

## **Benefits of agriculture cooperatives to their member households in Bhutan**

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**ABSTRACT:** Agriculture cooperatives (ACs) increase access to assets, information, services, and markets. However, little is known, to what extent ACs benefit farmers in Bhutan, owing to scarce studies. Understanding this research gap is indispensable for making informed decisions about ACs. Thus, this study investigates as to whether ACs improve access to livelihood assets (1) and if access to these assets predict livelihood outcomes (2) of farmers. These objectives were tested by using data collected from 192 member households of ACs in Trongsa and Zhemgang Districts (sampled by multistage sampling procedures) employing pre-tested structured questionnaires between June to July 2018. Data analyses, comprising descriptive statistics, principal component analysis, and regression analysis, were performed using the Statistical Package for the Social Sciences 19. Results reveal that ACs improve human, physical, natural, financial, and social capitals of farmers. Findings further prove that access to these capitals predict 65.7% of the livelihood outcomes of the households, where  $R^2 = 0.657$ ,  $F(4, 192) = 74.329$ ,  $p < .001$ . Given such importance of ACs, the Royal Government of Bhutan should continue strengthening existing ACs and establishing new ACs to expand benefits yield from such collective actions to farmers. This study recommends future studies to assess spillover benefits of ACs to non-members in the wider communities.

**Keywords:** agriculture cooperatives, livelihood outcomes, member households

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## Introduction

Scholars acknowledged agriculture cooperatives (ACs) as promising institutions to develop the state; thus, many countries have different collective actions, including cooperatives and farmers' groups, to cater to their differing needs (Birchall, 2004; Zeuli and Cropp, 2004). ACs enable farmers to access credit and market, gain economies of scale, increase bargaining power, and lower transaction costs (Markelova et al., 2009; Ortmann and King, 2007; Holloway et al., 2000). Also, ACs improve bonding, bridging, and linking in the neighbourhood (Tenzin and Natsuda, 2016). ACs further help their members to better access extension services, including farm machinery, farm inputs, and training, than non-members (Gejabo, 2016). ACs managing community forests increase their access to natural resources as well (Moktan et al., 2016). Several other studies have further published that ACs increase jobs, income, and food security (Wossen et al., 2017; Gejabo, 2016; Zeweld et al., 2015; Getnet and Anullo, 2012). Hence, many developing countries promote ACs to curtail poverty (Philip, 2003).

Embracing these benefits of ACs, the Royal Government of Bhutan (RGoB) started a cooperative movement in recent decades. For instance, the RGoB enacted the Cooperative Act of Bhutan in 2001, amended the same in 2009, established the Department of Agriculture and Marketing Cooperatives (DAMC) in 2010, and approved Cooperatives Rules and Regulation of Bhutan in 2010 (Dendup, 2018). After that, the RGoB has been supporting ACs with the formation and operation, including equipment, inputs, training, and marketing (Sonam and Martwanna, 2011).

These policy reforms and other supports enabled the registration of cooperatives with the DAMC starting 2010. According to the DAMC (2018), Bhutan has 67 cooperatives, of which ACs (e.g., crops, livestock, and forestry) accounted for about 82%, while non-ACs (e.g., saving, textile, and mining) account only about 18% (DAMC, 2018). Although the number of ACs in the country is small at present, Dendup (2018) presented the rising trend of ACs since the first registration of cooperatives in 2010. The

