



THE NATIONAL
RESEARCH INSTITUTE
PAPUA NEW GUINEA

DISCUSSION PAPER

THE ROLE OF DEMOCRATIC
GOVERNANCE TO COOPERATIVE
ECONOMIC PERFORMANCE: AN
ANALYSIS OF SURVEY DATA FROM
PAPUA NEW GUINEA

Morris Altman
Francis Odhuno
Louise Lamontagne
Hannah Altman

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First published in November 2022

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ISBN 9980 75 314 5

National Library Service of Papua New Guinea

ABCDE 202524232221

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Cover designed by PNG NRI Digital Media Unit

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Acknowledgements

We thank those at the Coffee Industry Corporation and the Office of the Registrar of Cooperative Societies of Papua New Guinea for enabling this research. We also thank Samson Jack for coordinating our interviews with the executives of the sample coffee cooperatives in Goroka, the executives for agreeing to complete our questionnaire, and Thomas Wangi for assisting in many ways. We also benefited from helpful comments received at the “Economic Performance and Governance of Coffee Farmers Cooperatives in Eastern Highlands Province” seminar in Goroka on November 2018. Additional comments from Reuben Sengere, Eugene Ezebilo, Osborne Sanida and Ronald Sofo are greatly appreciated. This paper is prepared as part of a research project supported by funds provided to NRI by the Australian Department for Foreign Affairs and Trade. However, views expressed herein are those of the authors and neither of these institutions should be taken as endorsing the views presented here.

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Abbreviations and Acronyms

CIC	Coffee Industry Corporation
EHP	Eastern Highlands Province
ICA	International Cooperative Alliance
IOF	Investor Owned Firm(s)
KFC	Korofeigu Farmers Cooperative
OCS	Office of Cooperative Societies (of PNG)
PNG	Papua New Guinea
USD	United States Dollar(s)

Abstract

Based on original 2017 survey data from sample coffee cooperatives in the Eastern Highlands Province of Papua New Guinea, we construct estimates and indicators for cooperative governance and then relate these measures to estimates of cooperatives productivity levels. We address the important issue of weather and the extent which the governance of coffee cooperatives, in particular, aspects of democratic governance, positively affect productivity. Our estimates suggest that cooperative governance is important to co-op productivity. These estimates further suggest that one important means of improving productivity in coffee cooperatives is to strengthen the extent of cooperative governance. This provides coffee cooperatives with a competitive advantage over the more hierarchical investor-owned farmstead. But there are outstanding issues related to technical education, marketing, and vertical integration of producers to processors to marketing that need to be addressed, some of which relates to governance issues. Some of these issues might require government support to resolve.

Introduction

A fundamentally important determinant of a cooperative achieving its cooperative competitive advantage is the extent to which the cooperative is organised around cooperative principles of governance. Democratic and informed decision-making is critically important. At least this is the hypothesis put forth by scholars who argue that cooperatives can be at least as productive as the traditional investor-owned firms or organisations (Altman, 2014; 2020; Bonin, Jones, and Putterman, 1993; Craig and Pencavel 1995; and Novkovic, 2006; 2007). The traditional investor-owned firm's governance tends to be hierarchal in governance. In this paper, this hypothesis of the importance of democratic governance is examined with respect to Papua New Guinea's (PNG) coffee cooperative sector. Counterposed to the cooperative sector is the plantation mode of organisation which once dominated the PNG coffee sector. Plantations are characterised by a hierarchical organisational structure, where farmers are employees of plantation owners. Moreover, plantations tend to be characterised by a skewed income distribution where the employee-farmers earn relatively low incomes and job security is very weak¹.

This paper is a follow-up and complement to Altman et al. (2020) study of productivity of PNG coffee cooperatives, which addressed the question of whether the small size of each member of the cooperative would make them uncompetitive in the global coffee market at least in terms of the productivity of the immediate producers in cooperatives. In this paper, we estimate labour productivity in terms of gross output (2017 sales) per cooperative member and employee. Altman et al. (2020) study found that by forming coffee cooperatives, relatively small producers achieve scale economies which allow them to be relatively productive. One does not have to adopt the hierarchical plantation mode of organisation to be productive. Moreover, scale has a limited but important effect on productivity. After a certain scale, however, increasing size does not appear to affect productivity (Duffy, 2009). Being huge, in terms of scale, is not required to optimise productivity.

To the extent that scale matters, forming a cooperative allows small producers to attain the scale required to be competitive in terms of productivity. The evidence in Altman et al. (2020) suggests that plantations are not the only means by which sufficient scale can be achieved. Forming cooperative mimic the scale that can be achieved by plantation-type organisations. Except, in a cooperative income is more equitably distributed, compared to a plantation, as it is controlled by the farmer members of the cooperative. Overall, one aspect of the cooperative advantage is that it provides small and medium-sized farmers with the means to compete with larger investor-owned farms or coffee plantations. But it also provides a more equitable distribution of income across farmers given that a cooperative is member-owned on the basis of equality, that is, "one member, one vote" (more generally on the advantage of coffee cooperatives see: Balch 2014; La Vin Lloyd, 2018; Milford, 2012; and Stulman, 2015).

Thus, accommodating multiple views through member engagement and democratic participation in the cooperative's affairs can add to the quality of decision making through an improved understanding of key issues and selection of appropriate solutions (Simmons, 2015). Therefore, other things being equal, engaged members tend to be more committed to making their cooperative successful. We test this hypothesis using an original 2017 survey data supplemented with non-survey data for a sample of coffee producer cooperatives in the Eastern Highlands Province of PNG to see how democratic governance relate to the economic performance of the cooperatives.

We find that in our sample of PNG coffee cooperatives, cooperative or democratic governance plays a positive role in the determination of productivity. This democratic governance has much to do with active participation in the governance of the cooperative. In other words, where there is more democratic governance, consistent

¹ Pinedo (2020) documents and elaborates upon the working conditions on large coffee farms in a number of significant coffee producing countries.

with cooperative principles and values articulated by the International Cooperative Alliance (ICA), productivity tends to be higher. We require more detailed survey data to provide a more nuanced analysis of the relationship between democratic governance and productivity. But one can conclude, given the available evidence, that another aspect of the cooperative advantage is democratic governance. By definition, such a governance structure can't be present in hierarchical forms of firm or farm organisation, such as one would find on a plantation.

The rest of the paper is organised as follows: In section 2, we discuss the relationship between core principles of cooperatives and the governance of cooperatives and their efficiency and, relatedly, their potential competitiveness. In section 3, the relationship between non-core differentiating attributes and the potential cooperative advantages are elaborated upon. In section 4, the literature on the significance of cooperatives are briefly reviewed. In section 5, we discuss and elaborate upon how our data was collected, and estimates constructed, and their representativeness. In section 6, we further discuss the representativeness of our data and our approach to using these data to test our hypothesis that good cooperative governance positively affects the productivity of cooperatives. We also present our empirical findings using the data in hand. Section 7 summarises our key objectives and findings.

Core principles, governance, and the efficiency and competitiveness of cooperatives²

Any discussion of cooperative organisation and potential competitiveness of cooperatives and their superiority over investor-owned firms with regards to the socio-economic wellbeing of members must be placed in the context of cooperative principles and values. These are well-articulated by the peak international organisation of cooperatives and mutual, the International Cooperative Alliance (ICA) (International Cooperative Alliance, (2008; 2019b). These high-level principles have been developed over the past two hundred odd years (Rochdale Pioneers Museum, 2019). These principles are the necessary conditions for cooperative organisations to operate efficiently and effectively in a competitive environment as well as for improving the wellbeing of the members and their community. The cooperative advantage cannot be realised if an organisation is referred to as a cooperative but operates like an investor-owned firm, or is dictated to by government, and where members lack effective voice in the decision-making process (Altman, 2018; 2020; see also, Novkovic, 2006 and Simmons, 2015).

