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Institutional Choices in the Benguet Potato Value Chain[1]

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Abstract

This study examines the value chains of Benguet potato using the transaction cost economics framework and draws policy implications from the analysis. Drawing on data from value chain actors collected through key informant interviews and focus group discussions, the study identifies two distinct chains: the longer traditional value chain and the shorter contract-farming value chain. In the traditional value chain, disposers serve as the primary marketing agents for potato farmers. Most transactions—from input provision to marketing—are highly informal, with no formal contracts governing exchanges. Relationships among players are maintained through informal mechanisms such as social networks and ties, resulting in a value chain that is functional yet characterized by dependency relationships and asymmetries in bargaining power that may disadvantage certain players. In contrast, contract farming involves farmer cooperatives or associations directly contracted by institutional buyers to supply potatoes, diminishing the role of disposers. This chain exhibits more formal characteristics, particularly during the contracting stage. Contract farming appears to reduce uncertainty and address the asset specificity and frequency requirements of both farmers and institutional buyers. More importantly, transaction cost analysis shows that the institutional arrangements observed in both value chains can be explained by the characteristics of the transactions they aim to govern. Based on these descriptive findings, the study

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recommends improved access to multipurpose credit for farmers, stronger market linkage programs, capacity building for farmer associations, and investment in price information systems.

Keywords: Agriculture, Value Chain, Transaction Cost Economics, Agricultural Policy, Institutions

Agricultural Value Chains, Transactions, and Institutions

Introduction

The agricultural value chain is comprised of a multitude of transactions among different players at different stages. These transactions are undertaken through various institutional arrangements chosen by transacting parties. Whatever the degree of effectiveness these institutions display, how they are arranged is often influenced by the characteristics of the transactions they are intended to be governed (Coase 1960; Williamson 1985). Thus, agricultural policy interventions must recognize how these existing institutional arrangements solve transactional challenges players face at different stages. Without doing so, policies will either tend to disrupt arrangements that are already working given the constraints of the players or introduce interventions that do not address the underlying transactional issues.

This paper attempts to answer the following question: why do players in the Benguet potato value chain choose the institutional arrangements that they do? Based on the answers to this question, the study draws policy insights aimed at improving the outcome for key players. The choice of research site is driven by the historically important role of Benguet as a source of potatoes in the country. The Cordillera Administrative Region (CAR), where Benguet belongs, has an overwhelming 84.5 percent average share in total domestic production of potatoes from 2010 to 2023 (PSA, 2024). Close to 90 percent of CAR's contribution to national potato production comes from the province of Benguet. This translates to a 75.3 percent share of Benguet in the total potatoes produced in the Philippines. This highlights the importance of this region's production in the country's potato supply and, by extension, to the incomes of agriculture players in the province.

The main analytic contribution of this paper is showing that the existing arrangements in the traditional value chain help prevent transactional breakdown by addressing uncertainties, issues on frequency, and human asset specificity, all within the limits of what individuals with bounded rationality

do. These findings confirm the empirical predictions of transaction cost and new institutional economics frameworks. However, we also find that such solutions do not fully solve transactional issues as players, especially farmers and farm laborers, still face considerable uncertainty in the market. The "sticky" nature of the informal arrangements also results in diminished bargaining power and agency among some players, especially individual farmers. Thus, although the arrangements make the value chain functional, they also create dependencies that may trap weaker players.

The contract farming value chain found in Benguet promises solutions to the transactional problems that the traditional value chain misses to address. As this paper will show later, issues on uncertainty, frequency, and specificity are addressed for both farmers and institutional buyers. However, the option to contract appears to be still limited among farmers with the capacity to organize and negotiate-competencies that may be hard for many to acquire. The demand for contract farming among buyers may still be too low to absorb a significant share of potato produce from Benguet. Moreover, it also appears that transactional failures due to opportunism are still an issue contract farming must solve.

The paper finds the following are still the most important policy issues that need to be addressed: improved access to multipurpose loan facilities for potato farmers, stronger market linkage and monitoring of contract farming agreements by relevant agencies, and enhancing the capacity of farmers' cooperative associations to engage in contract farming. These policy recommendations are not new in policy conversation, but the research shows that more work needs to be done. Aside from these, both local and national government must invest in price information systems to improve transparency and competition, provide labor and social protection to informal workers in agriculture, and encourage formalization of various relationships in the traditional value chain. We elaborate on these policy recommendations in Section 5.

Value Chains and Institutions

A value chain describes the full range of activities and associated transactions required to bring a commodity from conception to final consumers (Kaplinsky and Morris 2012). It can also be understood as the structures that facilitate the transformation of inputs into products that are ready for final consumption (da Silva and de Souza Filho 2007). In agriculture, the value chain consists of the different activities from input procurement, land preparation, up to marketing and processing of harvests.

In India, Gulati et al. (2022) document three broad stages in the potato value chain: pre-harvest, harvest, and post-harvest stages. The key pre-harvest activities in the value chain include procurement of seeds, land preparation, sowing, planting, cultivation, nutrient and water management, and weed, pest, and disease management. Farmers typically harvest baby potatoes after two to three weeks using a potato digger or by ploughing. However, harvesting can be done slightly earlier when there is higher demand for the market. The potatoes are then sorted according to size and stored in shade to avoid sun damage. Potatoes are typically marketed through local traders, processing firms, or the Agricultural Product and Livestock Committee (APMC) (Grant Thornton 2016). The important role played by traders in the marketing stage is documented in the value chain of other countries (El Gazzar 2015; Ugonna et al. 2013; Emana and Nigussie 2011; Svubure et al. 2017; Rahman et al. 2022). Local traders can either buy the potatoes from farmers for further resale or serve as a facilitator between farmers and wholesalers. In the latter case, traders earn a guaranteed commission per quintal of potatoes sold. However, in some cases, traders also serve as input suppliers to farmers by providing seeds, fertilizers, and pesticides through loans. The resulting relationship between farmers and traders-cum-lenders puts farmers in a weaker bargaining position during the price negotiation (El Gazzar 2015).

