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Research article

Farmers' selection model in a club value chain: the case of the Agro-Pontino kiwifruit industry

Mara Lai[1,*], Luca Cacchiarelli[2], Carlo Russo[3], Alessandro Sorrentino[2], Gaetana Petriccione[1]

[1] *CREA - Research Centre for Agricultural Policies and Bioeconomy, Italy*
[2] *Tuscia University, Italy*
[3] *University of Cassino and Lazio Meridionale, Italy*
*Corresponding author. E-mail: mara.lai@crea.gov.it

Abstract. Club varieties are protected horticultural varieties that farmers can grow only with the agreement of the intellectual property right holder (breeder). They contribute to the development of vertically coordinated value chains where breeders act as leading firms, because they can control both production and marketing of the protected variety. Despite the breeders' bargaining power, farmers find club contractual conditions more favourable than those usually offered for non-patented varieties. We hypothesize that breeders may have no incentive to contract all interested farmers in order to avoid expanding production and take advantage of the legal monopoly granted by current regulations. Thus, breeders are expected to select farmers according to an efficiency criterion instead of just licensing all applying farmers. Empirical results from the Agro-Pontino kiwifruit industry support this hypothesis. The results of a questionnaire, submitted to farmers, and of semi-structured interviews targeting key actors of the kiwifruit supply chains, confirmed the selection hypothesis and allow possible selection criteria applied to identify growers of yellow-flesh kiwifruit to be found. A logit-regression model was run using the questionnaire results, while information collected through the semi-structured interviews guided the identification of variables to be included in the model as well as interpretation of the results.

Keywords: Club varieties, kiwifruit, farmers' selection, innovation adoption, value chains.
JEL codes: Q13, Q18.

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HIGHLIGHTS:

- Diffusion of protected varieties in the fruit sector to be grown by farmers only after signing a contract with the property right holder.
- Selection of farmers to be involved in the club supply chains according to an efficiency criterion instead of licensing all applying farmers.
- The results of a survey submitted to farmers helped identify the main factors used as criteria in the selection process.

1. INTRODUCTION

Protected varieties are those for which breeders holds intellectual property rights (IPR), under the TRIPS/WTO agreements or the UPOV 1991 Convention or the EU Community Plant Variety Right (CPVR). Supply chains organised around protected horticultural varieties are assuming a relevant role in the fruit sector (Noleppa, 2016; Sansavini, Guerra, 2015). Known as "club supply chains" (from club varieties), their development benefited from the regulation on Plant Variety Protection (PVP) approved in 1991, as a result of the reform of the Union for the Protection of New Plant Varieties (UPOV), considered a "sui generis" protection system particularly suitable for horticultural plants.

The 1991 UPOV regulation reform extended protection to harvested materials (art. 14, paragraph 2) and gave impulse to breeding programmes in the fruit sector and to the economic exploitation of protected varieties, expressed by the initiating of several club supply chains. The effects of UPOV regulation, however, are still considered controversial because of the implications that its provisions might have on the organisation of agriculture supply chains, in terms of distribution of power along the chain and of farmers' position and welfare (Tripp *et al*., 2007). Breeders may claim their property rights on the harvest; when this happens, farmers might be subjected to production standards and delivery obligation. This implies that the breeders can extend their control on the marketing phase being at the same time input monopolist and harvest monopsonist for the farmers in the club. The reform of the legislation gives breeders the ability to influence both the upstream and downstream segments of the supply chain, by setting the quantity to be produced and imposing marketing control of the harvest (Di Fonzo *et al*., 2019).

Club supply chains represent an example of the effects that PVPs can have on the organisation of supply chains. In a typical club supply chain, the rights holder acts as lead firm exerting the «power to set the conditions for the inclusion of smallholders and the gains that accrue to them» (Lee *et al*., 2012). PVPs give breeders the possibility to influence management decisions of those farmers who want to grow protected varieties, because the right to use the variety can be conditional on contract agreements. These limits might go from paying royalties to joining a club supply chain. The latter might imply respecting production quotas decided by the breeder and adopting specific agricultural practices; thus, making relation-specific investments (Noleppa, 2016; Russo, 2020; Tripp *et al*., 2007). Whether the right holders are breeders or third parties, the key element is that they represent the lead firm of the supply chain and, as such, control its set-up and organisation.