These are the core ICA principles and related values (International Cooperative Alliance, 2019b):

- *Voluntary and open membership:* Open to all persons able to use their services and willing to accept the responsibilities of membership.
- *Democratic member control:* Controlled by their members. Members must be active in the decision-making process with full access to information. Elected representatives must be accountable to members in a transparent manner. Usually, there is a 'one member, one vote' system of representation.
- *Member economic participation:* Ideally, all members contribute equitably and democratically control their co-op's capital. Capital can be raised from other than member sources. But this cannot weaken the members control over the co-op. Surpluses are to be used for the benefit of co-op members, including for investment purposes, member control over the co-op must be assured.
- *Autonomy and independence:* Autonomy and independence which translates into co-ops must be autonomous and controlled by members. Any agreements with outside organisations, to raise capital and to garner support from government, for example, must be consistent with continued member control over their co-op – co-ops must remain autonomous and member controlled.
- *Education, training and information:* Education, training and information which are critical to effective democratic decision-making that can also culminate in economically efficient and competitive outcomes for the cooperative. In the context of agricultural cooperatives, knowledge about best practice technology, farming practice, crop choice, quality control, and market knowledge (organic coffee, for example) are of vital importance. Co-ops have the basis for providing education, training, and information collectively in a cost-effective manner and in the context of cooperative governance.
- *Cooperation among cooperatives:* Cooperation is critical as in such networking facilitates cooperatives gain scale and bargaining power as well as the knowledge base to compete with larger corporations, whilst maintaining their independence as individual cooperatives. In this way, small coffee producers, for example, can replicate the economies and power of larger farms and even of plantations, without losing their independence, shifting the income share in favour of the small producer.
- *Concern for community:* This relates to the contributions of cooperatives to the communities of which they are a part of, wherein these contributions are approved by members and where members have effective voice in determining policy. More so, cooperatives can be conduits for other development services channelled through it.

Taking these points of reflection further, derived from the ICA cooperative principles and values (ICA, 2008; 2019b):

²This section is derived from Altman (2018; 2020).

What is a Cooperative? “A cooperative is an autonomous association of persons united voluntarily to meet their common economic, social, and cultural needs and aspirations through a jointly-owned and democratically-controlled enterprise”.

What are Cooperative values? “Cooperatives are based on the values of **self-help, self-responsibility, democracy, equality, equity** and **solidarity** [emphasis added]. In the tradition of their founders, cooperative members believe in the ethical values of honesty, openness, social responsibility and caring for others.” [emphasis by Altman, 2020].

These values inform the ICA definition of a cooperative. We argue that there can't be a cooperative organisation that does not fulfill the **basic conditions of democratic governance and voluntary solidarity**. Deviating from these conditions generates an organisational form that is **different substantively from a cooperative**. The more that a cooperative deviate from **democratic governance and voluntary solidarity**, the more the cooperative melds into an investor-type firm organisation. We would argue that this would also **undermine the competitive or, at least, the productivity advantage** of such a non-cooperative organisational form. It would also undermine the potential cooperative on the market with regards to consumer preferences for products sold or produced by a cooperative. (Our emphasis derived from Altman, 2020).

The principle of democratic control by members is vital for members to have voice, which yields solidarity, loyalty, a sense of fairness, and ownership of the decision-making process. These principles, when properly executed, can also translate into accountability and transparency in the decision-making process – decisions can't be hidden from members. This also limits moral hazard in decision-making as well as overconfidence bias and loss aversion in decision-making. This relates also to how the cooperative decision-makers are incentivised. Our survey data allows us, up to a point, to examine some of the above aspects of cooperative governance and productivity controlling the relationship between scale and productivity, where it is the cooperative form of governance that facilitates the scale productivity effect.

An important aspect of cooperative governance that's worthy of emphasis is the importance of autonomy and independence. To maintain cooperatives as autonomous self-help organisations ultimately controlled by members, the terms by which cooperatives enter into agreements with other organisations, inclusive or private or public organisations, or raise capital externally (as opposed from members or surpluses) must ensure continued democratic control by members. Once again, we have the overriding significance of member control and relatedly, democracy to the cooperative organisational form. This, in turn, contributes to the cooperative advantage. The hypothesis here is that autonomy and independence by contributing to solidarity and fairness incentivises increases in productivity, contributing to the cooperative advantage.

Education is also of utmost importance. Cooperative members, elected representatives, managers and employees are supposed to be educated and trained so they contribute to the development of their cooperatives. Without cooperative education, members and members of the executive may not be aware of cooperative principles and values and how these can be operationalised in a cooperative. In these cases, the cooperative might be run along the lines of an investor-owned firm. This would undermine the cooperative advantage.

Education also requires cooperators to understand how to run a sustainable cooperative business (which is different from a profit maximising enterprise). What is often neglected in discussions about education, is the need to create a cadre of professional cooperative managers, consultants, analysts and leaders. Hiring generic managers and board members will undermine the cooperative advantage and can even generate a leadership team that perceives cooperatives as being inherently inefficient thereby, incentivising such leadership to attempt to demutualise the cooperative. Also being educated on what is a cooperative is not sufficient to develop competitive and sustainable cooperatives. Political cronyism, for example, yielding the hiring of 'good' cooperators over good managers can be the death knell of a cooperative.

Related to the above, technical education is also critically important. One needs experts who not only understand the nuisances of cooperative principles and values, but who also understand rules of accounting as it pertains to cooperatives, legal parameters, the ins and outs of supply chain management, how to improve crop yields, and how to improve the quality of output in a cost-effective manner, for example.

Non-core differentiating attributes and the cooperative advantage

If the assumption that the ICA/Rochdale core principles and values are key to cooperative success and advantage is valid, then other attributes of a cooperative which would differentiate it from other cooperatives, must be consistent and compatible with the core P&V. These differentiating factors might have historical, cultural, and religious roots, for example. Altman (2020) argued that the following interventions, for example, would serve to undermine the cooperative advantage as they violate member control and democratic governance:

- Reducing the democratic base;
- Reducing voice;
- Reducing member control over the co-op;
- Increasing state control over the governance of the cooperative;
- Reducing accountability;
- Reducing transparency;
- Disconnecting from community;
- Sexism; and,
- Racism.

