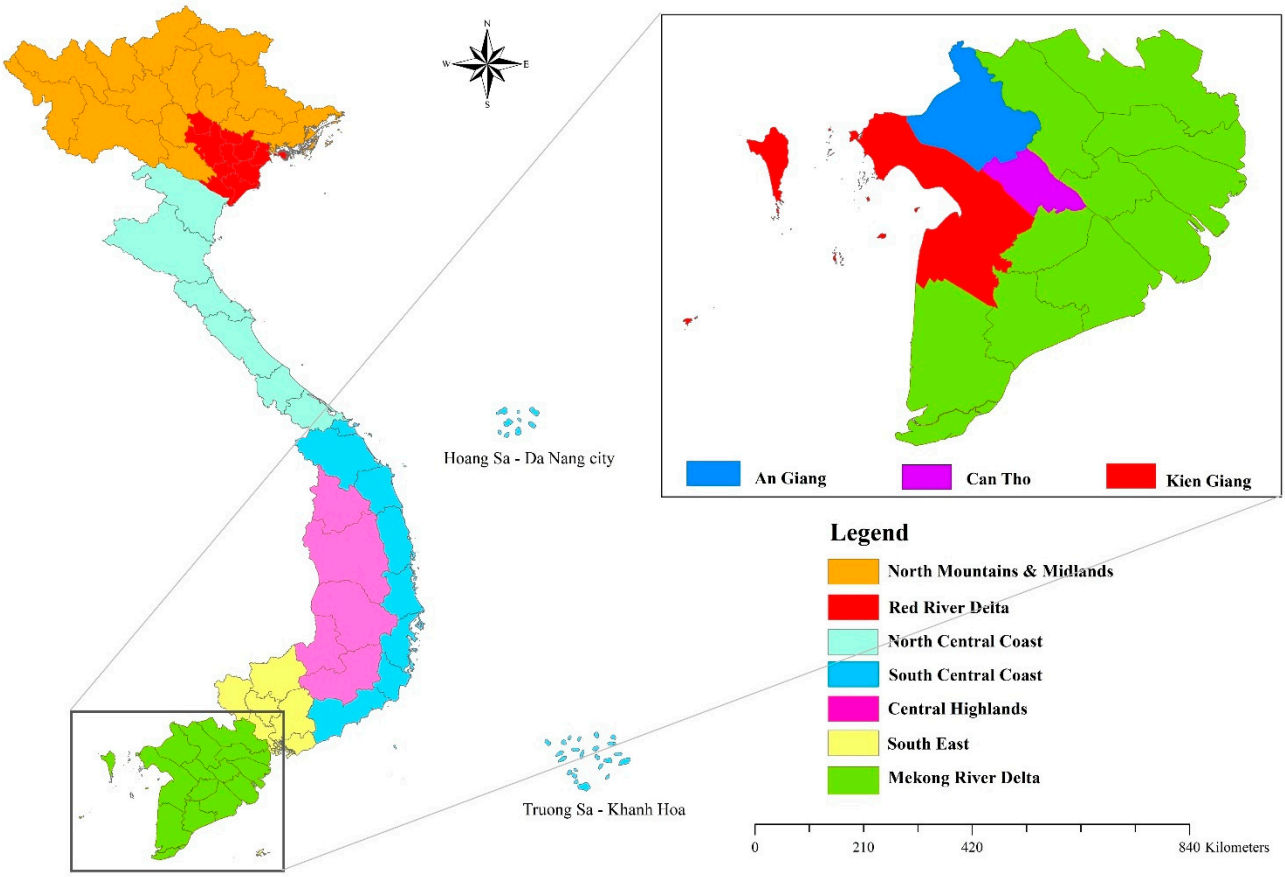

Figure 2. Study region and An Giang, Can Tho, and Kien Giang provinces in MRD, Vietnam. **Source:** Adopted from Tuyen, Sirisupluxana, Bunyasiri and Hung [108].

3.2. Data Collection

This study utilized a qualitative method to collect data. Data were collected through KIIs, FGDs, and POs directly in April and May 2021. Therefore, data triangulation was applied to obtain a complete view of the different stakeholders involved [116]. The purposive sampling method was applied to select key informants as it allowed the researcher to select the experienced respondents. A total of 27 KIIs were conducted with 36 participants including heads of departments, sub-departments, centers, stations, and offices at provincial, district, and commune levels; directors or chairman of agricultural cooperatives and companies' representatives; and farmers. Seven FGDs were organized with the participation of 43 respondents including representatives of the cooperatives (5), contractors (2), and producers (19 CF farmers and 17 non-CF farmers). KIIs and FGDs were conducted using semi-structured questionnaires. In addition, the researchers attended and observed two meetings focused on summarizing and planning the rice production crops of the commune and the cooperative group. The data collected included basic information of respondents, advantages and disadvantages, problems and prospects of CF.