The most relevant examples of club supply chains can be observed in the kiwifruit and apple industries, but the trend in the use of protected varieties is growing in other industries (grapes, nectarines, apricots, pears), albeit with a lower level of complexity in their organisation (Legun, 2015; Sansavini, Guerra, 2015). Usually, in these other industries the exploitation of protected varieties is limited to the payment of royalties, per plant or per quantity produced, or as one-off payment. As for the club supply chains, the kiwifruit industry is considered a key example of development of club varieties (Di Fonzo *et al*., 2019; Sansavini, Guerra, 2015).

The growing role played by protected and club varieties in the fruit sector raised interest in how these food chains are organised and structured. In relation to their organisation and the role played by breeders, the concept of excludability from the use of a certain good or service, as elaborated by the Theory of Clubs (Buchanan, 1965), becomes relevant. A club has been defined as «a voluntary group deriving mutual benefit from sharing one or more of the following: production costs, members' characteristics, or a good characterized by excludable benefits» (Sandler, Tschirhart 1980). The theory applies to those arrangements where excluding potential members from entering a club is possible. The accessibility of a club-good to non-club members would imply its use without paying the costs associated to membership. Hence, the flexibility of property arrangements represents an effective tool to exclude non-members from the use of the good (Buchanan, 1965). In the case of the kiwifruit clubs, the theory applies because the breeder and farmers achieve mutual benefits (large production volumes and higher prices, respectively) by voluntarily sharing the use of the protected variety and knowledge. Yet, unique characteristics emerge. Specifically, membership is awarded by the breeder, who also decides production volumes and practices, including quality standards of the harvest. The breeder's power to regulate access changes the nature of the innovation diffusion process from an innovation adoption model, where the innovation is adopted by any farmer who is willing to pay the price, to a supplier selection model where the innovation is accessible only to the farmers that the breeder decides to accept in the club. Breeders, in order to maximize their profit, will privilege more efficient farmers, capable of implementing the quality standards at a minimum cost. This might result in the exclusion of less efficient farmers from access to these new varieties, technical innovation and, potentially, higher profits.

Adoption and diffusion of innovation in agriculture have been extensively studied in economics and, more recently, in sociology, psychology and marketing; thus, there are multiple examples in the literature of innovation adoption models (Ajzen, 1985; Edwards-Jones, 2006; Rogers, 1962). Despite the differences between them and the variety of drivers used to explain the adoption and diffusion of innovation, a key element of them is the willingness of farmers and the interventions needed to support their adoption of innovations. The organisation of club supply chains, however, seems to entail the possibility that breeders might have a strong interest in selecting their suppliers; willing to pay the price to adopt the innovation might not be sufficient for farmers to join the club. In this respect, some insights might be offered by the literature dealing with the selection of suppliers, in particular explaining the mechanisms and potential criteria to be used to select the most suitable suppliers (Dey *et al*., 2015; Liu, Hai, 2005; Talluri *et al*., 2006). The definition of these criteria becomes key to select the most appropriate suppliers, considering that selecting "not-fit for the job" farmers might have negative consequences on the economic performance of breeders. The "market signalling" approach (Spence, 1973) might become a useful tool for breeders to set up the right criteria and correctly interpret them. Spence applied this approach to the job market, arguing that firms willing to hire employees with unobservable characteristics (such as work productivity) may solve the adverse selection problem by relying on "signals". Signals are observable actions (such as college degree or training) taken by the employees with a cost that is inversely correlated with the desired unobserved characteristics (for example, the cost in time and effort of a college degree is expected to be lower for a productive worker) (Spence, 1973).

If the signalling theory is transposed to the club supply chains, with the breeder being the employer and the farmers the employee, the same problem of information asymmetry applies. Breeders are not sure that farmers selected possess the right skills to implement the quality standards efficiently. They can become aware of farmers' skills and evaluate them once the business relationship is already in place and, if needed, they can terminate the contract, but this might bring negative consequences, because of the time required before the farm selected starts producing and the time to replace them. If the selection process fails in a relevant number of cases, the breeder might not be able to fulfil market demand. Knowing the complexity of the club variety to be produced, breeders might decide to select farmers and base this selection on a combination of observable indices and signals.