Contract farming serves as an alternative mechanism to arrange the value chain of agricultural products from livestock (Catelo and Costales 2008), raw materials (Sartorius and Kirsten 2007), and produce (Barik et al. 2024). In this arrangement, a buyer contracts farmers to plant a specific crop. This eliminates the need for traders. The quality, delivery schedule, and price are already fixed during the contracting stage (Kherallah and Kirsten 2002; Singh 2005). In some cases, the contractor provides the necessary farm inputs to the farmer. PepsiCo is an example of a firm that started contracting potatoes from farmers in India (Barik et al. 2024; Grant Thornton 2016). Contract farming is also present in Pakistan. Those who choose to operate under contract farming cite the provision of inputs, technology, transportation assistance, and price-fixing as primary motivators to enter the agreement (Rasool et al. 2023). In the Philippines, there are efforts by the Department of Agriculture (DA) and the Universal Robina Corporation (URC) to contract potato farming across the country. In this arrangement, URC provided input support to potato farmers and linked producers to URC's supermarket affiliates for marketing (JG Summit Team 2018). As found by Catelo and Costales (2008) in the case of livestock production, although contract farming involves the producer and buyer agreeing on terms, these agreements may still be informal in nature. They also found that many studies show mixed results regarding the efficiency gains in contract farming, but there are more instances of cases where contract farmers enjoyed efficiency gains compared to independent farmers. This

mixed result is also supported by Sartorius and Kirsten (2007), who found that the success of contract farming may be conditional on structural factors like how organized farmers are, the unique geographic distribution of farmers that influences coordination costs, and how farmers see contracting farming (e.g., as a main activity or a supplement only to spot market).

Although agriculture follows "biological" production functions that are fixed by nature (Cook et al. 2008), the agricultural value chain has a social character due to the institutional arrangements chosen by the players. Following North (1990), we define institutions as "the rules of the game in a society or, more formally, [as] . . . the humanly devised constraints that shape human interaction." We can classify institutions into formal and informal types. Formal institutions are "the codified, traceable rules written and enforced by organized third parties such as state legal systems or private arbitration courts" (Ménard and Shirley 2022). Common examples of formal institutions are laws and state regulations. Informal institutions, on the other hand, are the unwritten codes of conduct, norms of behavior, and conventions that often result from repeated interactions (North 1990). Both types of institutions facilitate and constrain social interaction and are therefore important in understanding socio-economic processes and outcomes.

As such, institutional choices exert a powerful influence on the performance of the whole value chain. Mohan (2016), for example, provides three broad institutions present in the agricultural value chain of Nepal. Governance institutions set quality standards, grading rules, and payment modalities. Governance institutions also explain how relationships and productive collaboration affect the effectiveness of a value chain (Zamora 2016). Labor institutions, on the other hand, set payment modalities, allocation rules, and availability rules that govern labor relations. Lastly, financial institutions set out rules concerning access to financing for farmers.

Institutions are also embodied in the relationships and transactions between value chain players. For example, the studies by Capacio et al. (2020) and Milagrosa (2007) highlight the relationships that endure between traders and farmers. In particular, the dual role played by traders as lenders and commissioned agents of farmers allows the latter to secure a favorable bargaining position in the marketing stage. For example, it allows the traders to set the price and grade of the produce. Because of this, the relationship between farmers and traders becomes "sticky" and "personal" over time and resembles what Capacio et al. (2020) describe as clientistic and hierarchical. In this case, the practices, with the resulting relationship itself, constitute the institutions.

Theoretical Framework and Method

Theoretical Framework

This paper will draw from Williamson's (1979, 1981, 1985) transaction-cost economics (TCE), a core pillar of new institutional economics (NIE), to analyze the role of institutions in the potato value chain. In contrast to the neoclassical framework, which often takes institutions as exogenous, NIE emphasizes the central role of institutions in shaping socio-economic phenomena (Ménard and Shirley 2022). As such, the framework allows us to explain the presence of both formal and informal institutional arrangements (e.g., contractual arrangements) and analyze their influence on value chain outcomes.

Value chain activities involve transactions which are broadly defined as the transfer of rights to use a resource (Ménard and Shirley 2022). Resources here include commodities, services, and even rights themselves. One major difference between the neoclassical and NIE frameworks is their treatment of transaction costs. Transaction costs can be defined as the costs incurred by transacting parties beyond the price of the commodity or service exchanged. The importance of considering transaction costs hinges on some behavioral characteristics NIE assumes about individuals. Unlike in the neoclassical tradition, individuals are assumed to be boundedly rational (Williamson 1981) and opportunistic. Bounded rationality implies that individuals, although intendedly rational, have limited analytical and data-processing capabilities. This further means that they have limited ability to process information and solve complex transactional problems (Williamson 1981). Some important consequences of bounded rationality among transacting parties are the adoption of rules of thumb and informal and incomplete contracts. Opportunism, on the other hand, refers to what Williamson (1985) described as "self-interest seeking with a guile." Thus, transaction parties can intentionally be dishonest and untrustworthy, and "disguise attributes or preferences," and "distort data, obfuscate issues, and otherwise confuse transactions" (Williamson 1985).

If individuals are hyperrational and non-opportunistic as in the neoclassical tradition, then characteristics of transactions and transaction cost itself is of little importance in explaining arrangements adopted by transacting parties. However, the more realistic assumption of bounded rationality and opportunism makes the dimensions of transactions become important in analyzing economic decisions (Williamson 1981).

The three important dimensions of transactions that impact costs are uncertainty, frequency, and asset specificity. Transaction uncertainty refers to the general refers to lack of ability of one or more transacting parties to ascertain future states relevant to the transactions. Williamson (1985) and Koopmans (1957) hint at two types of uncertainties: uncertainty due to the fundamental unpredictability of the future and uncertainty due to lack of information flow between transacting parties. Williamson (1985) notes that uncertainty due to issues of information flow may be a deliberate strategic decision of one or more parties in the transaction, and in such cases, we may call it behavioral uncertainty.