3.3. Data Analysis

A mixed method approach, using both quantitative and qualitative methods, was used to analyze the data. A quantitative method was used to rank-order the stakeholders' perceptions on the advantages and disadvantages of CF. We considered various techniques for ranking such as Henry Garett Ranking (HGR), RBQ, Rank Based on Sum (RBS), or Wilcoxon sign-rank test depending on the measurement approach. To rank the advantages

of CF, while Rout, Mishra, Bar and Mondal [85] utilized HGR, Anavrat and Mokde [90], Vinod and Mamta [91], Anavrat, Bante and Mokde [92], Anavrat and Mokde [102] applied RBQ. In this study, data analysis triangulation was considered, but, in the end, the RBQ method was selected because it was widely applied and more concise than others [108].

In the RBQ technique, firstly, the advantages and disadvantages of CF (separated into two groups) were ordered by each respondent (or individual) within the group. For advantages, the most advantageous was ranked 1st, and the least was ranked last. Likewise, for disadvantages, the most disadvantageous was ranked 1st, and the least was ranked last. Secondly, we calculated the RBQ values of each advantage and disadvantage by the following formula given by Sabarathnam [117]

$$\mathrm{RBQ} = \frac{\sum f_{r_i}(n + 1 - r_i)}{N * n} * 100 \quad (1)$$

where r_i was the r-th rank of the i-th advantage or disadvantage, n was the number of ranks, f_{ri} was the frequency of the respondents (or individuals) giving r-th rank to the i-th advantage or disadvantage. In this study, the number of ranks equaled the number of advantages (n = 12) or disadvantages (n = 9), and N was the sample size (N = 27). Finally, these advantages and disadvantages were ranked descending using the RBQ values; the highest RBQ received the 1st position.

A qualitative approach was used to reveal new insights into the stakeholders' views of CF. Qualitative data were also useful for understanding and deepening the findings from the quantitative data. The qualitative method was conducted using the analytical framework presented in Figure 3.

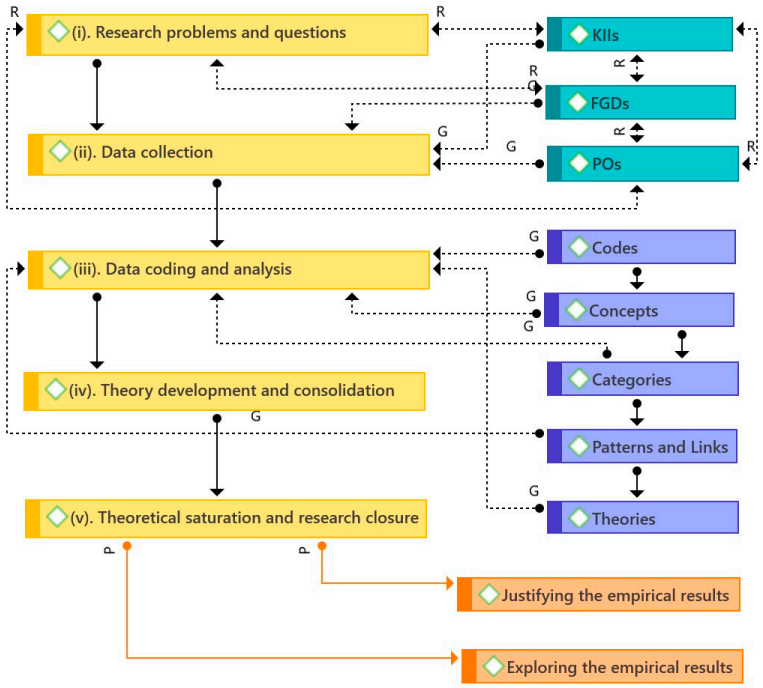

Figure 3. Research processing and analytical framework for the qualitative approach. (Note: Symmetrical dashed arrows with the letter R mean "is associated with", transitive dashed arrows with the letter G represent "is a part of", asymmetric solid arrows indicate the orders between components, and asymmetrical solid orange arrows with the letter P mean "is a property of"). Source: Adapted and adopted from Hoang [118] and Tuyen, Sirisupluxana, Bunyasiri and Hung [108].

The framework was developed based on exploratory interviews and a process of grounded theory. Exploratory interviews included KIIs, FGDs, and POs. The grounded theory process was adapted and adopted from the approach of Hoang [118] and Tuyen,

Sirisupluxana, Bunyasiri and Hung [108] to obtain the fit and rigor of the method according to the protocol and evaluation criteria [119,120]. The model included five stages with different techniques of data collection such as KIIs, FGDs, and POs. Open multi-stage coding using an inductive framework approach was utilized to code the collected data [121,122]. Data coding and analysis consisted of five steps: codes, concepts, categories, patterns and links, and theories. Data were analyzed using Atlas.ti 9 (ATLAS.ti Scientific Software Development GmbH, Berlin, Germany) and IBM SPSS 20.0 (IBM Corp., Armonk, New York, USA). The study utilized constant comparison and content analysis methods [123–125].