This paper analyses the case of the kiwifruit industry in the Agro-Pontino area, in central Italy. The objective of the study is to investigate whether the involvement of farmers in club supply chains can be considered as a model of adoption of the technical innovation by interested farmers or, as theory suggests, a model of selection of farmers by the breeder. This would allow it to be understood on which basis farmers are involved in club chains, if they can freely enter them and to what extent this process is controlled by right holders. Semi-structured interviews with key stakeholders and a survey submitted to farmers were used to collect information and data to conduct the analysis. Section 2 provides information about recent developments in the sector and the description of the main club and non-club chains identified in the Agro-Pontino area. Section 3 explains the empirical strategy used to conduct the studies in detail and sections 4 and 5 illustrate results and conclusions.

2. THE AGRO-PONTINO KIWIFRUIT FRUIT INDUSTRY

2.1. Development of protected varieties in the kiwifruit industry

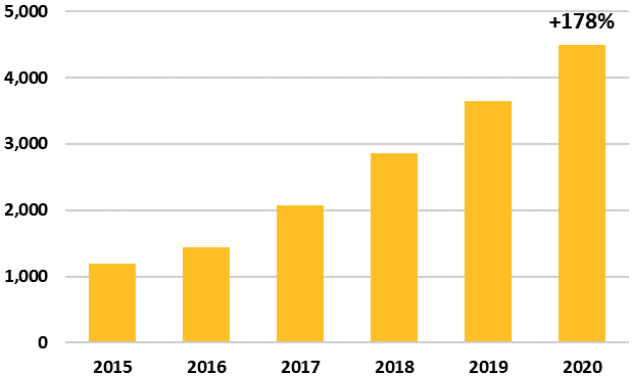
The importance of protected varieties in the kiwifruit industry has grown considerably in the past decade. Commercially, the yellow-flesh varieties are the most important, although some companies also recently started marketing red-flesh kiwifruit, always with the club formula. Green-flesh varieties, on the contrary, are mainly free; the most common free variety, Hayward, is also the most extensively cultivated both in Italy and abroad.

The development trends of the sector show that the club varieties are acquiring importance in terms of acreage and production, as evidenced by yellow-flesh kiwifruit registered within two of the main producing and exporting countries, namely New Zealand and Italy (https://www.csoservizi.com/; FAOSTAT). CSO

Figures 1 and 2 show the growing trends of acreage and production of yellow-flesh kiwifruit from 2015 to 2020 in Italy. Data refers to the main club varieties cultivated and marketed, that is Sungold (Zespri), Soreli, Dorì, Jingold (Jinyan and Jintao), and to the harvest that could be sold, net of waste and fruits not achieving the envisaged quality requirements. Acreage showed an increase of 178% in six years, reaching almost 4,500 hectares in 2020, while production increased by 346%, with 79,790 tons marketed in 2020.

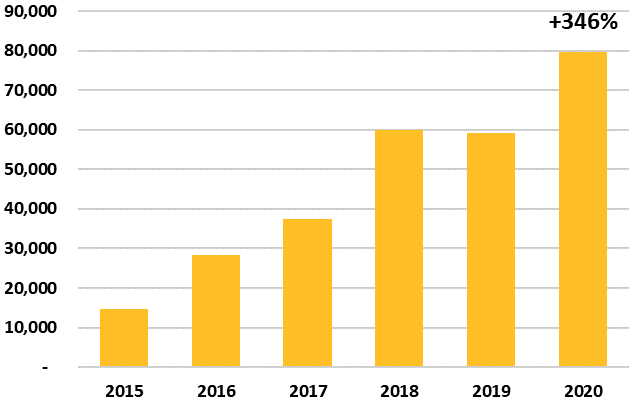
A comparison with the trend in green-flesh kiwifruit production shows that the latter is still widely

Fig. 1. Acreage (ha) of yellow-flesh kiwifruit in Italy from 2015 to 2020.