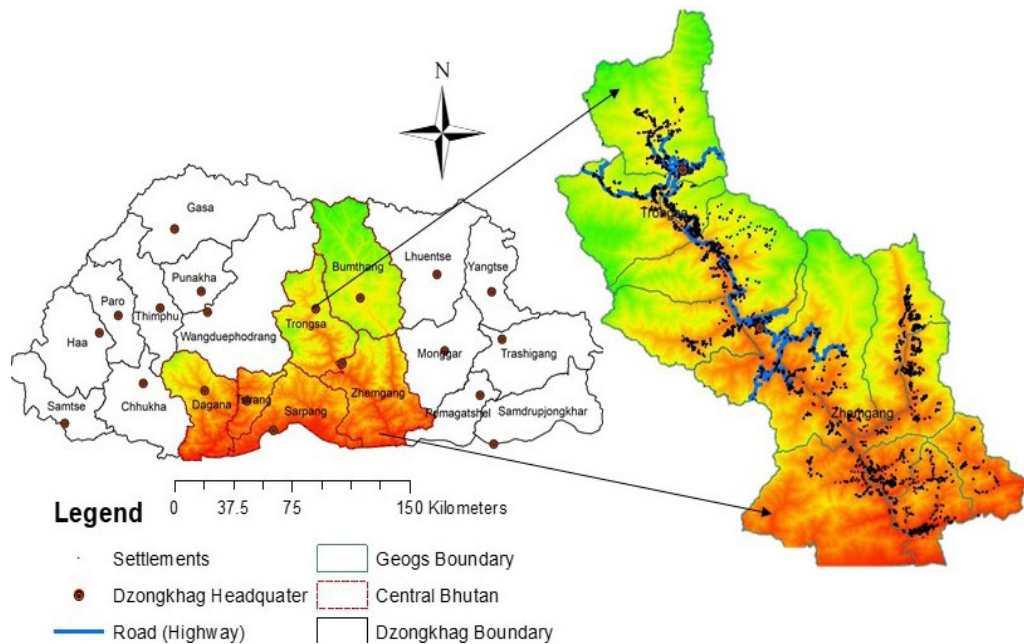
existing farmers' groups are also expected to upgrade to ACs with the rise in their scale of operation. Moreover, Bhutan is an agrarian country, where the agriculture sector employs 57.16% of people and contributes 17.37% to the country's Gross Domestic Product (National Statistics Bureau, 2018). As the RGoB has been focussing on the agriculture sector development, the quantity and diversity of ACs will likely boom in the future.

However, researches on ACs are yet to gain momentum in Bhutan as the cooperative movement in the country is relatively a new phenomenon. Thus, understanding of, to what extent ACs benefit farmers, are scarce in Bhutan. Scientific investigations on the benefits of ACs are vital for informed decision-making on matters related to ACs. Therefore, this research determined whether ACs improve access to livelihood assets (1) and if access to these assets predicts the livelihood outcomes (2) of member households.

## Materials and Methods

### Study Area and Sampling

The research site consisted of Trongsa and Zhemgang districts in Central Bhutan (Figure 1). Sampling involved a multistage sampling method. The first and second stages applied a purposive sampling of Central Bhutan (1) and Trongsa and Zhemgang districts (2), respectively. The maximum number and diversity of ACs in Central Bhutan necessitated its choice. Similarly, maximum and diverse ACs, and similar climatic and agriculture practices compelled to select Trongsa and Zhemgang districts. The third and fourth stages included a random selection of six ACs in each chosen district (3) and proportionate random sampling of 96 member households in each selected district (4), respectively. Accordingly, results were based on data collected from 192 member-households.



**Figure 1** Trongsang and Zhemgang Districts in Central Bhutan

### Data Collection

After informing stakeholders and obtaining verbal consent of selected member households, trained enumerators interviewed respondents using pre-tested structured questionnaires between June to July 2018. Respondents rated 22 items that explain whether their memberships in ACs have improved access to livelihood assets on 5-points Likert scales (Likert, 1932) ranging from 1 (Strongly Disagree) to 5 (Strongly Agree). These 22 items were selected based on review of previous studies and considering their

relevance in the context of Bhutan (Dendup, 2018; Gejabo, 2016; Lenjiso et al., 2016; Mojo et al., 2016; Moktan et al., 2016; Tenzin and Nat-suda, 2016; Abebaw and Haile, 2013; Holmgren, 2011; Ito et al., 2012; Garnevaska et al., 2011; So-nam and Martwanna, 2011; Wiggins et al., 2010; Wanyama et al., 2008; Karlı et al., 2006; Zeuli and Radel, 2005). **Table 1** displays the descriptive statistics of 22 items arranged in descending order by their mean values. The Cronbach's alpha for 22 items was .86, higher than the required .70.