4. Results

4.1. Perception of Advantages and Disadvantages of CF

The quantitative results in Table 2 illustrate that while the top three advantages of CF for government officials and contractors were the same: assured markets and possible access to new markets, stable or increased income, and guaranteed price and reduced market fluctuations, the ranking orders of these advantages between these two groups were, however, different. Farmers shared the same perceptions on two of the top three advantages of CF including guaranteed price and reduced market fluctuations, and assured markets and possible access to new markets, but their third ranking was input and service provision, instead of stable or increased income. Indeed, farmers indicated that under CF *"we will be discounted 3% of total input value if we use inputs supplied by the contractors"* (following FGD5). In addition, *"farmers are assured that they are not afraid of the falling market price. Even though paddy has fallen, the contractors still buy at the price according to the signed contract"* (following FGD5). Even though, *"farmers will be received higher price (or premium price) if the residue tests are passed"*, and *"they will be plus 200 VND/kg in comparison with market price"* (following FGD5 and FGD6). Thus, the perception of government policymakers was relevant to the policy objectives of the central government on CF by assuring the market and stabilizing income for farmers, while contractors and producers followed market orientation by focusing on guaranteed price and market access.

Table 2. Ranking for advantages of CF to farmers among the stakeholders.

Advantages	Government Officials		Contracting Buyers		Farmers		Overall	
	RBQ	Rank	RBQ	Rank	RBQ	Rank	RBQ	Rank
1. Guaranteed price and reduced market fluctuations	74.17	3	99.17	1	100.00	1	90.12	1
2. Assured markets and possible access to new markets	88.33	1	90.00	2	91.67	2	89.81	2
3. Stable or increased income	75.83	2	84.17	3	60.71	6	75.00	3
4. Access to inputs and services	70.83	4	72.50	4	65.48	5	70.06	4
5. Input and service provision	58.33	6	48.33	6	79.76	3	60.19	5
6. Reliable supply of inputs	50.00	8	65.00	5	53.57	7	56.48	6
7. Access to credit	59.17	5	32.50	9	67.86	4	51.54	7
8. Better product quality	36.67	9	36.67	7	39.29	8	37.35	8
9. Reduce pre- and post-harvest losses	30.83	11	34.17	8	36.90	9	33.64	9
10. Introduce new techniques, new varieties, and practices	51.67	7	30.83	10	10.71	12	33.33	10
11. Access to advanced/appropriate technologies	35.00	10	27.50	12	14.29	11	26.85	11
12. Improve farmers' skills and knowledge	19.17	12	29.17	11	29.76	10	25.62	12

Regarding the disadvantages of CF (Table 3), our study found that government officials and farmers agreed that the top three disadvantages were reducing the household's freedom or losing flexibility in making decisions; possible late purchase and input delivery, and delays in payments; and manipulation of agreed quotas and quality specifications. The top three disadvantages of CF for the contracting buyers included, in agreement with the other stakeholders, household's freedom reduction or loss of flexibility in making decisions; but also included two new concerns: might buy less of the product than the pre-agreed

quantities, or be rejected for not meeting required standards; and risks of indebtedness from loans and excessive advances.

Table 3. Ranking for disadvantages of CF to farmers among the stakeholders.

Disadvantages	Government Officials		Contracting Buyers		Farmers		Overall	
	RBQ	Rank	RBQ	Rank	RBQ	Rank	RBQ	Rank
1. Reduce the household's freedom or lose flexibility in making decisions	95.56	1	96.67	1	90.48	2	94.65	1
2. Possible late purchase and input delivery, and delays in payments	72.22	3	34.44	7	98.41	1	65.02	2
3. Manipulation of agreed quotas and quality specifications	93.33	2	15.56	9	74.60	3	59.67	3
4. Might buy less of the product than the pre-agreed quantities, or rejected for not meeting required standards	42.22	6	88.89	2	25.40	7	55.14	4
5. Unequal bargaining power between farmers and contractors	62.22	4	45.56	6	50.79	6	53.09	5
6. Possible high price of inputs	31.11	7	58.89	5	65.08	4	50.21	6
7. Risks of indebtedness from loans and excessive advances	25.56	8	80.00	3	19.05	9	44.03	7
8. Monopoly exploitation	60.00	5	20.00	8	53.97	5	43.62	8
9. Possible greater environmental risks	20.00	9	60.00	4	22.22	8	35.39	9