Asset specificity refers to the extent investments required by the transaction are specific such that their value outside the transaction is sufficiently low. Williamson (1981) identifies three types of specificity that can arise: (a) site specificity, (b) physical specificity, and (c) human asset specificity. Site specificity arises when one or more transacting parties invest in assets on a particular site in order to economize with transactions (e.g., investing in cold storage near farms). Physical specificity, on the other hand, refers to investment in assets that are special and only useful for a particular production process (e.g., special machinery that is only useful for chip making and nothing else). Lastly, human specificity refers to investments in human beings, resulting in skills and knowledge that are largely only valuable in the transaction of interest and are therefore non-transferable to another transaction. In all of these types of specificity, the investment will have low value outside of transactions, posing the threat of what is commonly known as the "hold-up" problem. The degree of asset specificity also determines the "switching cost" of parties in a transaction towards another transaction relation.

Lastly, transaction frequency refers to how often a transaction occurs or is expected to occur between two parties. The more frequent transactions are, the more likely it is to be governed by vertical integration and long-term contracts. On the other hand, less frequent transactions are more efficiently governed using classical contracting or market mechanisms (Williamson 1979).

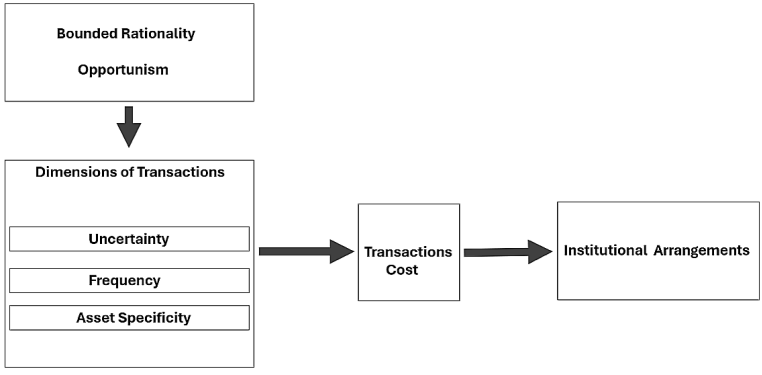
The level of uncertainty, asset specificity, and frequency of transaction together with the degree of opportunism and boundedness of rationality influence how value chain transactions are to be governed—i.e., the institutional arrangements that will persist in the value chain. TCE provides some empirical predictions about the relationship between transaction dimensions and institutional arrangements (Williamson 1979). The predictions that are most relevant to us are those that distinguish between market governance, trilateral governance, and relational contracting-the latter

of which can be further categorized into bilateral contracting and internal organization. The prediction can be summarized as follows (Williamson 1979): holding uncertainty at a certain level, a transaction that involves increasing asset specificity and frequency will likely be governed by relational contracting instead of market governance. Conversely, transactions with decreasing specificity and frequency are likely to be governed using market governance. The effect of uncertainty is to increase the desirability of relational contracting over market governance for specific levels of frequency and specificity.

Another important note about these three dimensions is that some of them interact so as to make one more critical in a transaction. For example, uncertainty is not a major concern if assets are nonspecific, as new transactions with another party can easily and cheaply be arranged. Conversely, transactions predicated on specific assets make uncertainty a major factor influencing arrangements between parties (Williamson 1985).

In this paper, we explain the institutional choices in the potato value chain in Benguet using the dimension of transactions outlined above. Figure 1 below graphically shows the framework that underpins analysis in this study.

Figure 1. Transaction Costs Economics Framework



Method

Data Gathering Method and Timeframe of Research

The research is focused on the value chain of potatoes in the province of Benguet. The respondents are traders who operate in the La Trinidad Vegetable Trading Post (LTVTP); farmers from the municipalities of

Mankayan, Buguias, and Kibungan; government agencies; cooperatives; farmer associations; and processing firms in Benguet. The selection of sites prioritized municipalities with high potato production based on the Office of the Provincial Agriculturist of Benguet. A total of 51 farmers (in four cooperatives/farmer associations), one trader/disposer, one input supplier, two buyers (who are also transport providers), four government agencies, and one food-processor firm participated in the study. The study also includes one cooperatives that serve as an input supplier. A food processing firm was also included in the study. All respondents are purposively sampled.

The research employed key informant interviews (KIIs) and focus group discussions (FGDs). The instruments used during these data-gathering activities consisted of semi-structured interview questions. The data gathering was conducted from July 2024 to November 2024. The KIIs and FGDs are recorded with the consent of the participants and are then transcribed for analysis.

Data Analysis Plan

The research employed a transaction cost analysis guided by the framework adopted from Williamson's TCE. The analysis proceeds in two stages. First, we provide a descriptive account of the potato value chain activities. In order to accomplish this, the researcher assigned codes for key phrases or words present in the interview, which in turn are categorized into the different value chain activities. In the second stage, we identify key transactions and the critical dimensions that influence how it is governed. This stage can also be viewed as an attempt to explain institutional arrangements found in the potato value chain using TCE.

The Potato Value Chains in Benguet

This section will present the key descriptive findings of the paper. The first subsection will discuss the key players, their roles, and the associated activities in the traditional value chain of potatoes from Benguet. This is followed by an analysis of institutional arrangement using the TCE framework. The second subsection will present the shorter contract farming value chain.

The Potato Value Chain in Benguet

Two types of potato value chains are present in Benguet: the longer traditional value chain and the shorter contract farming value chain. The traditional

potato value chain in Benguet is represented using figure 2 below, with each activity sequenced from left to right. As the figure shows, each activity may involve multiple players that might take on multiple roles. Additionally, some might figure in multiple activities across the chain. The contract-farming value chain also exists for potatoes from Benguet and is depicted in figure 3 below. The important characteristic of the contract-farming value chain is the absence of a disposer and trader, which usually facilitates the flow of goods from farmers to retailers in the traditional chain. In contract-farming, farmer associations directly sell and deliver to institutional buyers who often use the potato as input for their final product.