**Table 1** Twenty-two selected variables with their descriptive statistics

Variables	Minimum	Maximum	Mean	SD
ACs enable the purchase of hybrid animals	1	5	3.73	0.987
ACs encourage organic farming	1	5	3.47	0.678
ACs encourage saving	2	5	4.11	0.882
ACs engage in waste management	1	5	3.67	0.84
ACs enhance knowledge and skills	2	5	4.02	0.618
ACs expand leadership experiences	1	5	3.92	0.812
ACs improve access to credits	1	5	3.73	0.985
ACs improve access to extension	1	5	3.89	0.891
ACs improve access to farming inputs	2	5	3.88	0.64
ACs improve access to infrastructure	2	5	3.74	0.807
ACs improve access to land	1	5	3.48	0.716
ACs improve cow shed and its item	1	5	3.6	0.745
ACs improve information sharing	2	5	3.97	0.772
ACs improve motivation towards the farming	2	5	4.09	0.725
ACs improve mutual support	1	5	3.79	1.098
ACs improve network with stakeholders	1	5	3.76	0.714
ACs improves access to farming machinery	2	5	3.83	0.84
ACs improves trust to other members	1	5	3.41	1.025
ACs initiated natural resource management	1	5	3.67	0.813
ACs preserve the community's culture	2	5	3.66	0.75
ACs provide employment opportunities	1	5	3.69	1.026
ACs provide financial assistant	1	5	3.8	0.995

The Sustainable Livelihood Framework developed by the Department for International Development [DFID] (1999) guided the development of five livelihood outcomes in this study as (1) ACs improved household income, (2) ACs improved household food security, (3) ACs improved sustainable use of resources, (4) ACs improved ability to respond to shocks and vulnerabilities, and (5) ACs improved overall well-being of household. The internal consistency and reliability these five items were acceptable as the Cronbach's alpha satisfied the requirement of .70. Respondents rated all five statements using 5-point Likert scales, where 1(Strongly Disagree) to 5 (Strongly Agree) (Likert, 1932). As commonly applied in social science researches, average composite scores of these five statements were calculated for each respondent. Average

composite scores were then computed log transformation to determine elasticity. Transformed average composite scores which are treated as continuous data, are then fitted into regression model as dependent variable.

#### Data Analysis

Data analysis consists of the Principal Component Analysis (PCA) with varimax rotation in the Statistical Package for the Social Sciences 19. The Kaiser-Meyer-Olkin measure was .744, higher than the minimum threshold of .70 (Tabachnick et al., 2001), indicating that the sample size is adequate. As desired, Bartlett's Sphericity Test was significant, where  $X^2(231) = 2085$ ,  $p < .001$ , revealing that correlations among variables are sufficiently strong. The PCA extracted five components, which explains 63.95% of the

total variance, exceeding the 50% requirement in social science researches (Hair et al., 2006).

As presented in **Table 2**, the PCA generated factor scores for the five extracted components (renamed as in equation 1) using Anderson-Rubin's method because it assures orthogonality of the estimated factors, and generates uncorrelated factor scores, making them suitable independent variables for the regression analysis (IBM Knowledge Center, 2019). For determining elasticity, log transformation of both factor scores and average composite scores of livelihood outcome were computed before fitting into the regression model as shown in equation 1:

$$Y = \beta_0 + \beta_1 HC + \beta_2 PC + \beta_3 NC + \beta_4 FC + \beta_5 SC + \beta_0 \varepsilon_0 \quad (1)$$

Where:

$Y$  is livelihood outcomes;

$\beta_i$  is regression coefficient;

$HC$  is human capital;

$PC$  is physical capital;

$NC$  is natural capital;

$FC$  is financial capital;

$SC$  is social capital; and

$\varepsilon_0$  is error term.

## Results and Discussion

### ACs Improving Access to Assets

As displayed in **Table 2**, the PCA extracted five components. All extracted components were retained because their Eigenvalues were higher than 1(1), there was levelling off starting the sixth component on the Scree plot (2), and initial Eigenvalues up to the fifth component are bigger than random Eigenvalues generated by the Monte Carlo PCA for Parallel Analysis (3). The first component explained 27.28% of the total variance, followed by the second (11.48%), third (9.66%), fourth (9.47%), and fifth (6.07%), respectively. Five extracted components were named based on items loaded under each component: access to human (1), physical (2), natural (3), financial (4), and social (5) capital.