It is not surprising that the contractors might be apprehensive to list the manipulation of agreed quotas and quality specifications since this reflects on their own behavior. In fact, however, this disadvantage deserves attention; it was mentioned in the discussions and interviews during data collection: *"Sometimes, there is a delay in making decisions to handle in the production process, for example, when the field is infected with plant hoppers, the company often waits for 2–3 days to have medicine, so the rice must have suffered heavy damage. If you buy it outside, it's very quick"* [108]. Moreover, the limited capacity of the companies for transportation, drying and storage affected the delivery schedule, and farmers complained that *"sometimes there is a shortage of boats, the drying is not timely, so it is late to deliver paddy after harvesting"* (following FGD6). In addition, manipulation of the contract terms still happened because of the subjective or objective causes. A farmer stated that *"staff of the contracting companies base on moisture measurement to make difficult to farmers for wheedling money"* (following FGD3). Furthermore, a director of an agricultural cooperative also confirmed that

> *"when the market price falls below the contract price, contractors apply technical barriers to find ways to lower the purchase price or refuse to buy such as dirty paddy, mixed paddy, or prolonging the harvest date to yield (weight) lower; If the price drops much lower than the market price, they are willing to lose the deposit and break the contract"* (following KII5).

In addition to the ranked disadvantages, our qualitative analysis revealed additional disadvantages of CF: contractors were sometimes late in taking samples for residual testing and reporting of test results to the farmer was sometimes delayed; and supplies provided by the company were sometimes not effective in use for eradicating pests and diseases (following FGD6).

4.2. Problems of CF

Our qualitative research also revealed problems during CF implementation. Firstly, the most salient problem is a breach of contract, often in the form of side-selling. This problem affects both farmers and contractors.

If the market price was lower than the contract price, farmers sometimes found ways to bring paddy rice in from outside the CF area to sell to contractors to obtain a better price. At the same time, the contractors sometimes sought to renegotiate and adjust contract prices or even to reject buying the paddy rice of CF farmers by extending the harvesting time, increasing the complication and difficulty in quality specifications in terms of mixed and green rate, or delaying paddy delivery (following KII3). For example, *"if the price goes down, adjust the combine harvester so that it blows cleanly to ensure that the rice does not have flat grains (turn the fan speed up to leave only firm seeds)"* (following FGD3). If the price decrement

was big enough, the contractors would sometimes be willing to forfeit the deposit and break the contract altogether to reduce damage.

In contrast, if the market price was higher than the contract prices, then side-selling by farmers occurred. Farmers diverted production from the contracted area into spot markets to obtain a better price. Moreover, when market prices were much higher than the contract prices, CF farmers would be willing to break the contract, reimburse the contractor for the deposit, and sell paddy rice outside to obtain more revenue.

A related reason for farmers to break the contract is disruption by the independent brokers (traders) in the traditional market. Sometimes traders hate the contracting companies so much that they act strategically, paying above-market prices in order to disrupt the contract. If successful, they induce other contracted households in the same way to renegotiate or break their contracts to try to sell their paddies to this trader. For example, *"LT company contracts LT18, LT28 rice. LT contracts 6800VND/kg but traders buy 7400VND/kg. Traders hate the company: 10 households jointly produce rice under contract, and traders only buy paddy of 1 household at extremely high prices. The other nine men saw that and turned to negotiate with the contractors or break the contract to sell to this trader. But this trader has gone, no longer buy"* (following KII3). The consequences of breaking the contract happen to both farmers and companies. While the contracting companies were refused and could not continue contracting in the next season with these cooperatives and farmers, they had to move to other (new) areas or regions to make contracts, as farmers were not accepting of participating in CF in the next crop cycle.

Secondly, the brokers (local middlemen) sometimes manipulate the market price. These intermediaries manipulated market prices but they were controlled. A government official of a Rural Development Station was confused that *"the problem being asked is whom does the trader sell to? Selling again to the companies. So how are traders and companies related?"* (following KII7). Indeed, a director of an agricultural cooperative stated that "*traders/middlemen often fix high prices and pay farmers immediately but only choose good rice (beautiful rice), standing rice to buy. However, they often choose to harvest later than the companies. Therefore, even though the price is high, the production will decrease because the rice is drier"* (following KII18). He also believed that there was a close relationship between the contracting companies and traders or intermediaries. He said that

> *"the companies sometimes trap the cooperatives. A company set a price at 5900 VND/kg and then begged me to receive a deposit of 100 million VND with a handwritten note that mentions the price but did not mention the issue of compensation if the contract was broken. After that, the company relied on the middleman to increase the price, they increased the (market) price to 6000 VND/kg or 6100 VND/kg. This made farmers suspicious of the cooperative colluding with the company to force prices down. With the price that the cooperative was pegged at 5900 VND/kg, farmers did not agree to sell to the enterprise meanwhile the cooperative had received the deposit from this company. My cooperative would not have rice to sell to the company. After 4 days, this company forced me to pay the deposit and compensate 100 million VND."*

From this story, the cooperative director posited that the companies and the traders/middlemen mainly wanted to discredit the cooperative so that they could easily do business.