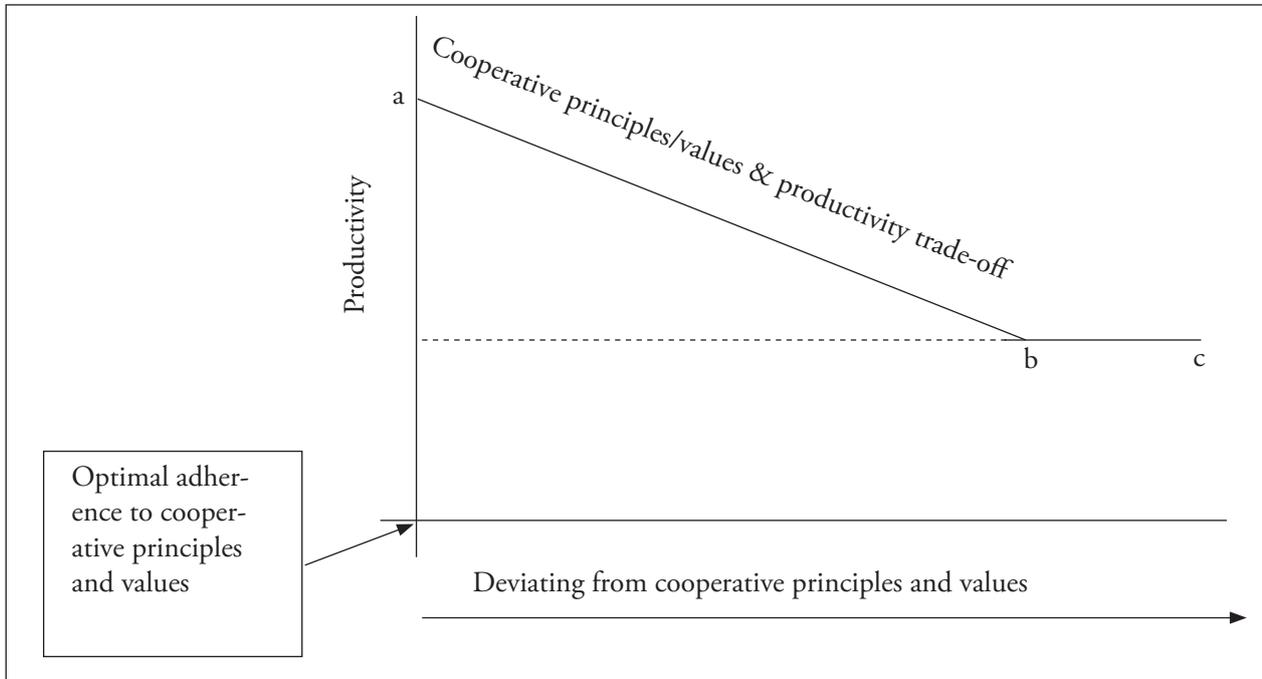
One might argue that any of the above might be consistent with the history, culture and social context of a particular country. Certain of the above interventions might distinguish a non-Western country from a Western country, for example. But one should note that the term Western country is highly misleading as all Western countries differ from each other quite significantly and there are considerable social, cultural, and institutional differences even within Western countries as there is within non-western countries (where the term non-western is for the very same reason highly misleading, a highly misleading generalisation). One should also note that absence of democratic governance, limited voice, and limited if any organisational control by workers, consumer, or suppliers, as well as gender inequity, for example, were all part of the cultural history of so-called Western countries (Crick, 2002; Nussbaum, 2000; and Sen, 2000). The principles and values of cooperative governance have evolved over time and were a product of social agitation and change. What some would label as western values are not 'naturally' or inherently western.

But what has evolved into the ICA/Rochdale principles and values (very much related to democratic governance and member control), we argue, play a critical role in providing cooperatives with their cooperative advantage. There is, in other words, an opportunity cost in terms of income and wellbeing to cooperators and society when deviating from core cooperative values and principles, even if many of these might be embodied by western values (albeit these have been relatively recently evolved). On the significance of culture positively and negatively impacting economic development and economic sustainability see Altman (2001; 2003), Harrison (1992), Jones (2006), Nussbaum (2000) and Sen (2000).

This point is illustrated in Diagram 1 (Altman, 2020). All other things remaining the same, adhering to cooperative principles yield maximum productivity, given by a . All other things remaining the same, this minimises unit production costs. The latter equals input costs divided by productivity. As productivity increases, unit costs fall. To the extent that deviating from core cooperative principles and values reduces productivity, given by ab , this would have the effect of increasing unit costs. This also reduces the size of the economic pie produced by the cooperative. After point b , decreases in productivity are assumed to stabilise at a relatively low level. An argument can be made that if one wishes to operate a cooperative outside of the frame of cooperative principles and values, productivity might be higher in a more transparent and honest investor-owned firm. But if the objective

is to be a cooperative, productivity is enhanced by moving up the *ba* trajectory through a greater adherence to cooperative principles and values.

Diagram 1: Cooperative Principles and Values, Culture and Productivity



Other interventions, however, can contribute to social cohesion and solidarity amongst cooperative members. This, in turn, can contribute to enhancing the cooperative's economic efficiency and to the cooperative advantage on both the supply and demand side of the market. For example, countries and even states or provinces within regions can have different sets of laws which a cooperative must adapt to if it is to be established and become sustainable. Different countries face different challenges which translate into different types of cooperatives and mutuals being relatively more dominant in different countries. In these cases, one size does not fit all. One might also have cooperatives that derive their inspiration from their country's, region's, or even neighborhood's cultural specificity. A cooperative might even be dominated with individuals from the same religion or ethnic background. This can contribute to a sense of solidarity and trust within such cooperatives, even if they might appear to be exclusionary with regards to individuals from other backgrounds. But within the cooperative, the cooperative can still adhere to the principles of member control and democratic governance. These considerations cannot be addressed given the limited data available from our surveys.

We've already discussed the theory and mechanics underlying how good governance in the cooperative can yield higher productivity through a higher quality and quantity of effort inputs, less turnover, smarter management, less freeriding and greater incentives for applied technical change (Altman, 2002; 2006; 2009a; 2015; Ben-Nur and Jones, 1995; Bonin, Jones and Putterman, 1993; Bowles and Gintis, 2011; Davis, 2004; Doucouliagos, 1995; Gordon, 1998; Lampel, Bhalla, and Jha, 2010; and Sexton and Iskow, 1993). When members are in control of their organisation and have meaningful and effective voice, it creates the incentives to make decisions and behave in a manner that would positively affect productivity and negatively impact on costs. This is assumed away in the conventional economic model. The latter assumes that productivity is typically unaffected by the overall incentive environment. Moreover, also as discussed above, democratic governance is expected to have a negative impact on productivity. But evidence from the literature lends serious support to the theoretical narrative that cooperative governance, democratic governance, *ceteris paribus* should yield higher levels of productivity.

A central differentiating characteristic of cooperatives or member-owned organisations, by their very nature, given its focus on membership value, broadly speaking, is its long-term orientation, as opposed to the short-term focus of many investor-owned firms. This is especially the case when such firms are listed on the stock market

and where the decision-makers benefit from maximising short-run returns as a basis for their compensation packages.

Focusing on member benefits orients the cooperative to concentrating on the long-term sustainability of the organisation and also, for this reason, mitigating risks and therefore paying attention to potential downsides of risky investments that might be characterised by high returns in the short run and by severe losses in the long run. This is especially the case when members are aware of the investment strategies and related risks proposed by decision-makers. The latter is most secure when the cooperative abides by the principles of transparency and meaningful consultation with members where members typically have a vested interest in maintaining the economic viability of their organisation. One can hypothesise (Altman, 2020) that cooperatives that violate the cooperative norms of accountability, transparency, and member control, which build upon the norms of democracy, will fail to be competitive.

The dynamic relationship between core cooperative principles and values and the cooperative advantage is illustrated in Diagram 2 (Altman, 2020). Given the assumptions made, abiding by these principles and values, serve to create an incentive environment conducive to higher productivity, which can translate into lower costs and/or improved benefits to cooperative members and their communities. The increasing productivity can take the form of increased x-efficiency (co-op members working harder and smarter) or technological change (can also take the form of product development). On the demand side, one has greater consumer loyalty, which provides the cooperative with significant advantages over investor-owned firms. In the domain of coffee, this could take the form of consumers of coffee in relatively wealthy countries preferring co-op produced coffee to coffee produced by investor-owned organisation. Co-op coffee can be and should be marketed as fair trade coffee. Our survey data does not allow to address this important question.