The first component loaded four items linked to enhancing human resources; thus, it was referred to as access to human capital. The RGoB has been supporting ACs with training in areas of farming, leadership, management, and

business creation. The RGoB also fund study tours among members of ACs, aiding them to strengthen their knowledge, skills, information, and motivations. Regular contacts in ACs also increase the exchange of ideas and experiences. Like the finding of Zeuli and Radel (2005), ACs often change their leaders, providing leadership skills, including management, communication, and critical thinking, to several members. Lawless and Reynolds (2004) likewise reported that ACs were continuous learning organisations. ACs also enhance the motivations of members in farming, which accords with Mojo et al. (2016). ACs are the groups of like-minded people, whereby a collection of their diverse skills and knowledge boost creativity. Thus, one category of benefits of ACs in Bhutan is connected to improving human resources.

The second component loaded six items associated with physical infrastructure; thus, it was named as access to physical capital. Farmers in remote Bhutan do not readily access farm inputs and machinery owing to disperse settlements, mountainous terrain, and lack of information. Thus, the RGoB supports farmers with farm inputs (e.g., seed, fertilisers, and pesticides), farm machinery (e.g., tools and equipment), and other infrastructure (e.g., processing plants, market-outlets, and storehouse). For instance, members of dairy cooperatives receive hybrid animals and materials for the construction of cowsheds. In Bhutan, the physical capitals from the RGoB usually route through the extension offices to farmers; hence, access to the extension also grouped under this component. Earlier studies have also declared that ACs improved access to infrastructures (Mojo et al., 2017; Ma and Abdulai, 2016; Gejabo, 2016). Thus, another benefit cluster of ACs is related to increasing access to physical capital.

The third component loaded four items linked to natural resources; thus, it was named as access to natural capital. Corroborating findings of Chagwiza et al. (2016) and Fischer and Qaim (2012), ACs have leased government or private land, enabling smallholders to access farmland, which otherwise is difficult to obtain, individually. ACs engaging in community forests also increase their access to natural resources (Moktan et al., 2016). Some ACs also engaged in natural

resource management, including reforestation, waste management, organic agriculture, and water source management, which in return provide households with better ecosystem services. Thus, ACs also play an essential role in improving access to natural resources.

**Table 2** Five extracted components from the Principal Component Analysis with Varimax Rotation

Variables	Components					Com
	1	2	3	4	5	
ACs enhance knowledge and skills	<b>.915</b>	.152	.200	.021	.100	.911
ACs improve information sharing	<b>.778</b>	.237	-.049	.010	.007	.664
ACs improve motivation towards farming	<b>.756</b>	.085	.259	.089	.056	.657
ACs expand leadership experiences	<b>.730</b>	.147	.207	-.004	.229	.650
ACs improve access to extension	.075	<b>.700</b>	-.070	.019	.194	.538
ACs improve access to farming inputs	.077	<b>.690</b>	.217	.118	.095	.552
ACs improve access to infrastructure	.166	<b>.689</b>	-.087	.162	-.030	.537
ACs improves access to farming machinery	.297	<b>.635</b>	.049	.301	-.075	.590
ACs improve cow shed and its item	.308	<b>.562</b>	.282	.131	.131	.524
ACs enable the purchase of hybrid animals	-.074	<b>.484</b>	.310	.344	.150	.476
ACs improve access to land	.047	.043	<b>.849</b>	.186	.082	.767
ACs engage in waste managements	.232	-.011	<b>.796</b>	-.003	-.013	.687
ACs encourage organic farming	.086	.078	<b>.751</b>	.056	.180	.612
ACs initiated natural resource management	.165	.131	<b>.737</b>	.044	-.010	.589
ACs improve access to credits	-.036	.148	.060	<b>.855</b>	-.004	.758
ACs provide financial assistant	-.035	.218	.098	<b>.800</b>	.007	.699
ACs provide employment opportunities	.078	.081	.156	<b>.715</b>	.237	.604
ACs encourage saving	.282	.379	-.055	<b>.552</b>	-.055	.534
ACs preserve the community's culture	.128	.147	.071	.104	<b>.933</b>	.925
ACs improve mutual support	.012	.145	.120	-.218	<b>.784</b>	.699
ACs improves trust to other members	.117	-.113	-.033	.319	<b>.733</b>	.666
ACs improve network with stakeholders	.148	.387	.156	.094	<b>.473</b>	.429
<b>Initial Eigenvalues</b>	6.001	2.526	2.124	2.083	1.336	
<b>Monte Carlo Parallel Analysis</b>	1.6764	1.5621	1.5491	1.4000	1.2783	
<b>Cumulative %</b>	27.276	38.760	48.414	57.880	63.952	
<b>No. of items</b>	4	6	4	4	4	
<b>Cronbach's alpha</b>	.847	.775	.825	.787	.748	