Figure 2. Benguet Potato Traditional Value Chain

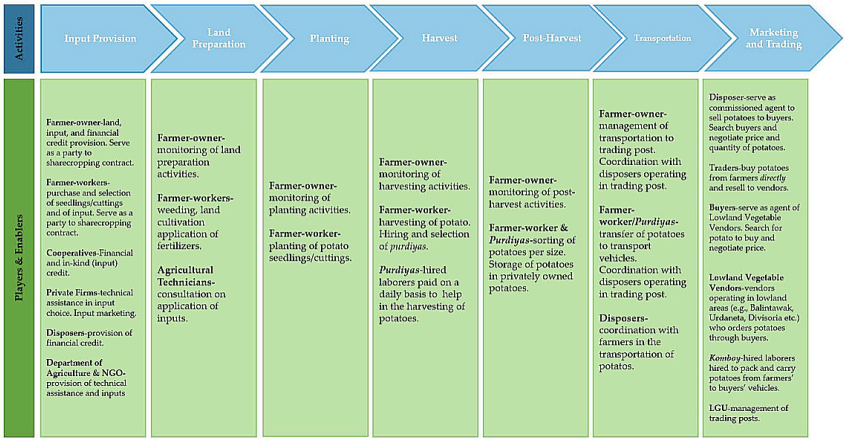
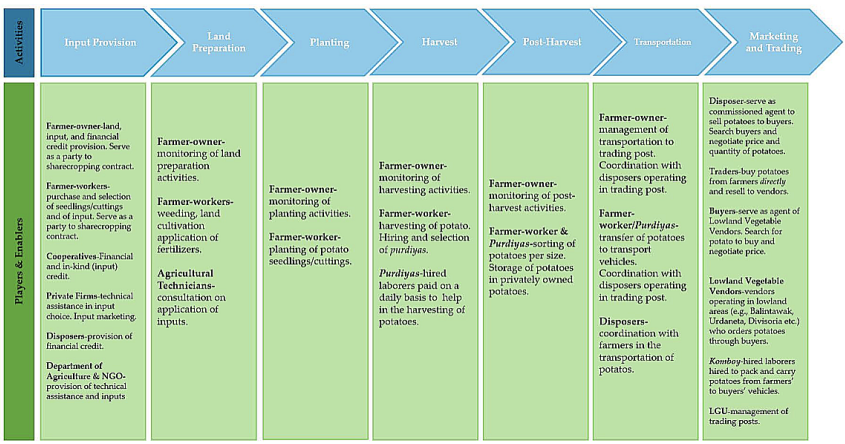


Figure 3. Benguet Potato Contract-Farming Value Chain



Input and Capital Provision

Material Inputs

Before discussing the input and capital provision stages, we first distinguish between the various arrangements found by the study on the relationship between farmland owners and farm laborers. We use the term farmer-owners to refer to landowners whose land is used for crop production. Interviews with respondents suggest that these individuals are also directly involved in agricultural production through directly financing farmer-laborers and making management decisions (e.g., hiring, cropping, etc.). The colloquial terms used for farmer-owners are "boss" or "supply." Farmer-laborers, on the other hand, are usually laborers contracted by farmer-owners to do the day-to-day farming activity. The researchers also found a third type of players who farm their own or family-owned land.

Input and capital provision refer to the activities related to the access of necessary materials for production, as well as the financing sources needed by producers. In this part of the value chain, the primary players are farmer-laborers, farmer-owners, private firms, as well as disposers who also serve as lenders to producers.

Access to inputs depends on the existing arrangement. In the case of potato production involving farmer-owner and farmer-laborer, the farmer-owner finances the purchase of inputs, while the farmer-laborer is in charge of physically securing the material from input supplier stalls. In one of the areas covered by the study, farmer-laborers buy potato cuttings from private input supply firms usually found in La Trinidad, Benguet (e.g., Sayangan and Shilan). Farmers can also use potato seedlings or tubers. In this case, farmers secure the tubers by (a) segregating a portion of potatoes harvested last cropping to serve as seedlings for the current cropping or (b) buying from fellow farmers with available tubers. According to respondents, using harvested potatoes as seedlings for the next cropping can be done five times before noticeable quality deterioration in the next harvest is observed. Once quality declines, farmers stop using harvested potatoes as seedlings and buy new cuttings/tubers specifically grown for planting purposes. It is, however, unclear to what extent the farmer-owner is involved in the decision of whether cuttings or tubers are to be used.

Farmers who operate family-owned land may also access inputs from private firms or fellow farmers. However, their credit source may differ from farmer-laborers. For instance, some farmers who operate family-owned land reported that they borrow from disposers for their financing needs. This is

also corroborated by disposers during their separate interviews. These credit ties, however, are not limited to financing farming activities, as the financing can also be accessed for other purposes (e.g., education, health, necessities, etc.), similar to that of farmer-owners. There are also cases where input and loan provision of disposers is done under the condition that the disposers have exclusive rights to market the produce once harvested. The details and consequences of this arrangement will be discussed in Section 4.1.

Another important input needed by farmers is fertilizers, including chicken dung, which are reported to be directly procured and delivered by farmer-owners to their farmer-laborers. The farmer-owners report that these are typically bought from local markets, including supplies available in the Municipality of Tublay and Barangay Shilan, La Trinidad.

Labor

Farmer-owners usually hire family (e.g., husband and wife), local referrals, as well as migrant workers referred to by currently employed farmer-laborers. Labor can also be augmented during high-demand (e.g., harvesting) activities by hiring daily workers referred to as *purdiya* or via "bayanihan" practices among farmer-laborers. Farmer-owners also report that there are no strict evaluations nor requirements concerning farming skills before hiring and that necessary competencies can be easily taught and learned during the actual production process. In the case of family-owned and operated farms, family members typically serve as the workers in the early stages of the production process, but this is generally supplemented by *purdiya* during harvest season. The hiring of laborers, whether farmer-laborers or *purdiya*, is highly informal, with no written contracts stipulating the terms of employment, payments, deliverables, obligations, etc. Laborers and owners typically rely on social networks, reputation, and trust.

As part of the labor arrangement, farmer-owners usually serve as creditors to farmer-laborers during the production stage to finance the latter's needs (e.g., household necessities, education of children, medical, etc.). These loans were reported as usually interest-free. Thus, apart from labor, there is also a credit relationship between farmer-laborers and farmer-owners.