Diagram 2: Cooperative Principles

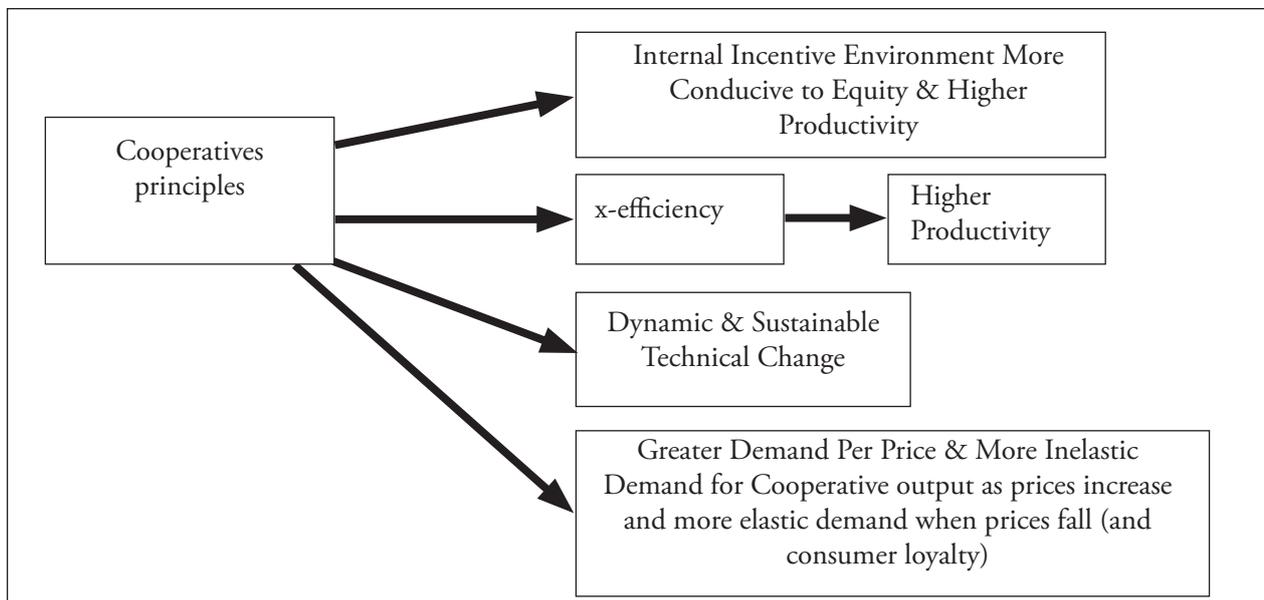
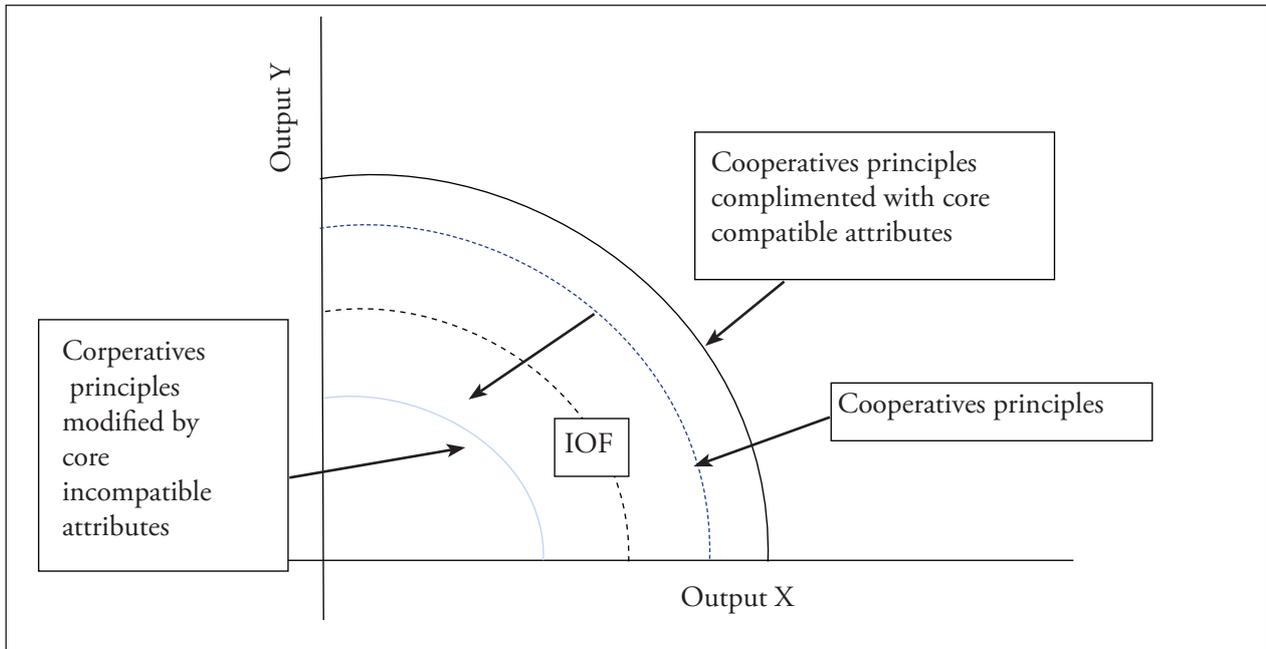


Diagram 3 below, further illustrates some of the points made with regards to the relationship between cooperative success, at least in terms of productivity, and core cooperative principles and values as non-core principles and values. What stands out as vital cooperative principles and values are informed democratic governance and member control. We argue that the cooperative performance is at its best when the cooperative adheres to cooperative principles and values. This is given by the cooperative principles production possibility frontier (maximum output given inputs). This performance is enhanced by the introduction of non-core attributes which are consistent with core principles and values. This is given by the core compatible attributes curve, which lies above the cooperative production possibility frontier. This improved performance could be, for example, grounded in the domain of culture, which can increase solidarity and trust amongst cooperative members.

This could also incorporate increasing solidarity and trust between general membership and the cooperative decision-makers, who might also be members. Both of these production possibility frontiers lie above that which represents the investor-owned firm (IOF). But if the cooperative breaks with core cooperative principles and values, this shifts inward the production possibility frontier. It is possible that the cooperative would, in this case, be less productive than an efficiently managed investor-owned firm.

Diagram 3: Non-core attributes and the Production Possibility Frontier



The significance of cooperatives and its theoretical underpinnings³

The standard neoclassical economics literature suggests that cooperatives cannot be economically efficient. This is because of the transaction costs associated with the democratic form of organisation and governance embedded in cooperatives and the assumed difficulty of the cooperative in raising necessary capital and utilising surplus for investment purposes. The traditional investor-owned firm is the preferred organisational form in the traditional economics literature as it is seen to be more efficient and more effective in raising capital for investment purposes. Cooperatives are, therefore, relegated to sometimes useful marginal economic organisations that serve to help the down-and-out, with considerable support from government, if they are actually forced to compete on the market (Altman, 2009a; Ben-Nur and Jones, 1995; Vladislav, 2007). But cooperatives represent a large percentage of the world economy and many of the large international firms are cooperatives or mutuals (a cooperative organisational form) (International Cooperative Alliance, 2019a; 1919c; 2021). Some quick facts⁴ on the importance of cooperatives would be useful:

- There are more than 1.2 billion cooperative members in the world;
- **One in every six people on the planet** are members of the any of the **3 million cooperatives** in the world;
- The top 300 cooperatives and mutuals in the world report a total turnover of **2.1 trillion USD**; and,
- **In Oceania, 38 percent of the population are co-op members.**

There are critical gaps in the traditional and influential economics literature that generate predictions of cooperatives as being inefficient and sub-optimal organisational forms. Traditional theory assumes that members of the firm (for example, coffee growers) work as hard and smart as they can, irrespective of the ownership structure of the firm. But this simplistic assumption has been challenged empirically and theoretically, with the theoretical challenge encapsulated in the theoretical framework referred to as x-efficiency theory (Leibenstein, 1966; see also Akerlof, 1982; Altman, 2001; 2002; 2005; 2006; 2009a; 2009b; 2014; 2015; Ben-Nur and Jones, 1995; Bonin, Jones, and Putterman, 1993; Gordon, 1998; Sexton and Iskow, 1993). The main point here is that owners, managers and workers behave differently in different incentive environments, which also encompass the firm's governance structure. They tend to work harder and smarter and are therefore, more productive and innovative (further increasing productivity) when the incentives are 'right'. Cooperatives, when operated like a cooperative (see below), can be more productive than the investor-owned firm according to this theoretical narrative. Even if cooperatives tend to be more expensive to run than investor-owned firms (if cooperative members pay themselves and their employees better and introduce superior working conditions) this can be compensated for by the cooperative advantage – the increased productivity flowing from the cooperative organisational form, which should encompass democratic governance (Altman, 2020).