Note: **Com**: Communalities

The fourth component loaded four items related to the financial resources; thus, it was named as access to financial capital. ACs were found saving regularly to their mutual fund, which they offer low-interest loans to their members. ACs also help needy members to secure group loans from commercial banks. ACs further provide financial relief to member-families during difficult circumstances, including sick and dead. Previous studies also agreed with the

current finding that ACs improve access to credit (Wossen et al., 2017; Fischer and Qaim' 2012; Sonam and Martwanna, 2011; Holloway et al., 2000). In compliance with Nugusse et al. (2013), Wanyama et al. (2008), and Philip (2003), ACs in Bhutan also generated jobs providing an alternative source of income to the farmers. Other studies have also declared that ACs improved access to financial capital (Zeweld et al., 2015; Garnevskaja et al., 2011; Roy and Thorat, 2008;



Valentinov, 2007).

The fifth component loaded four items related to the socio-culture; thus, it was named as access to social capital. ACs promote culture through cultivating native crops, domesticating native animals, and producing traditional products. For example, a cooperative in Zhemgang promotes local culture by producing a traditional bamboo product called *Bangchung*. Other social capitals include improved belongingness, relationships, and trust due to regular get-together among members in ACs. As reported in Holmgren (2011), ACs in Bhutan also support each other during their rough times, including the peak farming seasons, sick, death, and house construction. ACs in Bhutan also created avenues for their members to connect with government officials and promoters. In agreement, earlier studies have also reported that ACs improve networking, including bonding, bridging, and linking (Tenzin and Natsuda, 2016; Abebaw and Haile, 2013). Thus, the fifth component suggests that ACs in Bhutan also enable households to access socio-cultural benefits.

#### Relationship between Access to Assets and

#### livelihood outcome

**Table 3** presents the influence of access to assets by households on their livelihood outcome. The analysis of variance test was significant as  $F(4, 192) = 74.329$ ,  $p < .001$ . The adjusted  $R^2$  was 0.657, affirming the goodness of fit of the regression model. Multicollinearity was not a problem as Anderson-Rubin's method of estimating factor scores generated uncorrelated independent variables.

The result established that 1% change in score human capital (*HC*) changed livelihood outcome score by 14%. The effect was positive and significant at  $p < 0.001$ . Human capital composed of knowledge, skills, information, motivations, and leadership experiences. Human capital alone is not adequate to accomplish positive livelihood outcomes; but it is imperative to use other assets (DFID, 1999). This means that it is impossible to use other assets without human capital. Similarly, Bennett (2010) also expressed that human capital is indispensable to pursue different livelihood strategies. Thus, the result suggests that ACs need to improve the human capital of households to enhance their livelihood outcomes further.