Farmer-owners and laborers adopt sharecropping to allocate profits. This arrangement means that payment to the laborer for farming is only made once potatoes are sold in the market, with the payment to the farmer an increasing function of the profit from the sale of potatoes. Based on participants' responses, farmer-laborers are entitled to half of the profits. However, the

farmer-owner deducts the total amount of the laborer's loan from the latter's share before making the final payment. Hence, it is normal for laborers to get lower amounts after the sale of the produce.

Land Preparation

Land preparation is primarily done by farm-laborers loosely monitored by farmer-owners. The activities at this stage involve weeding, cultivation, and application of fertilizer, particularly chicken dung. Weeding usually takes around three days for manual labor or less when complemented by machinery. Farmer-laborers also receive free consulting services from technicians of private input manufacturers on the use of fertilizers.

Planting

The planting of potato seedlings starts with the careful selection of potato tubers or cuttings. As mentioned earlier, farmer-laborers are primarily in charge of personally selecting what they think to be good-quality seedlings. After selection, they put the seedlings in crates and transport them to the farm. The seedlings are then planted by farmer-laborers, with help from *purdiya* for farmers operating their family-owned land. Participants said that it usually takes two days for the planting to be completed, depending on the area of the plot. Plants are usually watered using sprinklers during the dry season. Around two weeks after planting, farmer-laborers implement side-dressing, or the application of synthetic fertilizers to land, in order to boost the growth of the crop. Based on interviews, the fertilizers include triple-14, triple-16, and urea.

As discussed earlier, during the planting season, no income from the crop accrues to farmer-laborers. During this period, however, they may access loans from farmer-owners for their daily needs, the education of children, and emergencies. In some cases, loans provided by farmer-owners are in kind (e.g., rice/bigas, cooking oil, etc.). Again, the total value of the loan, whether cash or in-kind, is deducted from the farmer-laborer's share after the sale of the produce. Disposers may also extend loans to farmers during this period.

Harvesting, Post-harvest, Transportation

Farmers reported that potatoes take around three months before they are ready for harvest. However, the smaller varieties can be harvested as early as 75 days. The decision to harvest potatoes earlier or later also depends on the prevailing market price, with some farmers reporting that they choose to

harvest earlier when the market price is higher. Farmers say that the harvesting usually takes around one to three days, depending on the size of the farm and the number of workers.

Labor requirements during harvest season are higher than in the other activities in the value chain. The *bayanihan* system, or the practice of mutual assistance within the community, is one of the ways labor is augmented during this season. As reported by some participants, they help each other in harvesting the produce, with the implicit expectation that they will also receive help when it is their turn to harvest. Another strategy to fulfill the labor needed for harvest is to hire *purdiyas*. From the interview, it appears that farmer-laborers are often directly responsible for hiring *purdiyas*, which makes strategic sense as they are the ones who are going to work directly with them on the farm. During the time of the research, farmers reported that they pay *purdiyas* a fixed rate ranging from ₱300 to ₱400 per day. The total cost of hiring *purdiyas* is included in the cost of production. The higher the prevailing market price, the higher the daily payment to *purdiyas*. However, there are instances that *purdiyas* are not paid at all if the price of potatoes falls below the cost of production. Participants report that often during these instances, the *purdiya* understands why they cannot be paid, and just decides to release the farmers from obligation to pay them.

Similar to the labor arrangement discussed in Section 3.1.1, the hiring of *purdiya* is highly informal with no written contracts. Farmer-laborers generally decide who to hire based on social network, reputation, and trust. It also appears that the relationship between farmer-laborers and farmer-owners on one hand and *purdiya* on the other is usually built and sustained for many cropping seasons. This means that farmers already have a typical set of *purdiya* whom they always hire for the harvest season. Thus, formal contracts, which are deemed to be transactionally costly, are replaced by informal mechanisms. This arrangement allows both farmers and *purdiya* to enter into employment agreements flexibly. However, the obvious downside of the absence of a formal employment agreement is the lack of formal protection it offers the *purdiya* (e.g., social security, security of tenure, employment hazard protections, etc.).

There are minimal post-harvest activities reported in potatoes. Activities include the sorting of potatoes based on quality and size. The potatoes are then placed in crates or sacks in preparation for storage or delivery. Potatoes are not washed after harvesting to maintain quality. Farmers reported that they store the potatoes in concrete dark storage facilities or *bodegas* close to their farms. Based on the participants, storing potatoes after harvest can be done and is usually employed as a strategy when the market price is low.

Some farmers say that they can store potatoes for up to five months before delivering them to the trading areas.

Marketing and Trading

Disposers, traders, buyers, wholesalers, and manual packers/shippers or *komboys* are the main players involved in the potatoes' marketing and trading stage. The main areas where highland vegetables are traded are the La Trinidad Vegetable Trading Post (LVTP) at Kilometer 5, Pico, La Trinidad, and the Benguet Agri-Pinoy Trading Post (BAPTC) located at Strawberry Fields, La Trinidad.

Disposers are individuals who serve as marketing commission agents of farmers operating in the trading areas (LVTP or BAPTC). Their primary activity involves searching for buyers, negotiating price and quantity, as well as fixing other details of the sale of produce (e.g., how payment is settled, etc.). Farmers also reported that where their produce will be traded depends on where the disposer chooses to operate (e.g., LVTP or BAPTC). It is important to note that farmers are usually hesitant to do the marketing themselves, as many of them believe that disposers can do the task more effectively. The disposers then charge a commission fee for each kilogram of potato sold. In the interviews, the reported commission rates are between ₱1 and ₱5 per kilogram, depending on the market price. No formal contract governs the relationship between disposers and farmers. With the absence of such formal agreements, farmers often rely on the reputation of disposers. Based on participant interviews, disposers are normally part of farmers' social network (e.g., relative, relative of co-farmer, relative of friends, etc.), which enables farmers to get information on the credibility of disposers. Once a strong relationship is established, disposers also often take on another role in the value chain. As mentioned in Section 3.1.1, some disposers offer credit to farmers. The loans are often not limited to financing farm production but extend to support the other needs of farmers and their households. One common condition requested by disposers to farmers when providing loans is the exclusive right to market their produce. In this case, the disposers serve as financiers and disposing agents for the farmers, practically integrating the latter into production activities. Farmers also reported that they have been working with the same disposers for years.