Thirdly, contractors sometimes made late payments, delayed harvesting, or delayed delivery. Although these issues were examined and listed in the disadvantages, the results of the FGDs and interviews highlighted that these were also objective problems of CF. These issues are strongly related to the capacity of the contracting companies. In some cases, the companies had limited capacity, especially financial and facility ability. Therefore, at the peak of harvesting time, these contractors did not have enough transportation equipment (such as boats) to deliver rice after harvesting and money to pay. In other cases, this problem came from the incentive of the unfavorable market price movements. In the case of a market price lower than their contracted price, the companies sometimes extended the harvesting time to hope for an increase in the market price to avoid losses.

Fourthly, farmers sometimes did not completely comply with production regulations. The most common was the improper use of pesticides, which affects the output quality. In addition, rice quality was also sometimes unsatisfactory because the non-CF households with adjacent fields sprayed pesticide near the harvest date, and overspraying affected the test results of the CF farmer.

The violation of contracts and the manipulation of market prices led to a fifth problem: mistrust. In some cases, there was a lack of credibility and failure by contractors to fulfill commitments to the farmers, and vice versa.

4.3. Prospects of CF

Despite the problems in CF performance, the prospects of CF are still quite bright. First, CF still attracts farmers to participate. Study results indicated that farmers would continue participating in CF because *"CF brought many benefits to households in particular and rice production of the regions in general"* (following KII5). In addition, KII3 indicated that the number of farmers, enterprises, and cooperatives participating in RCF would be larger. Second, CF products meet the requirements of the market demand for high-quality products because *"CF can assure the quantity of rice required for orders as well as for the market of high-quality rice"* (following KII5). Moreover, CF tends to be expanded to produce high-quality exported rice for foreign markets (following KII3). Third, the contractors still have strong incentives to join CF with farmers and cooperatives. The companies issued policies to support the cooperative in CF performance such as lending to buy machines. Moreover, *"enterprises still want to cooperate with cooperatives because the rice quality is guaranteed. But when buying rice through traders, the quality is not homogeneous because traders buy rice from many different fields"* (following KII3). Four, CF will stabilize in the upward direction and improve the quality of performance because farmers will have developed the habit of CF production (following KII20). The results also indicated that *"CF should be encouraged to expand"* (following KII6). Finally, what might be most important is that the central and local governments have strong support for the stakeholders participating in CF, especially the enterprises, cooperatives, and farmers. These supports were specified by many policies at different levels (Figure 4). The first official national policies on CF were issued in 2002 through the decision 80/2002/QD-TTg to set up incentive policies for enterprises and farmers to sign contracts for agricultural products [126]. Then, the new sub-law documents continued to be issued to amend or issue new policies to promote CF implementation based on the results of implementation the previous time [127–129]. The latest and most complete policy referring to CF is decree 98/2018/ND-CP in 2018 that promulgated new regulations on incentive policies to related parties to facilitate CF implementation with a higher level and wider scope of impact [130]. In addition, these decisions, 194/QD-TTg and 555/QD-BN-TT, in 2021 also examined CF as an appropriate and adequate measure to restructure Vietnam's rice industry and develop the agricultural sector [131,132]. The promising prospects of CF were reconfirmed to develop green, environmentally friendly agriculture, and adapt to climate change; especially as Vietnam strives for the vision to become one of the world's leading agricultural countries by 2050 [133]. Meanwhile, at the provincial level, all selected study provinces have issued systematic policies to apply and promote CF. The interview results illustrated that *"the Provincial People's Committee supports Loc Troi to do CF well to bring benefits to farmers"* (following KII5).