**Table 3** Access to assets improving sustainable livelihood outcomes

	Unstandardized Beta	Std. Error	Standardized Beta	t	Sig.
Constant	.058	.029		1.970	.050
<i>HC</i>	.140	.021	.283	6.680	.000
<i>PC</i>	.159	.019	.354	8.344	.000
<i>NC</i>	.300	.027	.472	11.103	.000
<i>FC</i>	.183	.017	.452	10.636	.000
<i>SC</i>	.057	.020	.125	2.936	.004
Adjusted $R^2 = .657$					
$F(4, 192) = 74.329$ , $p = .000$					

**Note:** Both dependent and independent variables were employed log transformation and fitted into regression model for determining elasticity (to look at the percentage changes). *HC*: human capital; *PC*: physical capital; *NC*: natural capital; *FC*: financial capital; *SC*: social capital

Increasing physical capital (*PC*) score by 1% increased the score of livelihood outcome by 15.9%, and the influence was significant at  $p < .001$ . The physical capital composed of farm inputs, tools, and machinery, which help to convert raw materials to finished goods or other infrastructure (Holmgren, 2011). According to Mphande (2016), physical assets enable households to complete work quicker. They improve activity diversifications and productivity of households (DFID, 1999). Thus, the finding demonstrates that ACs enabling access to physical capital further improve livelihood outcomes of farmers.

Livelihood outcome score of household changed 30% due to 1% change in score of natural capital (*NC*). As expected, the impact was positive and significant at  $p < .001$ . As ACs operate in communities with limited resources, their activities affect the quality and quantity of resources (Jack et al., 2008). ACs often engage in activities improving natural resources. In return, it provides access to better resources (Bennett, 2010) and ecosystem services (Perman et al., 2003), enabling households to generate income, goods, and services. Thus, natural capitals support the economy and well-being of humankind (Barbier, 2011).

One percent change in score of social capital (*SC*) significantly raised the score of livelihood outcome by 5.7% at  $p < .05$ . Tenzin and Natsuda (2016) agreed with the current finding that social capitals improve the livelihood outcomes of people by enhancing teamwork, confidence, and income; and reducing transaction costs. Tenzin et al. (2015) further published that social capital reduces poverty in the country. Good social connections further give identity and purpose in the broader society (Mphande, 2016). The same report also illustrated that social capital improves access to relevant information. Given the importance of social capitals, the RGoB included community vitality, which comprised of social obligations, reciprocity, exchange, trust, and supports, as a pillar of Gross National Happiness (GNH) (GNH Centre Bhutan, 2019). The GNH is a development philosophy, developed and adopted by the RGoB, to oversee its developmental activities in Bhutan. Socio-culture benefits of ACs also improve the livelihood outcomes of

households by facilitating them to coexist in the broader community.

## Conclusion

ACs improved access to assets, including human, physical, natural, financial, and social capitals of member households. Results further suggested access to these assets predicted 65.7% of the livelihood outcomes of households. Thus, it can be safely concluded that ACs in Bhutan help member households to raise their livelihood outcomes. However, as the movement of ACs is a recent event, the RGoB and its development partners should continue strengthening existing ACs and establishing new ACs in the country. Stakeholders should continue supporting ACs until they can operate independently through training, subsidies, and grants. Continued support is necessary because concepts of modern ACs are new to many farmers, and most of the ACs depend on external aids as of now. Efforts of stakeholders in creating successful ACs will have significant benefits in the future, as successful ACs extend their benefits to wider communities. Furthermore, educating and creating awareness programs on the benefits of ACs will inspire non-member households in the community to join ACs and obtain benefits that yield from their membership in ACs. However, this research is limited to the benefits of ACs to their member households only. Studying spill over benefits of ACs to non-members could have been helpful; however, it was beyond the scope of this research. Thus, future research can assess the spill over benefits of ACs to non-member households in the community to gain new insight into the benefits of ACs in Bhutan.

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## References

Abebaw, D., and M. G. Haile. 2013. The impact of cooperatives on agricultural technol-