Buyers are agents of vegetable vendors from lowland regions (e.g., Metro Manila, Pampanga, Pangasinan, etc.). The primary role of buyers is to buy the vegetables required by their clients vegetable vendors. It is important to note that the lowland vendors typically order a combination of several vegetables

of varying quantities. Thus, buyers may also be seen as shopping agents of vendors, which serves to reduce the cost of vegetable procurement. Buyers typically receive orders from lowland vendors. Once received, the buyer searches for potatoes that meet the standards of their clients and proceeds to negotiate with disposers on the price. Like disposers to farmers, buyers serve as the primary information provider to vegetable vendors from the lowlands, especially concerning the market price of vegetables in the trading posts. Apart from disposers and buyers, there are also traders in the value chain of potatoes. In contrast to disposers and buyers who serve as commissioned agents of farmers and lowland vegetable vendors, respectively, traders are players who buy the produce of farmers in bulk from farmers and sell it to buyers or directly to lowland vendors. Thus, traders differ from buyers in that they internalize the risks and rewards to themselves once they buy the potatoes from farmers.

Potatoes are usually not packed when delivered from the farm to the trading post. Hence, once disposers and buyers close a transaction, disposers or buyers usually hire *komboys* who operate in the trading post to pack and carry the potatoes from farmers' trucks to buyers' transport vehicles. In some cases, disposers have their own *komboys*, eliminating the need to hire individuals operating in the trading post.

Contract Farming Value Chain

Contracting Stage

This study also found the contract farming value chain of Benguet potato. Although the production process still starts with securing inputs and labor as in the longer traditional value chain described above, the value chain of contract farming begins with the contracting stage. During this stage, the two main contracting parties are Farmers' Cooperative and Association (FCA) and institutional buyers (IBs) such as restaurants and fast-food chains. In some of the cases, government agencies like DA link FCAs to institutional buyers. The key provisions in the contract between an FCA and an IB are the following: the institutional buyers will buy the potato from FCA at a mutually agreed fixed price, and the farmer association will ensure the timely delivery of potato that satisfies the volume and quality requirements of the IB. FCA member farmers in turn commit a certain volume to their farmer association, which consolidates this to ensure the volume and quality satisfy the contract requirements. Based on information gathered from FCA's and farmers, the contract does not include IB support on the purchase of farm inputs and other activities during the production stages (e.g., land preparation up to post-harvest farm activities).

An important consequence of direct contract between an FCA and an IB is the elimination of disposers and buyers in the transaction. In place of these intermediaries, FCAs serve as the negotiating party with institutional buyers. Furthermore, under contract farming, the marketing of vegetables is integrated and accomplished during the contracting stage and not during the latter part as in the traditional value chain.

Input Provision for Post-harvest Activities

The production activities from input to post-harvest stages are very similar to the traditional value chain. Informal labor arrangements between land-owners, farmers, and *purdiya* are still prevalent. What distinguishes these stages under contract farming is the heavier involvement of the FCA in farm activities of its members. This is because the FCA, as an entity, is the contracting party and hence responsible for fulfilling its end of the contract. Hence, the FCA has the incentive to coordinate, intervene, and assist in farming activities of its members to ensure the right volume, quality, and timeliness of potato supply.

FCAs reported that they provide credit to its member to purchase inputs. In some cases, the FCAs buy the input themselves and provide it to their members with the promise of payment from the latter on a later date-usually after the sale of potatoes. During land preparation to post-harvest activities, the FCA assigns farmer-members to closely monitor and assist their co-members to ensure quality and implementation of good agricultural practices (GAPs). Once the potatoes are harvested, FCA members then deliver their volume commitments to their association, which in turn ensures that the potatoes delivered pass the quality requirement of their IBs. It is important to note that a member farmer usually harvests more potatoes than they have committed and therefore sells the noncontracted volume in the open market via the traditional value chain. The delivery of potatoes to the institutional buyer is the responsibility of the FCA.

As we will show below, contract farming solves important problems surrounding transaction dimensions for both farmers, FCAs, and IBs. However, the participants reported some challenges in contract farming. First, there are instances of reneging from both sides of the contract. There are cases where institutional buyers fail to pay farmers after delivery of the produce, resulting in losses among farmers. On the other hand, some farmers renege on providing what they have committed to the association, leading to the association's difficulties in meeting the volume requirement of institutional buyers. This reneging usually happens when the market price in a trading post is significantly higher than the fixed price agreed upon by the

organization with the institutional buyers. These cases have resulted in the complete breakdown of the contract farming arrangement. Finally, contract farming only has a limited capacity to absorb the total potato production of the region. Thus, contract farming cannot completely replace open spot markets as a marketing strategy for all farmers.

Institutional Choices in Value Chains of Benguet Potato

This section builds on the highly descriptive account of the value chains presented in Section 3 and provides analysis of key transactions using the TCE framework outlined in Section 2.1. Specifically, we explain the institutional arrangement found in Section 3 by characterizing the relevant dimensions of key transactions. We first deal with the traditional value chain in subsection 4.1 and turn to contract farming in subsection 4.2.

Traditional Value Chain

Interlocked Credit and Marketing Transactions Between Farmers and Disposers

The interlocking transactions between disposers and farmers may be explained by (1) human assets specific to disposers (e.g., accumulated market knowledge, network of buyers on trading post, ability to negotiate, etc.), (2) bounded capacity and uncertainty of farmers surrounding the marketing of their own produce, and (3) the farmer's perceived transaction cost of formal credit. Thus, under this interlocking arrangement, a farmer is assured of both credit and a marketing agent for his produce. One important characteristic of this arrangement is that power to decide marketing strategies (e.g., negotiation, choice of trading post, etc.) often resides with the disposers, which provides them significant control over the value chain.