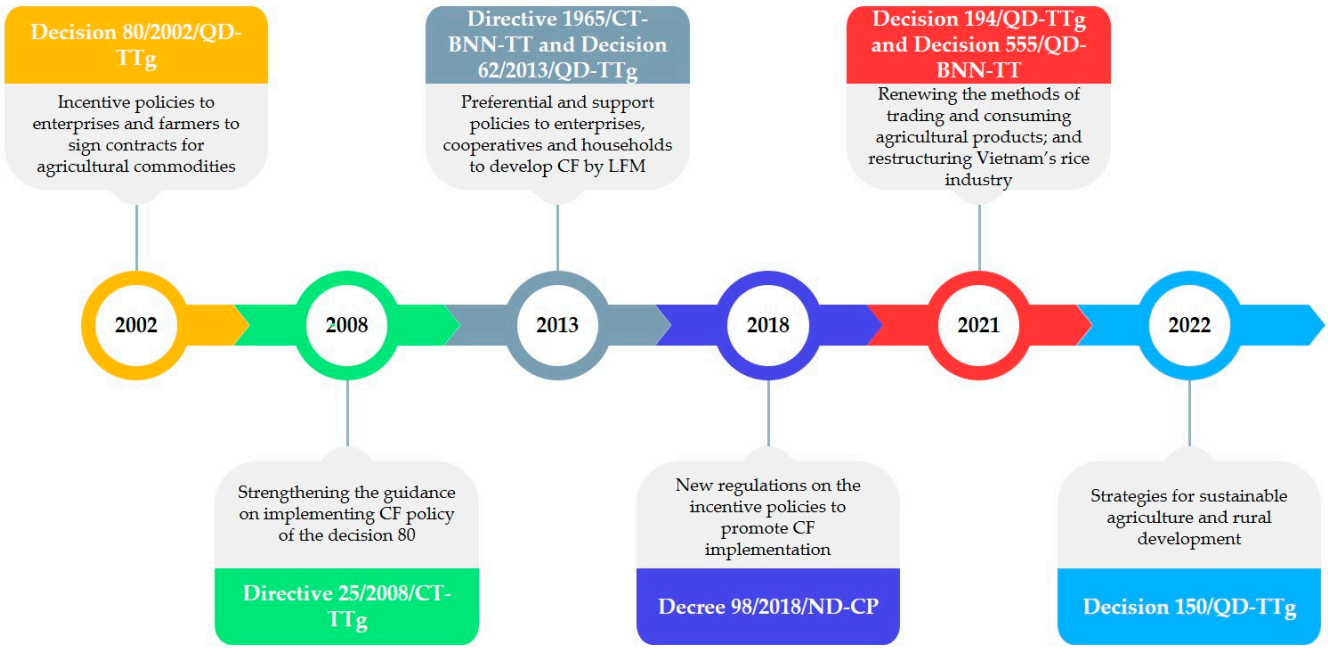

Figure 4. Key and representative policies related to CF in Vietnam. Source: Author's synthesis based on the policy documents [126–133].

5. Discussion

5.1. Comparison to Previous Studies of Perceptions

We studied twelve advantages of CF. This was the largest number in comparison with the previous empirical studies such as the 10 advantages of Anavrat and Mokde [90], Vinod and Mamta [91], Anavrat, Bante and Mokde [92], and Anavrat and Mokde [102], 8 of Serdaneh and Jaoua [79], Gabagambi [80], Martin and Mwaseba [81], and Bounmasith and Guanglu [84], 6 of Rout, Mishra, Bar and Mondal [85], Harish and Kadrolkar [86], Sarkhel [87], Shoja Rani [88], and Ray, Kumari, Sinha, Umrao and Nayak [89], 4 of RCDC [98], and Singh, Kumar, Singh and Chand [106], and 3 of Nhân and Hoàng [64], and Rugimbana [83]. Considering the ranking of the CF advantages, generally, the study indicates that a guaranteed price and reduced market fluctuations was the biggest advantage of CF. This result was in line with Anavrat and Mokde [90], Vinod and Mamta [91], and Anavrat, Bante and Mokde [92]. By contrast, Anavrat and Mokde [102] showed that this advantage ranked in the lowest position of the advantages of CF in India. Regarding the advantage of assured markets and the possible access to new markets, the study reveals that this was the second main advantage of CF. This position is consistent with the results of Anavrat and Mokde [90], Vinod and Mamta [91], Anavrat, Bante and Mokde [92] Rout, Mishra, Bar and Mondal [85], and Ogunleye and Ojedokun [105]. The study also demonstrates that stable or increased income was the third ranked advantage of CF. This finding was contrary to the tenth ranking in the study of Ogunleye and Ojedokun [105] on Cassava in Nigeria. On the subject of the lowest ranked advantages of CF, the results reveal that improving farmers' skills and knowledge was ranked at the bottom among the twelve advantages. While this result is in agreement with the study of Ogunleye and Ojedokun [105], it is quite different from the studies of Vinod and Mamta [91], and Anavrat and Mokde [102], with a position in the middle of the list of CF advantages. In terms of access to advanced/appropriate technologies, it is also one of the three lowest ranked advantages of CF. This result is consistent with Anavrat and Mokde [90], and Vinod and Mamta [91] but different to Anavrat, Bante and Mokde [92], and Anavrat and Mokde [102]. Anavrat, Bante and Mokde [92], and Anavrat and Mokde [102] indicated that access to advanced/appropriate technologies was placed in the top three highest advantage of citrus CF in India. Looking at the middle positions of the advantage rankings, from fourth to

ninth, the study illustrates that all of them were related to the outputs and inputs. However, the advantages based on inputs for production including access to inputs and services, input and service provision, reliable supply of inputs, and access to credit had mostly higher rankings than those of the outputs such as better product quality, as well as reduced pre- and post-harvest losses. These results are also in line with the studies of Vinod and Mamta [91], and Anavrat, Bante and Mokde [92] rather than the findings of Anavrat and Mokde [102].