This point is easily illustrated (Altman, 2001; 2002; 2015). Average cost is the cost per unit of output. One way of writing this down is:

Unit cost of all inputs divided by the productivity of these inputs.

³ This section draws heavily from Altman (2009a; 2014; 2015; see also Altman et al., 2020).

⁴ Source: <https://www.un.org/esa/socdev/documents/2014/coopsegm/grace.pdf>; <https://www.ica.coop/en/facts-and-figures>. See also, Altman, 2017 and Karaphillis, Duguid, and Lake, 2015.

If costs increase by 10 percent and productivity increases by 10 percent, there is no change in average costs. Given that labour cost tends to be well below 100 percent of total costs, to compensate for any increase in labour costs, productivity need only increase by less than 100 percent to compensate for any increase in labour cost. For example, if labour costs represent 50 percent of total costs, and labour costs increase by 10 percent, productivity need increase by 50 percent of 10 percent or by only 5 percent, and so on.

Another important point here is that given the incentive environment of a cooperative, land productivity can be increased by cooperators working harder and, more importantly, smarter, without additional traditional factor inputs, such as increasing land per labour input. This is, in part, related to cooperators being incentivised to adopt better technology and invest in better education as compared to investor-owned farms. These initiatives directly impact on the wellbeing of cooperators, their families, and their neighbours (Altman, 2015; 2018; 2020; Dogarawa, 2010; Fulton and Giannakas, 2013).

Some might argue that an advantage of a larger investor-owned coffee producer would be their ability to take advantage of scale economies. Cooperatives, it might be argued can't get big enough, in a cost-effective manner, to compete with larger investor owned coffee producers in this domain. Scale economies would allow coffee producers to increase labour and land productivity simply by becoming bigger which would facilitate increasing productivity without significant additional investments in traditional factor inputs. But a cooperative advantage lies in the fact that smallholders can replicate the scale effects of larger farms such as plantations through the formation of cooperatives which create networks of independent smallholders. These networks (cooperatives) can generate similar economic advantages as can larger farms. Herein, smallholders retain their independence whilst gaining a competitive advantage that is lost when acting independently (Altman, 2014; 2015; see also Liu and DeeVon, 2013; Schroeder, 1992; Yoo, Buccola and Gopinath, 2013). One of the core findings of our earlier paper (Altman et al., 2020) is that PNG coffee cooperatives are able to achieve efficient levels of scale to be competitive, at least from a scale perspective.

With regards to the Highlands region of PNG, there is limited empirical evidence that coffee cooperatives are considerably more productive and produce higher quality coffee than stand-alone coffee producers (Sengere, 2016, p.156). This is in the context of coffee producers in PNG being quite small and cooperatives serving to network these smaller producers into what mimic larger units of production, hence, taking advantage of scale economies. This speaks to economies of scale. Relatedly, cooperatives allow for the provision of support services that naturally accrue to larger unit of production, such as coffee plantations (Sengere, 2016, p.157). The World Bank has also identified scalability through cooperatives as an important ingredient to success in the coffee sector, whilst impediments to increasing the size of cooperatives represent an obstacle to improving the viability of this sector (World Bank, 2015).

There is also evidence that, just like in other countries, in PNG, practical education on bookkeeping, financial literacy, and credit improve the economic performance of coffee cooperatives (Sengere, 2016, p.156). How this is provisioned is critically important. And this can be viewed in part as a public good (with positive externalities) deserving at least partial support from government. A World Bank partnership program, providing support linkages between private sector exporters and smallholder coffee producers in PNG (almost all coffee producers in the PNG are smallholders) to overcome high transaction costs of developing such partnerships, has apparently increased productivity significantly (World Bank, 2015). This support consisted of investment grants, technical assistance and business development training. This actually relates to scale economies specific to vertical integration. These linkages are actually between coffee cooperatives and exporters over which the smaller-holder controlled cooperatives have no stakeholder share or control. This is a challenge for the PNG coffee cooperative sector and not the subject of any detailed consideration in our earlier study (Altman et al., 2020) or in this study.

Survey, data and methods

A case study of coffee producer cooperatives is adopted for this study. It involved semi-structured interview with two representatives of 10 cooperative entities. The government agencies responsible for cooperative development in PNG – the Coffee Industry Corporation Ltd and the Registrar of Cooperatives, were instrumental in the selection and invitation of the cooperative officials to take part in the study. But the resulting sample cooperatives were chosen by the Coffee Industry Corporation (CIC) officer in charge of Eastern Highlands Province. Each cooperative society was required to appoint two lead people to conduct data gathering and complete the questionnaire. As an incentive, we offered to pay the travel expenses for a maximum of two cooperative executives to come to Goroka town, the Eastern Highlands Provincial capital, for the interview. Each of the cooperative officials enlisted to provide data and responses agreed to participate in our interview. The interviews were conducted between 31 July to 2 August 2018.

For our data-collection instrument, we adopted from the extensive questionnaire developed by Mellor (2009) to collect indicators of cooperative success, governance and infrastructure (questionnaire is available upon request). Interviews with the pre-selected cooperative societies were conducted only in Goroka town. The survey generated data for 10 cooperatives in the Eastern Highlands Province. Therefore, the survey results are very limited, and the information collected is regionally specific.

Apart from the survey data being regionally specific, there are no time-series data for individual cooperatives that participated in the survey. The output and input (expenses data) provided are for the last few years, but the most reliable and consistent data are for 2017. Most of the data relate to specific economic and governance questions such as estimating the output produced and governance. Some of the survey data that appears to be relatively reliable are used to generate productivity estimates for the sample cooperatives – similar to what we used for our scale analysis of coffee cooperatives in PNG (Altman et al., 2020). But given that the data on inputs appear to be weak (too much variation to be plausible given the output estimates), no value-added estimates for productivity can be constructed. Productivity estimates are, therefore, based on the value of total output that the cooperative representatives report to have sold in 2017 in response to the survey questions.

The survey data are supplemented where possible by additional information provided by the Office of Cooperative Societies of Papua New Guinea (OCS PNG) and the Coffee Industry Corporation (CIC) officer in charge of Eastern Highlands Province. Useful information is provided on hectares per cooperative, for example, for all of the active and registered coffee cooperatives in the Eastern Highlands Province. This incorporates most of the coffee cooperatives in our sample. But the output data is completely and narrowly assumption based, so that each cooperative has exactly the same productivity in terms of output per hectare (Altman et al., 2020). Hence, these data are not used. Fortunately, the surveys allow us to estimate output in value terms from which we construct tentative productivity estimates for the sample coffee cooperatives. This allows us to relate our productivity findings in Altman et al. (2020) to the measures of democratic governance.

Relating governance and productivity of coffee cooperatives

Significance of coffee cooperatives in PNG's Eastern Highlands Province

All the active and registered co-ops in the Eastern Highlands Province are listed in Table 1 (the sample co-ops are coded in gold), along with some of the out-of-sample data derived from the Office of Cooperative Societies of Papua New Guinea (OCS PNG). Much of the latter data are relatively reliable and can be used to supplement the in-sample data. But there are no out-of-sample data for two of the 10 coffee cooperatives included in our sample, the Rika Rika Cooperative and the SK2 Linupa Farmers Cooperative. Just using the available data, the sample cooperatives represent about 43 percent of the active coffee cooperatives in the Eastern Highlands Province in terms of total hectares. When adjusted for the missing cooperatives, this percentage increases to 49.5 percent (Table 1).

The Eastern Highlands Province itself consists of eight districts. They contribute about 36 percent to PNG's total annual coffee and export an average of 23,187,000 tonnes of green beans per year. Most of the coffee is exported from the more easily accessible areas of the Eastern Highlands Province. The remoter areas of the province produce a very small percentage of this output since coffee is very costly to export given their poor transportation infrastructure (Act Now! For a Better Papua New Guinea, 2014).