Labor Related Transactions Between Landowners, Farmer-Laborers, and *Purdiyas*

Sharecropping and long-term contracting between landowners and laborers appear to solve connected issues on frequency, uncertainty, and human asset specificity. Sharecropping solves uncertainties by forcing both parties to share the risk associated with shirking, low effort, and shocks like natural disasters, among others.

For example, under sharecropping, a calamity that causes low yield will not be solely shouldered by laborers, protecting them from risks beyond their control. This is opposed to fixed-rent arrangements where laborers pay rents to landowners regardless of yield. On the other hand, the landowners are protected from behavioral and opportunistic tendencies of a laborer, as the profits from the sale of potatoes are split. More concretely, laborers are discouraged from shirking and exerting low effort since their reward is tied to how productive the harvest is. Furthermore, as opposed to a fixed-wage arrangement, the landowner is not obligated to pay a laborer a fixed amount in the case of low productivity due to shirking or low effort.

Sharecropping can also be viewed as a solution to the transactional issues raised by asset specificity and frequency. Although the ease of learning farm-related skills reported by farmers and laborers points to low human asset specificity, the knowledge that is acquired about a specific farm for a specific crop on a specific planting season may result in knowledge that is specific only to the farm-laborer combination. This knowledge in turn is essential for ensuring a smooth production process and better yield. Thus, although the activities in the production stage are often technologically separable, the frequency of need for laborers (e.g., daily throughout the planting season) with farm-specific knowledge may explain the owner's preference for a farmer who can commit for the whole production stage. However, for laborers to commit (e.g., not take on other jobs), they must be assured access to income during the planting season. Hence, the contract between landowners and laborers often involves access to credit-in cash or in kind-from the former to the latter.

The market-based hiring of purdiyas is influenced by its low specificity and low frequency (e.g., only during labor-intensive stages like planting and harvesting). However, the hiring of the same set of purdiyas during different planting seasons can be explained by search cost and uncertainty-minimizing effort of hiring parties (e.g, farmer-laborers).

Transactions Between the "Middle Players": Disposers and Buyers

The relationship between disposers and buyers is closer to a repeated spot market interaction, as transactions are often characterized by low asset specificity required from either party as well as high frequency. However, given high market uncertainty faced by an individual disposer, they often choose to maintain a network of buyers to ensure a relatively reliable market for potatoes. The same can be said for buyers but with the intention to

ensure a reliable source of potatoes for their retailer clients. The transaction-specific knowledge (e.g., quality requirements, pricing behavior, temporal requirements, etc.) that emerges between a specific buyer-disposer explains the persistence of their interaction and the suki system. Additionally, the accumulated network of potential transaction partners and market knowledge specific to individual disposers and buyers may also explain their power in the value chain over retailers and farmers. However, although an uncertainty-mitigating relationship between buyers and disposers is developed, whether transactions will materialize is still influenced by variables such as quality and cost. A sufficiently big gap between disposer and buyer prices may still result in either or both parties exploring other potential transaction partners.

Transactions Between Buyers and Retailers

Retailers from lowland and their buyers are often engaged in long-term informal contracts. The retailers often require a frequent and reliable supply of potatoes that satisfies a quality threshold, while buyers prefer a regular client who will avail his service as a buyer. Thus, on each side, the transaction is characterized by relatively high frequency and uncertainty. Instead of relying on market governance, these problems are solved by parties through an informal contract. Throughout the transaction, both the buyers and retailers acquire specific knowledge about each other (e.g., quality requirements, preference over potato variety, negotiating strategy, etc.) that helps in the smooth procurement of potatoes. Hence, the relationship-specific asset coupled with the frequent need for reliable supply of potatoes explains why retailer–buyer relationships persist.

Notes on Informality of Arrangements

The traditional value chain of potatoes from Benguet exhibits informality across the different stages and transactions. The informality also extends to contracts entered into by different players. This informality exposes players to transactional failures such as reneging, as well as potentially inferior outcomes such as high-interest rates on credits. This begs the question of how informal transactions and contracts persist as an equilibrium institutional choice among value chain players. More importantly, why were they chosen in the first place?

The research suggests potential answers to these questions. The choice to organize transactions informally appears to be due to the low-bound rationality that increases the upfront transaction cost of formalizing transactions. Organizing transactions informally reduces the cost associated

with registration, documentary requirements, and contract design, among others. We use the word upfront since informal transactions may involve costs that only become apparent in the latter stages. As an example, farmer-laborers and farmer-workers enter transactions not backed by formal contracts. This is less costly (upfront) for both parties. The same is true for the relationship between disposers and farmers in the marketing stage. It is important to highlight that this institutional decision on the transaction level is nested within the wider institutional framework present in society, and how the players perceive it. The more costly formalization is seen by players, perhaps due to observed inefficiencies in formal rules and regulations, the more likely they will choose informal arrangements.

However, the low upfront transaction cost will surely not sustain informal arrangements in the long run, i.e., as an equilibrium choice, especially in transactions whose risk and potential failures tend to unravel only in the later stages. So, how does informality persist? Like our answer above, the perception of persistently high transaction costs can explain this long-term decision to choose informal arrangements. However, another important observation is that players in the value chain use social networks to minimize risks associated with informal arrangements. The social network serves as a mechanism where reputation is checked, agreements are enforced, and sanctions are imposed. As reported above, relationships among farmer-owners and farmer-laborers, farmer-laborers and purdiyas, and farmers and disposers are all based on close social ties. Parties' reputations are checked based on information from social networks. The enforcement of contracts, on the other hand, is tied to the social sanctions that may be imposed on a party. As an example of the latter, the failure of a disposer to follow agreements with one farmer may result in her reputation being tarnished, resulting in other farmers severing ties with her. This social sanction makes informal contracts enforceable for a disposer who wishes to stay in business in the long run. This is in contrast to formal arrangements where reputation, enforcement, and sanctions are all backed by state laws, regulations, and policies. Homogeneity (in goals, culture, social background, etc.) among parties also appears to serve as another factor supporting informal arrangements. An obvious limitation of contracts and transactions under these informal arrangements is their scalability. Potential entrant partners (e.g., disposers, buyers, workers) must be part of or vetted by a trusted network before being considered as a party for a transaction. Impersonal transactions, which are characteristic of modern markets, are harder to flourish.