Source: Centro servizi ortofrutticoli.

Fig. 2. Production (t) of yellow-flesh kiwifruit in Italy from 2015 to 2020.



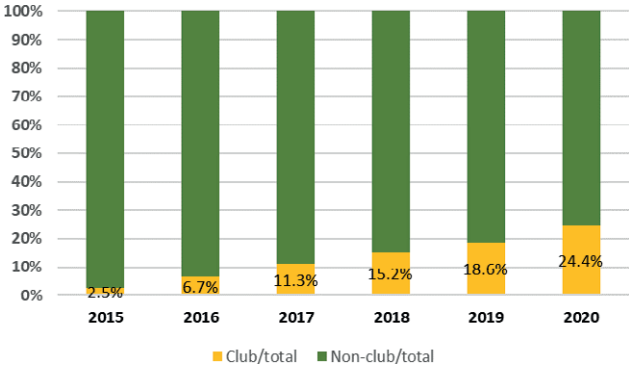
Source: Centro servizi ortofrutticoli.

produced in Italy, as already pointed out, but shares of traded fruits have been decreasing constantly in the past six years, while the yellow-flesh one is increasing (Fig. 3).

Italy is the third main producer of kiwifruit worldwide and the main one in Europe, followed by Greece, whose production increased by 37% in the past six years (specific data about club varieties production is not available). The kiwifruit industry in New Zealand, second main producer of kiwifruit and first producer of yellow-flesh kiwifruit with Zespri (265k tonnes in 2019 and 5,480 hectares[1]), confirms the same trends observed in Italy, with a decrease in the production of green-flesh kiwifruit and a corresponding increase of yellow-flesh kiwifruit (+133% from 2015 to 2019[2]).

[1] Source: Centro servizi ortofrutticoli
[2] Source: Centro servizi ortofrutticoli

Fig. 3. Marketed (%) club and non-club kiwifruit in Italy from 2015 to 2016.



Source: Centro servizi ortofrutticoli.

The growing role played by club varieties in the kiwifruit industry raises the need to focus on how these food value chains are organised and structured.

2.2. The kiwifruit industry in the Agro-Pontino area

The introduction of kiwifruit in the Agro-Pontino dates to the 1970s. It is the main production area of the country, with 26% of the national acreage in 2020. The area is considered highly specialised and is characterised by the cultivation of both free (mainly green-flesh Hayward) and protected varieties, in similar environments with respect to land quality, weather conditions, infrastructures and availability of services. The industry is characterised by a variety of supply chains. The first distinction is between club and non-club supply chains (Russo, 2020). The club chains trade mostly yellow-flesh kiwifruit (Sungold and Jingold varieties), while the non-club chains trade not protected varieties (Hayward green-flesh). Club supply chains are driven by breeders.

Two main club value chains can be identified in the Agro Pontino area; the major difference between them lies in the relationship the breeder has with Producer Organisations (POs). In one case, growers are members of the POs, and the breeder takes advantage of the knowledge POs have of their members to identify the most appropriate farmers to become club growers.

The club supply chains of kiwifruit in the Agro-Pontino can be split in three main areas, corresponding to input provision, production and marketing. The provision of input is directly controlled by the breeder or by a network of nurseries that grow and sell the materials in agreement with the breeder. Production is ensured by farmers, who join the supply chain upon signing a contract. They can be members of POs or independent

farmers. The marketing phase can be further broken into three layers, namely (i) buyers, (ii) other intermediaries; (iii) retailers. The distinction between the first two layers refers to buyers who directly buy from farmers, including POs, and buyers who buy from other breeders. The breeder is at the same time the supplier of the genetic input, the buyer of the harvest and the supplier who negotiates with retailers. The breeder controls the production, signs production contracts with farmers and provides farmers with technical assistance in order to reach the quality standard required to market the product with its brand. The contract signed by farmers includes the delivery of the entire harvest to the breeder. Farmers are usually allowed to grow other non-club varieties and they may or may not deliver the unprotected harvest to the breeder.