Eastern Highlands Province produced 38 percent of all coffee in the country from 2007 to 2009. Therefore, our sample coffee cooperatives probably produced about 19 percent of Papua New Guinea's total coffee output (50 percent of the 38 percent attributed to Eastern Highlands). Our sample is of a large enough size to reveal important aspects of the coffee production in Papua New Guinea. But we don't have enough information to speak to the representativeness of our sample, given soil, transportation and other important infrastructural capability differences across the country.

In PNG, as a whole, village-based small farmers (less than or equal to 2.5 hectares) produce 85 percent of the annual coffee output (Altman et al., 2020). About 524,000 rural households (almost all these small farms—less than or equal to 2.5 hectares) depend upon coffee production to earn some or all their cash income (but such households also depend upon home-grown non-market output). Plantations or larger estates produce 4 percent of the annual coffee output. Farms of between 10 and 20 hectares produce 11 percent of the annual coffee output. Especially since 2009, there is close to a perfect relationship between coffee production, revenue, and exports amongst farms producing coffee. This speaks to the increasing specialisation amongst coffee producers in the production of coffee (Altman et al., 2020).

But the cooperative organisational framework can facilitate such change given the incentive environment of the cooperative discussed below. Such changes can only take place if cooperative members have the resources to do so and if the appropriate governance structure is in place. From the survey data, we are able to examine by proxy if cooperative governance positively affects the above important productivity enhancing changes by examining the relationship between the extent of cooperative governance and productivity.

Table 1: Active coffee cooperatives in Eastern Highlands Province

District	Co-operative Name	Number of farmers	Total land area (Ha)	% of Hectares controlled by the co-op	Part of the Sample
Kainantu	Timuza Business Group (TBG)	24	12.1	1.70%	Yes
	(TYFC)	40	19.8	2.78%	Yes
Henganofi	Kunepa Ensign Coffee Cooperative (KECC)	70	13.7	1.91%	No
	Lihona Memorial Lutheran Youth Association (LMLYA)	50	14.9	2.09%	No
	Kapare Fresh Produce (KFP)	35	9.3	1.30%	No
	Sirumpa Farmers Cooperative	31	16.0	2.24%	No
	Rikarika Cooperative (RC)		No Data		Yes
	Nompi Coffee Cooperative (NCC)	23	51.1	2.11%	No
Okapa	Henagaru Village Development Cooperative (HVDC)	70	42.3	5.93%	Yes
	Kanite Kirapim Associations (KKA)	155	75.9	10.62%	Yes
	Keefu Hafaru Coffee Cooperative (KHFC)	37	18.1	2.53%	Yes
	Sefuna Farmers Cooperative (SeFC)	44	10.8	1.50%	No
	Kagu Keta Members' Cooperative	92	41.2	5.76%	No
	Iwaki Coffee Producers (ICP)	50	92.0	12.88%	No
	Urai Coffee Cooperative (UCC)	100	55.6	7.78%	Yes
Lufa	Hauka Pehuwo Peoples' Association (HPPA)	25	23.8	3.33%	No
	Lakave Integrated Framers Cooperative (LiFC)	53	46.5	6.51%	No
	Hatamo Coffee Cooperative (HCC)		No Data		No
	Crater Organic Farmers Cooperative (COCC)		No Data		No
	Kanex Coffee Farmers (KaCF)	40	34.3	4.80%	No
Ungai Bena	(KFC)	140	62.7	8.78%	Yes
	Libatihuto Coffee Cooperative	21	20.1	2.81%	Yes
	Fubbi Indigenous Farmers Cooperative (FIFC)	29	10.8	1.51%	No
	Numux Coffee Cooperative (NuCC)	26	39.6	5.59%	No
Goroka	Iza Gahana Coffee Producers (IGCP)		No Data		No
Daulo	Luhuka Coffee Project (LCP)	51	39.6	5.54%	No
Total		1206	714.4	100%	
	Sample as % of Total (unadjusted)			42.93%	
	Sample as % of Total (adjusted for missing sample co-ops)			48.50%	

Source: Productivity of coffee farmers' cooperatives in Eastern Highlands Province of Papua New Guinea: Evidence from survey data (Altman et al., 2020).

Estimates of productivity of coffee cooperatives

The survey data allows us to construct imperfect estimates of productivity for the 10 sample coffee cooperatives in the Eastern Highlands Province. This also allows us to identify productivity differences across cooperatives, providing us with some insight into the determinants of productivity amongst our sample cooperatives. From the survey responses, we have data on cooperative members, cooperative employees, coffee sales or revenue which is the value of gross output, and expenses, from which we can generate a number of important estimates. Given the limited quality and reliable data available, we are only able to derive gross output estimates for 2017 for our sample cooperatives. The largest cooperative by sales or gross output is the Korofeigu Farmers Cooperative (KFC), producing about 60 percent of all sample cooperative output. KFC is also the largest cooperative in terms of co-op members and number of employees. The second largest cooperative is the Rika Rika Cooperative, accounting for 18 percent of all sample cooperative output.

Table 2: Productivity and related estimates using survey and non-survey data

Name of Co-op	Total Land area (Ha)	% of Hectares	Land per labour input	Gross Sales	% of Gross Sales	Rev per Co-op Members + Employees	Rev per Ha
Korofeigu Fsrmers Cooperative	62.7	20.5%	0.15	998,560	49.2%	2,466	15,916
Libatihuto Coffee Cooperative	20.1	6.5%	0.38	132,713	6.5%	2,502	6,609
Urai Coffee Cooperative (UCC)	55.6	18.1%	0.58	108,747	5.4%	1,133	1,956
Henagaru Village Development Coopera-tive (HVDC)	42.3	13.8%	0.36	52,322	2.6%	447	1,236
Timuza Business Group (TBG)	12.1	4.0%	0.39	11,000	0.5%	355	907
Tuwo Youth Farmers Cooperative	19.8	6.5%	0.14	7,368	0.4%	139	371
Keefu Hafaru Farmers Cooperative	18.1	5.9%	0.42	4,000	0.2%	93	221
Kanite Kirapim Ples Association	75.9	24.7%	0.45	11,000	0.5%	66	145
Rikarika Cooperative (RC)	No Data			300,000	17.9%	2,041	
SK2 Ginupa Growers Cooperative	Omitted			52,500	3.1%	1,250	

Source: Productivity of coffee farmers' cooperatives in Eastern Highlands Province of Papua New Guinea: Evidence from survey data (Altman et al., 2020).

The available data allow us to construct a proxy measure for productivity of gross output (2017 sales) per cooperative member and employee. We use cooperative member and employee as a proxy for labour input. These estimates allow us to rank our sample cooperatives by our measure of productivity and scale (gross output in terms of sales and the number of co-op members). This ranking suggests a positive relationship between productivity and cooperative size. But the most productive cooperative is the Libatihuto Coffee Cooperative

which is much smaller in terms of sales than the somewhat less productive Korofeigu Farmers Cooperative (see also, Sengere, 2016). The KFC cooperative is more than three times larger in terms of output and about 12 times larger in terms of the number of co-op members (see Table 2 above and for more details see Altman et al., 2020). This suggests that the relationship between productivity and scale is probably not a linear one. To be very productive does not require that a cooperative is as large as the KFC in Papua New Guinea. Moreover, scale is not the only variable affecting productivity as one should expect.

But this brings us to a discussion of how productivity is affected by cooperative governance in a manner that takes us beyond the important capability of achieving scale economies. It is important to recognise that it is the cooperative form of governance, (discussed below) which allows for small- and medium-sized farm to scale up whilst each retaining and maintaining their independence. This particular feature of cooperative governance allows for and helps explain the productivity effect of scaling-up through cooperatives as evidence from our sample of 10 coffee cooperatives in PNG.

Survey results for cooperative governance and productivity

From the perspective of our discussion of coffee cooperatives, principles related to democratic governance, member control, autonomy, cooperation amongst cooperatives, and education and training are vitally important. These speak to the capacity of cooperatives to become competitive in terms of productivity and the quality of the coffee produced and processed, given the resources and decision under their control, and their capacity to improve the wellbeing of their members and the communities of their members, whilst remaining competitive.