Contract Farming

The arrangements found in the traditional value chain solve challenges associated with transaction dimensions. However, farmers and institutional buyers are still exposed to issues involving uncertainty, frequency, and temporal and asset specificity even in the presence of middlemen like disposers and buyers. Contract farming is a governance arrangement that attempts to solve these issues.

Farmers and institutional buyers face considerable uncertainties in the traditional value chain. Farmers usually have no assurance that a market exists for their commodity. IBs, on the other hand, face uncertainty about the availability, quality, and supply timeliness of potatoes they need. Due to the volatility of the market, both parties face price uncertainty. Another related issue is that of specificity. The current landscape of the food industry has also intensified firms' (e.g., restaurants, food processors, groceries, etc.) need for agricultural produce that is delivered on a timely schedule and passes certain quality standards. However, the traditional value chain is less capable of satisfying these requirements due to relatively specific investments farmers have to make to meet the temporal and quality requirements. For example, the specific varieties of potato an IB needs might be a specific variety that has no sufficient demand in the open market. The high frequency at which farmers and institutional buyers need to successfully engage in market transactions makes the uncertainty and specificity issues more severe.

Contract farming solves these issues simultaneously for both parties. The uncertainty faced by farmers regarding market demand and price and IBs' uncertainty on price, availability, quality, and schedule of delivery are precisely what is agreed upon in a contract farming arrangement. Coupled with the high frequency of transactions, contract farming appears to be more transaction-cost-efficient than repeated spot-market arrangements. Farmers and the FCAso have higher incentives to undergo specific investments related to training, varieties of seeds, timing, etc., since they are assured that such activities will have returns due to the contract farming. For example, FCAs are more incentivized to train their members in GAP and invest in monitoring and assistance to their members since they are assured of a buyer who will buy their potatoes.

Policy Recommendation

The analysis from the last section shows that disposers persist because of the bundled functions they serve-from credit, marketing, and risk management-

and the weak and costly formal institutions that could provide farmers with other options. The resulting dependencies and bargaining power asymmetries therefore create clear policy problems that should be addressed. Additionally, policies must exploit the potential of contract farming as a complementary channel to spot market and as a model to reduce value chain dependencies and asymmetries. Along these lines, we propose the following policies.

1. Improve access to loan facilities that cater not only to the agricultural production requirements of farmers but also to their other needs.

   The loans provided by disposers during the input and production stage increase their bargaining power over farmers during the marketing stage. This asymmetry can be reduced if the government can improve access to credit facilities that provide farmers with access to loans for both production and other household needs. Providing access to credit for production purposes may not be enough to minimize the reliance of farmers on disposers who often offer "bundled" loans. The regularity of these loan facilities must also be assured to reduce the uncertainty on the part of the farmers.

2. Strengthen market linkage efforts of government agencies to facilitate connecting farmers to relevant markets.

   One key issue faced by farmers is the uncertainty or lack of a market that can absorb their produce. This problem is being addressed by current market linkage policies such as KADIWA and the DA's Market Development Programs. However, the study shows that the government must make sure that any linkage facilitated is sustainable and has the right incentives for both farmers and buyers to continue transactions in the long run. This may prevent the observed contract reneging of both farmers and buyers. Additionally, policies that provide farmers with access to markets only for short periods may not be sufficient to incentivize farmers to participate.

3. Capacitate cooperatives and farmer associations through organizational, technical, and entrepreneurial training.

   Our analysis of the disposer and farmer relationship may be instructive to cooperative development efforts. First, if the cooperative is to serve as a successful marketing agent of its network (e.g., serve as a party to enter a contract-farming arrangement, or help its members enter new markets), it must have the core competencies usually attached to disposers. It must effectively reduce costs associated with searching for and maintaining buyers, negotiating quality standards and prices, together with temporal

requirements (e.g., schedule and frequency of delivery). This is where factors concerning structure, internal organization, and leadership are important. Second, the government may help cooperatives and farmer associations provide affordable and sustainable financing to agricultural households for both production and consumption purposes. Government agencies can assist in enhancing cooperatives in both of these areas by offering relevant training and programs. Efforts of governments may flow more efficiently to farmers if they are channeled through farmer cooperatives and associations.

4. Invest in Price Information System in BAPTC and LVTP.

   Technologies and mechanisms that allow players to know the prevailing market prices of potatoes are important in two ways. First, it reduces the information gap between disposers and farmers that may also reduce the opportunistic tendencies of the latter. Secondly, information flow facilitates competition and fair pricing of potatoes in trading posts. The state appears to be the viable agent to undertake investments in these technologies as they may be too costly for any individual player or FCA to shoulder.

5. Support Formalization of Transactions in the Traditional Value Chain.

   As suggested by the results of the study, the arrangements found in the traditional value chain serve functional roles in facilitating transactions. However, they also result in contractual failures such as reneging, opportunism, or weakening of bargaining power of some players. These can be alleviated by gradually formalizing some of the value chain transactions, such that of disposers and farmers, with the support of government agencies such as the DA. Simple written agreements will clarify to these parties their obligations and rights within the transaction. Of course, this policy proposal presupposes a strong and credible enforcement capability on the part of the government.

Concluding Notes

This paper attempts to account for the existing institutional arrangements in the potato value chain from Benguet. The study suggests that many of the arrangements may be viewed as solutions to transactional issues faced by players. However, although these solutions facilitate a functional value chain, they may also result in dependencies and weakening of the market power of some key players-notably of farmers. This suggests that some institutional solutions may structure interactions but result to inferior outcomes for some

players. The study also adds to the rich empirical literature on agricultural value chains in the Philippines, providing additional evidence and documentation of practices in the vegetable production sector. The use of qualitative data and the TCE framework to understand institutional arrangements offered depth to this study, but results may not be generalizable. Thus, and as a complement to this study, the strength of TCE's explanatory power may be further tested by conducting an analysis of systematically sampled and bigger transaction-level data. This analysis may also cover other highland vegetables aside from potato to provide insight into how the heterogeneity of commodities affects value chain arrangements.

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