We studied nine disadvantages of CF. This is also the largest number in comparison with the eight of Serdaneh and Jaoua [79], and Bounmasith and Guanglu [84], five of Rugimbana [83], and four of Gabagambi [80], and Martin and Mwaseba [81]. In terms of rankings, while this study examined and then ranked the disadvantages of CF, all of the other studies only indicated the advantages without rankings except for the study of Ogunleye and Ojedokun [105]. However, these authors mentioned and ordered the CF disadvantages in terms of preferences towards CF with the list of 22 statements. Some authors also revealed the major disadvantages without rankings [80,81]. Considering each problem of CF, reducing the household's freedom or losing flexibility in making decisions was the most unfavorable to farmers. This finding is consistent with the studies of Gabagambi [80], Martin and Mwaseba [81], and Rugimbana [83], but this disadvantage was not ranked by these authors. Other disadvantages of CF in this study were similar to some authors' findings such as possible late purchase and input delivery, and delays in payments indicated by Singh, Kumar, Singh and Chand [106], the manipulation of agreed quotas and quality specifications of RCDC [98], and other studies already illustrated in Table 1.

As a result of this study, there seems to be a difference in the perception of CF's advantages and disadvantages among the stakeholders despite the few similarities between two of the three respondent groups in some rankings. To our best knowledge, this is perhaps the first study to simultaneously investigate perceptions on CF's advantages and disadvantages among all stakeholders including government officials, contracting buyers, and farmers. While this study examined the advantages and disadvantages of CF for farmers, Harish and Kadrolkar [86], and Shoja Rani [88] indicated the advantages and disadvantages of CF for both farmers and firms. In addition, despite non-ranking, Gabagambi [80], and Martin and Mwaseba [81] measured the advantages and disadvantages by a Likert scale separating partially integrated CF and fully integrated CF farmers. In fact, some issues considered to be advantages in this study were considered benefits, incentives, or motivations in those studies. For instance, while the guaranteed price and reduced market fluctuations were an advantage of CF in this study and most of the studies (Table 1), it was also considered a benefit in the studies of Kaur and Singla [93], and Sharma [94], an incentive by Guo et al. [134], and a motivation by Masakure and Henson [135], and Opoku-Mensah [136]. Similarly, assured markets and possible access to new markets were also examined as a benefit by Kaur and Singla [93], and Sharma [94], an incentive by Guo, Jolly and Zhu [134], and a motivation by Masakure and Henson [135], Opoku-Mensah [136], and Nhan and Yutaka [137]. Likewise, some disadvantages in one study are considered as constraints, challenges, or problems in other studies. For example, the high price of inputs was also a challenge for CF following Mango and Kugedera [95], a constraint following Rout, Mishra, Bar and Mondal [85], Kaur and Singla [93], Kambhampaty and Goverdan [97], and Harish [138], or a problem following Harish [138], and Velusamy [139].

5.2. Comparison to Previous Studies of Problems

This study implies that breach of contract was one of the most common problems of CF. This is relevant to the studies of Minot [140] in sub-Saharan Africa, Ray, Kumari, Sinha, Umrao and Nayak [89], and Dhillon, Singh and Dhillon [96] in India, and Hambloch [141] in the Philippines. In many cases, CF farmers tried selling the contracted output to other buyers to take advantage of a better market price. In some cases, contractors were unwilling or unable to pay the contracted or negotiated price and used technical barriers such as

product quality specifications to evade their commitments. In fact, frequent fluctuations in market prices were also an objective problem during the CF performance, and positively affected side-selling [101,142]. Additionally, Ewusi Koomson et al. [143] mentioned side-selling as a major threat to CF promotion and development in sub-Saharan Africa.

Late payment and delayed delivery were also considered a problem of CF, in agreement with the studies of Sharma [94], Dhillon, Singh and Dhillon [96], Harish [138], Singh and Thakur [144], and Singh and Thakur [144]. Admittedly, delayed delivery was caused by the low capacity of the machines [145] or the limited availability of the contractors' transport vehicles while contracting large areas [139]. Rajput, Sharma and Sharma [101], and Velusamy [139] also indicated a delay in input provision. In addition, other authors documented more problems of CF, such as output rejection or a high rejection rate in India [96,100,138]. Other reported problems of CF include the high cost of inputs, transportation, production, and maintenance [82,101,138,139]. As to the problem of farmers complying with production regulations, this study is in line with the study of Rajput, Sharma and Sharma [101], whose study illustrated an improper use of fertilizers and plant protection chemicals or failure to comply with the instructions of the contractors by CF farmers. Altogether, our study is consistent with most of these authors in using qualitative methods for investigating problems of CF (excluding [94], Rajput, Sharma and Sharma [101]), and our study has broadly similar findings.