Two supply chains based on free varieties have been identified in the area. The main difference between them is the nature of buyers, who may be private traders or POs. POs, where present, collect the entire harvest of their members and usually provide them with the plant materials. They can be considered as "the lead firm" of the supply chain, even though they do not have the capacity to fully control production, unlike what happens in the club supply chains.

3. METHODS AND DATA

The investigation was conducted by using a farmer survey and semi-structured interviews targeting privileged actors involved in different ways in the club supply chains.

The farmer survey was originally designed to investigate the relevance of unfair trading practices within club value chains and to compare the difference in the occurrence of these practices between club and non-club supply chains[3]. Survey data were used to understand whether there are significant differences between farmers producing free kiwifruit varieties and those producing patented varieties and which farmers' characteristics can influence their opportunity to join club value chains.

The semi-structured interviews include three main sections:

1. The first investigates the factors determining farmers' participation in club supply chains. Questions about the following topics were included:
   a. Preliminary contacts. The process through which initial contacts were made between farmers and breeders is examined. Specifically: who takes the initiative and the role of possible intermediaries, such as POs and cooperatives in these initial exchanges; when POs or cooperatives are involved, additional questions are asked about how the process is managed within the PO/cooperative, to understand if farmers can propose themselves or if a strategy of the organisation exists to manage the process.
   b. Advanced contacts. The role of intermediaries is investigated in relation to the completion of contracts, in the case that the initial exchanges go further, and a business relationship is established. The relationship the breeder has with intermediaries is analysed, when they are involved, and what are the roles of both in the decision to include or not farmers in the club supply chain.
   c. Identification of prospective members. The process of involvement of farmers in the club chain is investigated. Questions about potential criteria to apply to this process are asked, including the role POs and cooperatives play in it.
2. The second section focuses on the characteristics of contracts signed between breeders and farmers and, where relevant, POs and cooperatives, or other intermediaries. This section aims to understand general content, length, presence of specific clauses related to, e.g., quantities to be delivered, price definition, quality standards to be achieved and possible penalties existing if they are not achieved, potential investments needed to make the farm adequate to grow the new variety, waste disposal, conditions to market productions, other possible obligations, conditions to exit the contract. The role of POs and cooperatives is also analysed, including the contract that the breeder signs with them, if present.
3. The third section deals with the organisation of the club supply chain and the strategic approach followed by the breeder in organising it. Distribution of tasks, responsibilities, specific requirements related to agricultural practices (e.g., training, access to advice), including investments. Nature and evolution of the relationships between different actors: breeders and farmers; breeders and POs and cooperatives, when involved; farmers and POs and cooperatives; farmers among them; retailers and farmers; retailers and breeder; retailers and POs/cooperatives. Additional questions investigate the presence of specific

[3] The data are property of the European Commission Joint Research Centre (JRC) and were collected for the research project *Pass-Through of Unfair Trading Practices in EU Food Supply Chains Methodology and Empirical Application*. The use of the data for this publication was authorized and the authors thank the JRC for the kind concession. A full description of the dataset is in Russo (2020).

risks linked to the participation in a club chain and organisation of the monitoring system, including information collection.

Based on the data collected by the survey, our objective is to estimate how the different farmers' characteristics, specialisation and farm size affect the opportunity to be selected to join a club supply chain. Thus, our dependent variable is a dichotomic variable, which can be expressed by being or not being a member of a club supply chain. Given the nature of the dependent variable a logit regression model with multiple regressors was applied, as follows:

$$\text{logit}\left[\pi(\mathbf{x})\right] = \log\left(\frac{\pi(\mathbf{x})}{1-\pi(\mathbf{x})}\right) = \beta_1 x_1 + \beta_2 x_2 + \ldots + \beta_k x_k$$

The equation with the dependent variable Kiwiclub and the regressors selected was formulated, as follows:

Ln(p/1-p) Kiwiclub= β0 + β1Age + β2Graduation + β3Fulltime + β4Kiwifarm + β5UAAkiwi + u

where the dependent variable "Kiwiclub" is a binary variable which equals 1 when the producer is a member of a club chain and 0 otherwise; the regressors, selected on the basis of the results of previous studies (Dey *et al*., 2015; Di Fonzo *et al*., 2019; Russo, 2020; Talluri *et al*., 2006) and of the key-informant interviews, are: age, level of education, extent of the agricultural activity (full time/part time), specialisation of the farm and kiwifruit UAA and u representing the random disturbance. The parameters βi are estimated by the maximum likelihood method. Furthermore, we estimate the marginal effect on the probability of being a member of a club when regressors change.