Democratic governance does not imply that every member of the cooperative participates in every decision. Rather, members are involved in the general decision-making process and the lead decision-makers inform members of their decisions, members assess lead decision-makers' decisions and lead decision-makers can be voted out of office.

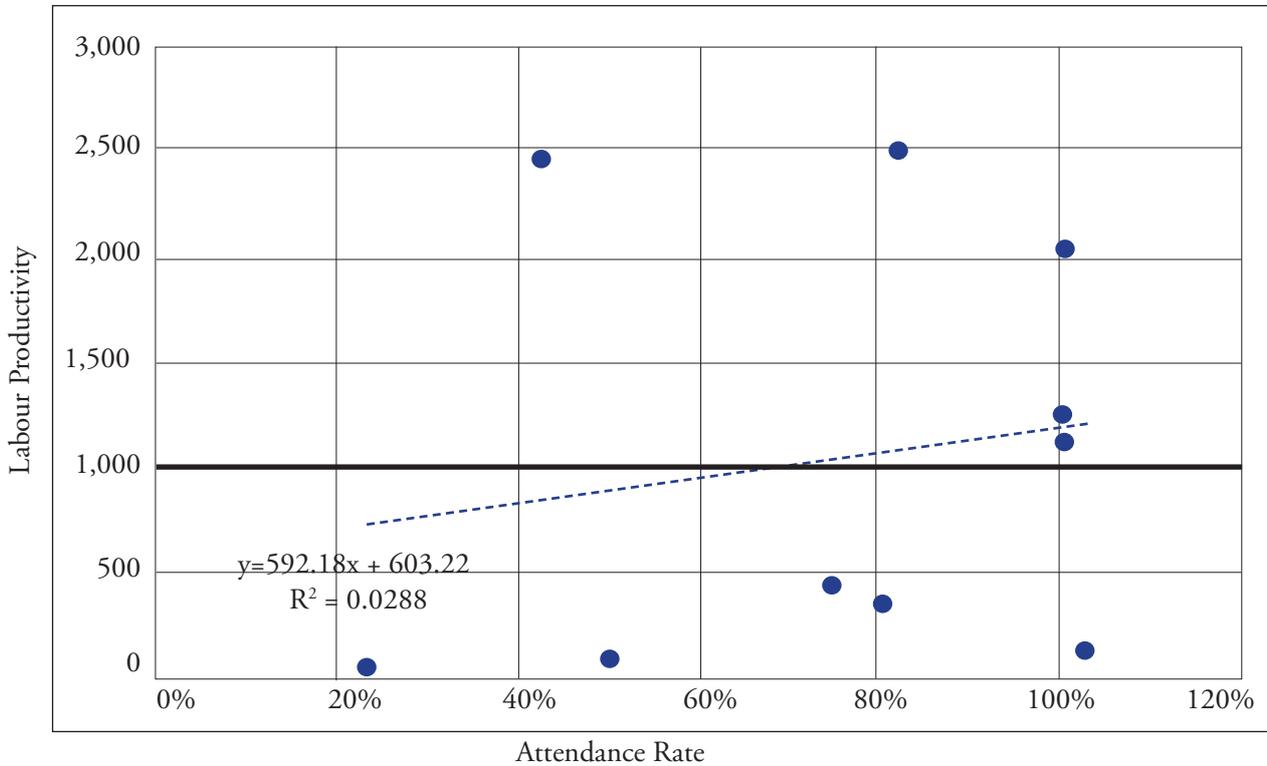
Important aspects of member participation are their participation in annual meetings and other most pertinent decision-making activities. This also relates to operational decision making. The survey data allow us to determine the percentage of members who attend annual meetings and the percentage of who participate in different aspects of their cooperative's business decisions. The latter is at least as important as the former, if not more so, as this relates to the manner which the coffee co-op is actually managed. The cooperative advantage should reveal itself most profoundly through members voice at the micro level of the management of the cooperative. These estimates, derived from the survey data, are presented in Table 3 as well as are our previously discussed estimates of labour productivity. Recall, that we estimate labour productivity in terms of gross output (2017 sales) per cooperative member and employee. Our sample co-ops are ranked by the level of labour productivity. There is a high participation rate for both annual meetings and for co-op business decisions, is especially true for the most productive of the coffee cooperatives. This is consistent with important aspects of International Cooperative Alliance principles for good governance.

Table 3: Member participation in decision-making, ranked by labour productivity

Co-op Name	12.1 How many registered members are in the cooperative in 2017?	12.8 How many members (or delegates) attended the last annual meeting?	Member attendance/ members	12.7 How many members in the most recent year participated in the business (sold, purchased, borrowed, paid premiums)?	Participation/ members	Rev per Co-op Member + Employees
Libathuto Coffee Cooperative	22	18	81.8%	20	90.9	2,504
Korofeigu Fsrms Cooperative	250	105	42.0%	250	100.0	2,466
Rikarika Cooperative (RC)	119	119	100.0%	107	90.0	2,041
SK2 Ginupa Growers Cooperative	35	35	100%	15	42.9	1,250
Urai Coffee Cooperative (UCC)	80	99	123.8%	150	187.5	1,133
Henagaru Village Development Cooperative (HVDC)	94	70	74.5%	74	78.7	447
Timuza Business Group (TBG)	25	20	80.0%	9	36.0	355
Tuwo Youth Farmers Cooperative	41	42	102.4%	22	53.7	139
Keefu Hafaru Farmers Cooperative	30	15	50%	16	53.3	93
Kanite Kirapim Ples Association	155	35	22.6%	28	18.1	66

Source: Productivity of coffee farmers' cooperatives in Eastern Highlands Province of Papua New Guinea: Evidence from survey data (Altman et al., 2020).

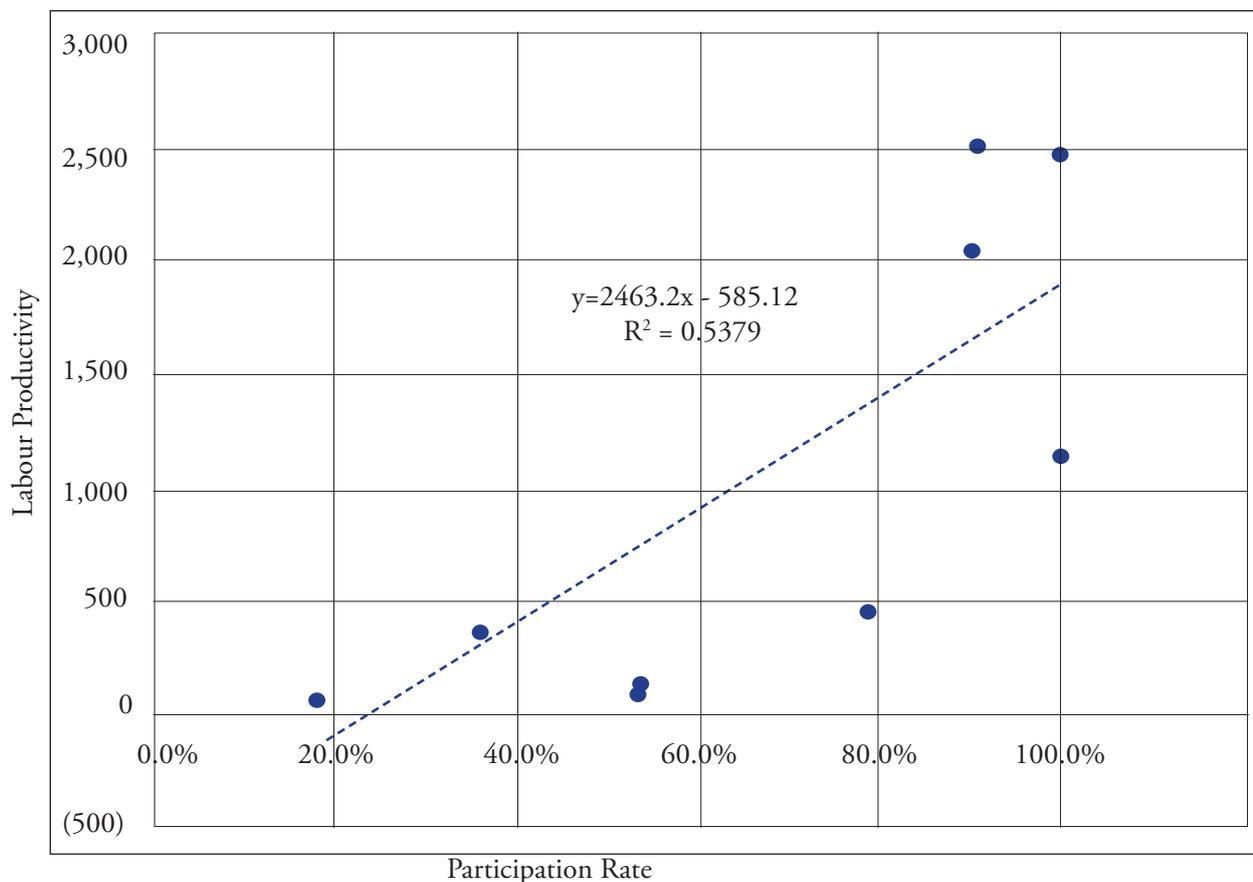
Diagram 4: Labour productivity and attendance rate