Mistrust was also a problem of CF. This is in line with the studies of Nhan and Yutaka [145] in Vietnam and Serdaneh and Jaoua [79] in Lao DPR. The mistrust was caused by the behavior of both contractors and farmers. Serdaneh and Jaoua [79] showed that the companies did not believe in the farmers because of their frequent side-selling, while farmers did not rely on the contractor since they did not return to buy the contracted output or did not buy all the products. Moreover, the insufficient information provided by the company or lack of transparency also led to substantial mistrust among these stakeholders [34].

5.3. Comparison to Previous Studies of Prospects

In terms of the prospects of CF, the findings reveal that CF's future in Vietnam is overall quite promising. This result is the same as in India through the studies of Ray, Kumari, Sinha, Umrao and Nayak [89], and Choudhary et al. [146]. In fact, not only did 87% of the CF farmers want to continue with CF in the future [94], but also a high percentage of non-CF farmers were interested in participating in CF in India [97]. Kumar and Kumar [99] also indicated that 63.6% of CF farmers tended to remain with or increase their cultivated area under CF. Moreover, CF was the best solution to overcome the problem of excessive demand [89]. Most importantly, CF was beneficial and able to make an important contribution to agricultural growth, so it should be promoted [87,94]. In Ethiopia, a vast majority of farmers (about 92%) were aware of and willing to participate in CF schemes [147]. In China, 76.0% of non-CF farmers answered positively when they were asked whether they would be willing to join CF [134]. In Ghana, while Opoku-Mensah [136] indicated that 78.2% of farmers would like to be involved in CF, Ruml and Qaim [34] demonstrated that 61.54% would not sign another contract after finishing the current one in case of unchanged terms. They did not want to continue producing under CF because of unfair contract provisions.

Our findings have several important implications for policymakers and stakeholders involved in CF. Our study provides empirical evidence on the problems of CF in Vietnam, especially on the effects of violating the terms of the CFAs. It also indicates that there is a need for coordination among stakeholders to accurately gather information about enterprises that violate contracts and then to widely disclose that information to interested parties as a warning.

6. Conclusions

In summary, our literature review led to a comprehensive list of advantages of CF, twelve in number, ranked in order of importance by stakeholders as (1) guaranteed price and reduced market fluctuations; (2) assured markets and possible access to new markets; (3) stable or increased income; (4) access to inputs and services; (5) input and service provision; (6) reliable supply of inputs; (7) access to credit; (8) better product quality; (9) reduce pre- and post-harvest losses; (10) introduce new techniques, new varieties, and practices; (11) access to advanced/appropriate technologies; and (12) improve farmers' skills and knowledge. We also developed a list of nine disadvantages of CF, ranked as (1) reducing the household's freedom or losing flexibility in making decisions; (2) possible late purchase and input delivery, and delays in payments; (3) manipulation of agreed quotas and quality specifications; (4) might buy less of the product than the pre-agreed quantities or be rejected for not meeting required standards; (5) unequal bargaining power between farmers and contractors; (6) possible high price of inputs; (7) risks of indebtedness from loans and excessive advances; (8) monopoly exploitation; and (9) possible greater environmental risks; and other disadvantages found using the qualitative method included being late in taking samples for residual testing and delays in informing results; and ineffective inputs from the contractors. The empirical results also reveal differences in the perceptions of the advantages and disadvantages of CF among stakeholders.

We also find that CF in Vietnam still has several problems such as breach of contract, including side-selling; market manipulation by the local middlemen; late payments, prolonged harvest time, and delayed harvesting and delivery; failure in compliance with production regulations; and mistrust.

Our results indicate that mistrust is a major problem. Therefore, the improvement in credibility between companies and farmers needs to be addressed through the participation of the contractors in the (director board of) agricultural cooperatives, or in the union of cooperatives (UNICOOP), to share the risks. Moreover, agricultural insurance policies should be considered and promoted to combine with CF to ensure the peace of mind of farmers when participating in CF.

Our study encourages further research on several issues. Firstly, studies investigating the participation in CF from a broader perspective need to go beyond the narrow socioeconomic characteristics of farmers. Indeed, perceptions on the advantages and disadvantages of CF may be the direct factor or mediator affecting farmers' participation behavior. Secondly, it would be worthwhile designing a good CFA with reasonable contract attributes, especially price options or risk-sharing mechanisms to reduce market fluctuations—a key factor affecting side-selling.

Our study is not without limitations, in particular a limited sample size (under the conditions of the COVID-19 pandemic) of all types of related stakeholders. Future studies might increase the sample size through reasonable methods of data collection. Future studies might utilize the quantitative method by surveying with a larger sample size in order to better analyze the differences of farmers' perceptions on CF.

Despite the problems discussed above, we believe that the future of CF in Vietnam is quite bright. Thus, we hope our study will provide solid empirical evidence to the related stakeholders and help to develop working plans or policies to reduce the disadvantages and address the problems of CF, thereby leading to a healthier agriculture sector for Vietnam and other countries

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