The questionnaire was submitted to 85 kiwifruit producers in the Agro-Pontino area, 19 of whom grow club varieties and the remaining 66 grow non-club varieties. These 85 farmers are representatives of 2,119 kiwifruit growers in the area considered (2010 Census). Table 1 reports farmers' characteristics and Table 2 variables and statistics of the selected sample.

60% of the sampled farmers are full-time farmers, 71% are male and only 21% are college graduates. Almost half of them are members of a cooperative or PO, and 63% are specialised in the production of kiwifruit, meaning that 22% of them grow club varieties, and all these 19 farmers are members of a PO. On average, they are aged 54 years and the kiwifruit UAA is slightly above 5 hectares.

Tab. 1. Farmers' characteristics.

Full time farmers	*60%*
Male farmers	*71%*
Graduated farmers	*21%*
Kiwifruit specialised farmers	*63%*
PO/Coop members	*49%*
Club varieties growers	*22%*

Tab. 2. Descriptive statistics of variables used in the analysis.

Variable/Statistics	Min.	Max.	Mean	Std Dev.
Age of farmers	25	73	54	9.60
UAA (ha)	1.50	170.00	11.01	21.90
Kiwifruit UAA (ha)	0.50	73.00	5.29	9.30

4. RESULTS AND DISCUSSION

Table 3 shows the estimates and marginal effects of the logit regression model. The overall fit of the model, measured by McKelvey and Zavoina R2, is 0.897, which represents a very high result for logit estimations, indicating that the variables included in the model explain a relevant part in the selection of farmers to be included in the club chains. These results are consistent with a selection of farmers by breeders, based on a combination of observable indices (age, sex) and signals (education, work experience, farm size) (Spence, 1973). Specifically, full-time farmers have 58% higher probability to be included in a club chain, while graduate farmers have 53% higher probability to be selected by breeders than farmers with a lower level of education. The specialisation of the farm is also valued as an important characteristic. Farmers growing only kiwifruit have 20% higher probability of being selected than those producing other fruit varieties, while farm size has less influence on the choice of farmers. Age, on the contrary, negatively influences the possibility to be part of a club chain. Younger farmers are preferred to older ones as club growers. However, this influence does not seem that important, and this can find an explanation in the average age of farmers being rather high in the area, as in the rest of the country.

Interviewees reported the availability of farmers to become part of the club supply chains, despite the condition of the contracts to be signed with the breeder being considered rather strict and so are the agricultural practices to be followed to achieve quality standards. Interviewees agreed on the fact that a selection is performed, and the model gives insights into the most relevant factors considered in this selection process.

Tab. 3. Results of the logit model.

	Coefficient	Std. Error	Significance	Marginal effects
(Intercept)	-3.60101	2.49177		
Age	-0.10470	0.04774	**	-0.0133
College diploma	2.86224	1.28013	**	0.5396
Full-time farmer	5.25047	1.61305	***	0.5828
Kiwi farms (specialised)	1.83766	0.89101	**	0.2044
UAA kiwi	0.49872	0.21836	**	0.0636

McKelvey and Zavoina R^2=0.897
Mac Fadden R^2=0.405
n: 85
N: 2,119

Breeders are concerned by the need to select the most "fit for the job" farmers. The results of the analysis confirm that breeders oriented their choices following signals such as education, work experience and professionalism/being a full-time farmer (Spence, 1973). This strategy has been confirmed by interviews with breeders, who mentioned the existence of a selection process, where education and experience of growers are valued as positive signals. The factors included in the selection can be associated with more efficient farmers. Breeders prefer to grant access to the club supply chain to more efficient and skilled farmers.