Source: Productivity of coffee farmers’ cooperatives in Eastern Highlands Province of Papua New Guinea: Evidence from survey data (Altman et al., 2020).

With regards to the relationship between attendance at annual meetings and productivity, there is a positive relationship, which is consistent with prior assumptions about the relationship between good governance and productivity. But the empirical relationship is not a strong one (Diagram 4). However, it is important to note that the most productive co-ops have relatively high participation rates. But the evidence also suggests that relatively high participation rates are not sufficient to generate high levels of productivity – which should be expected. Other variables should also play a role here. One should also note that there is a strong negative relationship between attendance at annual meetings and the size of the co-op. The larger the co-op, the lower the participation rate (Diagram 5). One would expect that in the larger co-ops, the participation rate would be smaller for social, transaction cost and monitoring reasons. But still, even amongst the larger and more productive co-ops, the participations are relatively high.

Diagram 5: Labour productivity and participation rate



Source: Productivity of coffee farmers’ cooperatives in Eastern Highlands Province of Papua New Guinea: Evidence from survey data (Altman et al., 2020).

There is also a strong positive relationship between participation in co-op business decisions and productivity, measured in terms of gross output (2017 sales) per cooperative member and employee (Diagram 5). This is consistent with the prior hypothesis that good governance at this level contributes to higher levels of productivity. This more micro day-to-day positive participatory relationship with productivity is even stronger than the above annual meeting participation productivity relationship. Here too, abiding by proper ICA good governance rules, appears to have contributed to improved productivity.

The survey data also allows us to assess the extent which the sample co-ops’ behaviour is consistent with good business practice as well as with ICA cooperative principles. This is given in Tables 4 and 5. In general, just about all cooperatives appear to have adopted good business and co-op operating principles, given the responses to the survey questions. To the extent that these responses are accurate, low productivity would have to be attributed to other factors including, possibly, small size and lack of engagement in cooperative management.

Table 4: General governance of EHP coffee cooperatives (A)

Co-op Name	13.1 Are the by-laws and changes in the by-laws reviewed at the annual meeting? Yes/No	13.2 Is the board elected by members? Yes/No	13.3 Is the manager selected by the board/executive? Yes/No	13.4 Is the manager a government official? Yes/No	13.6 For at least board positions open in the past two years, two or more persons ran for the position. Yes/No
Kanite Kirapim Ples Association	Yes	Yes	No	No	Yes
SK2 Ginupa Growers Cooperative	Yes	Yes	Yes	No	Yes
Rikarika Cooperative (RC)	Yes	Yes	Yes	No	Yes
Timuza Business Group (TBG)	Yes	Yes	No	No	Yes
Henagaru Village Development Cooperative (HVDC)	Yes	Yes	Yes	Yes	No
Tuwo Youth Farmers Cooperative	Yes	Yes	Yes	No	No
Urai Coffee Cooperative (UCC)	Yes	Yes	Yes	No	No
Korofeigu Frsmers Cooperative	Yes	Yes	No	No	Yes
Keefu Hafaru Farmers Cooperative	Yes	Yes	Yes	No	Yes
Libatihuto Coffee Cooperative	Yes	Yes	No	Yes	Yes

Source: Productivity of coffee farmers' cooperatives in Eastern Highlands Province of Papua New Guinea: Evidence from survey data (Altman et al., 2020).

Table 5: General governance of EHP coffee cooperatives (B)

Co-op Name	13.8 At the time of elections, information is provided to members about board nominees and issues facing the cooperative? Yes/No	13.9 Is there a written business plan or annual work plan for the cooperative? Yes/No	13.10 The business plan or other document includes a manager succession plan. Yes/No	13.11 Has there been at least one management training program within the last two years? Yes/No
Kanite Kirapim Ples Association	Yes	Yes	Yes	Yes
SK2 Ginupa Growers Cooperative	Yes	Yes	Yes	Yes
Rikarika Cooperative (RC)	Yes	Yes	Yes	Yes
Timuza Business Group (TBG)	Yes	No	No	Yes
Henagaru Village Development Cooperative (HVDC)	Yes	Yes	Yes	Yes
Tuwo Youth Farmers Cooperative	Yes	Yes	Yes	Yes
Urai Coffee Cooperative (UCC)	Yes	Yes	Yes	Yes
Korofeigu Fsrmers Cooperative	Yes	Yes	No	Yes
Keefu Hafaru Farmers Cooperative	Yes	Yes	Yes	Yes
Libatihuto Coffee Cooperative	Yes	Yes	No	Yes

Source: Productivity of coffee farmers' cooperatives in Eastern Highlands Province of Papua New Guinea: Evidence from survey data (Altman et al., 2020).

Conclusion

This study builds upon an earlier study by Altman et al. (2020) which focuses on determinants of productivity, with a focus on scale, amongst a sample of PNG coffee cooperatives in the Eastern Highlands Province. This study makes use of the productivity data and analysis present in the 2020 study and summarises some of our key findings. Our results show that in our sample, cooperatives were able to achieve scale economies increasing productivity that would mimic the performance of the traditional investor-owned farmstead or plantation. In other words, one does require to adopt the more hierarchical mode of organisation (the plantation) to achieve scale.

However, in this study, we make use of survey data on different aspects of cooperative governance in these sample coffee cooperatives (related to the principles and values stipulated by the International Cooperative Alliance) to examine the relationship between productivity in the sample cooperatives and the extent to which the sample cooperatives adhered to certain important aspects of cooperative principles and values. Theories related to cooperative governance would suggest that adherence to these principles and values should have a positive effect on productivity. The limited survey data that we do possess suggest a strong positive relationship between cooperative governance and productivity, especially with regards to the participation of co-op members in the day-to-day governance of the cooperative. In other words, one way of increasing productivity is a higher level of adherence to cooperative principles and values. This, however, avenue can be further strengthened amongst our sample coffee cooperatives. This avenue to increasing productivity of coffee producers is simply not available to the investor-owned farmstead.

This study's robustness is based on the overall significance of our sample cooperative's significance to coffee production in the Eastern Highlands which, in turn, is a major contributor to PNG's coffee production. However, drawing a broader sample of coffee cooperatives from throughout PNG would provide more robust findings and assist in producing ways and means to enhance coffee production productivity in this very important sector of the economy. Also, of importance would be gather more nuanced data of cooperative governance.

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