The data collected with the interviews also indicate the role of POs and cooperatives as being relevant in this selection process (Di Fonzo *et al*., 2019; Russo, 2020). They are involved in the selection process and, in at least one of the two club supply chains analysed in the Agro-Pontino area, farmers involved in it are all POs' members. The involvement of POs might be considered as an additional strategy to mitigate this risk for breeders. POs and cooperatives know their members and they might have a rather precise idea of which farmers are more skilled. Their involvement relates also to issues such as trust and reputation, which become more relevant within the perspective of a long-lasting business relationship, and of course can assist breeders in correctly "reading" growers' signals.

5. CONCLUSIONS

This investigation supports the conclusions that farmers' involvement in club supply chains can be defined as a farmers' selection rather than farmers' adoption model. Farmers cannot freely access a club supply chain and breeders exert the power to exclude farmers from growing their patented variety. Breeders apply selection criteria to recruit growers in the club supply chains, despite the willingness of farmers to become members. Cultivating protected varieties, though, entails following and meeting specific quality requirements, and this might need farmers to modify agricultural practices and invest in modernizing their farm structures.

Breeders seem to consider that professional farmers with a higher level of education might ensure production standards of club varieties. Full-time farmers have 58% higher probability to be included in a club chain, while graduate farmers have 53% higher probability to be selected by breeders than farmers with a lower level of education. Farmers specialised in the production of kiwifruit have 20% higher probability to be selected than those also producing other fruit varieties. Age negatively influences the possibility to be part of a club chain.

No detailed economic data are available to measure farm income from yellow-flesh kiwifruit production compared to green-flesh kiwifruit. Information about farm income was not filled in by farmers in the questionnaire. However, interviewees agreed on the fact that protected varieties allow, at least, to double farm income. This information would need to be confirmed by a quantitative analysis that could allow a comparison with the income of free varieties growers. This might be the subject of future research on this topic.

The results of the analysis suggest potential implications linked to the PVPs and the adoption and diffusion of innovations. The update of the UPOV regulation in 1991 influenced, to a certain extent, the incentives that breeders have to innovate and the process to manage the exploitation and diffusion of their innovation. Before the reform, the payment of royalties (per plant or per quantity produced, or a combination of them) was an adequate means to exploit new varieties. The royalty system incentivises the diffusion of new varieties. The breeder maximises his profit by increasing the diffusion

of the protected varieties and, consequently, the amount of royalties received.

After the reform, the incentives for breeders changed. The extended protection of harvested materials opened up new exploitation possibilities, including that of registering trademarks associated to the new varieties and of controlling all phases of the supply chain, including marketing. These new economic incentives of breeders led to an interest in better protecting the investments on new varieties and the economic margin deriving from their exploitation. Protecting the variety from non-authorised growers combined with the need to achieve quality standards able to ensure good results in the marketing phase raised the importance of selecting farmers to be involved in the club supply chains, hence, influencing the process of adoption and diffusion of innovations.

Another potential implication of the diffusion of club supply chains concerns the access that farmers have to the new varieties. Our investigation suggests that the most efficient and skilled farmers are selected to be part of the club supply chain, which, according to interviewees, ensures higher profits. Inefficient farmers, on the contrary, are excluded from the club chains; they do not have the possibility to access innovation and increase their profits. This might have implications in terms of policy interventions to increase skills and knowledge of less efficient farmers. Of course, improving their efficiency would not ensure access to the club, since breeders will still apply the selection process.

The study has some important limitations. The high level of reticence of respondents and the difficulty in finding farmers and other actors available for interviews reduced the amount of data to be used in the analysis. The lack of previous studies on this topic and the lack of economic data about the spread of club varieties complicated the analysis. Another limitation of the study is that it refers only to the Agro-Pontino area and does not consider other areas in the country and abroad where yellow-flesh kiwifruit is grown, even though the area was chosen because of its homogeneity.

These results support the conclusion that further and more specific criteria and conditions might be set up by breeders to engage farmers. Additional research would be needed to better define these criteria and understand the farmers' position and perspective in the club supply chain, given the importance that they are assuming in the fruit sector. Additional research to quantify the differences in terms of farm income between club and non-club growers, to be extended also to other industries, might give important insights to judge the functioning of these supply chains and to understand if the limitations that farmers must accept to be part of them are balanced by an increased farm viability.

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