- ogy adoption: Empirical evidence from Ethiopia. *Food. Policy.* 38: 82-91.
- Barbier, E. B. 2011. *Capitalizing on Nature: Ecosystems as Natural Assets.* Cambridge University Press, Cambridge, UK.
- Bennett, N. 2010. *Sustainable Livelihoods from Theory to Conservation Practice: An Extended Annotated Bibliography for Prospective Application of Livelihoods Approaches in Protected Area Community Research.* Protected Areas and Poverty Reduction Canada-Africa Research and Learning Alliance Working Paper No. 1. Available: <https://dspace.library.uvic.ca/bitstream/handle/1828/4461/sustainable-livelihoods.pdf?sequence=1&is-Allowed=y>. Accessed Dec.14, 2019.
- Birchall, J. 2004. *Cooperatives and the Millennium Development Goals.* International Labour Office, Geneva.
- Chagwiza, C., R. Muradian, and R. Ruben. 2016. Cooperative membership and dairy performance among smallholders in Ethiopia. *Food Policy.* 59:165-173.
- DAMC. 2018. Summary of cooperatives. Available: <http://www.agrimarket.gov.bt/public/farmer/summary/type/1>. Accessed Mar. 2, 2019.
- Dendup, T. 2018. Agricultural transformation in Bhutan: from peasants to entrepreneurial farmers. *Asian. J. Agri. Exten. Econ. Sociol.* 23: 1-8.
- DFID. 1999. *Sustainable Livelihoods Guidance Sheets.* Department for International Development, London, UK.
- Fischer, E., and M. Qaim. 2012. Linking smallholders to markets: Determinants and impacts of farmer collective action in Kenya. *World. Dev.* 40: 1255-1268.
- Garnevskaja, E., G. Liu, and N. M. Shadbolt. 2011. Factors for successful development of farmer cooperatives in Northwest China. *Int. Food. Agribus. Man.* 14: 69-84.
- Gejabo, M. T. 2016. Agricultural cooperatives and rural women's access to livelihood capitals, the case of Garagodo and Hembecho cooperatives, Wolaita zone, Southern Ethiopia. *Glob. J. Hum. Soc. Sci.* 16: 26-33.
- Getnet, K., and T. Anullo. 2012. Agricultural cooperatives and rural livelihoods: evidence from Ethiopia. *Ann. Public. Coop. Econ.* 83: 181-198.
- GNH Centre Bhutan. 2019. *The Nine Domains of GNH.* Available: <http://www.gnhcentre/bhutan.org/what-is-gnh/the-9-domains-of-gnh>. Accessed Mar. 11, 2019.
- Hair, J. F., W. C. Black, B. J. Babin, R. E. Anderson, and R. L. Tatham. 2006. *Multivariate Data Analysis.* 6<sup>th</sup> Edition. Pearson Prentice Hall, Upper Saddle River, NJ.
- Holloway, G., C. Nicholson, C. Delgado, S. Staal, and S. Ehui. 2000. Agroindustrialization through institutional innovation transaction costs, cooperatives and milk-market development in the East-African highlands. *Agr. Econ.* 23: 279-288.
- Holmgren, C. 2011. *Do cooperatives improve the well-being of the individual? A case study of a Bolivian farmers' cooperative.* B.S. Thesis. Lund University, Lund.
- IBM Knowledge Center. 2019. Factor analysis scores. Available: [https://www.ibm.com/support/knowledgecenter/en/SSLVMB\\_subs/statistics\\_mainhelp\\_ddita/spss/base/idh\\_factsco.html](https://www.ibm.com/support/knowledgecenter/en/SSLVMB_subs/statistics_mainhelp_ddita/spss/base/idh_factsco.html). Accessed June. 18, 2019.
- Ito, J., Z. Bao, and Q. Su. 2012. Distributional effects of agricultural cooperatives in China: exclusion of smallholders and potential gains on participation. *Food. Policy.* 37: 700-709.
- Jack, B. K., C. Kousky, and K. R. E. Sims. 2008. Designing payments for ecosystem services: Lessons from previous experience with incentive-based mechanisms. *Proc. Natl. Acad. Sci. U.S.A.* 105: 9465-9470.
- Karl, B., A. Bilgiç, and Y. Çelik. 2006. Factors affecting farmers' decision to enter agricultural cooperatives using random utility model in the South Eastern Anatolian Region of Turkey. *J. Agri. Rural. Dev. Trop.* 107: 115-127.
- Lawless, G. and A. Reynolds. 2004. *Worker cooperatives: Case studies, key criteria & best practices.* UWCC Staff Paper No.3. Available: <https://staging.community-wealth.org/sites/clone.community-wealth.org/files/downloads/paper-lawless.pdf>. Accessed Mar. 20,

- 2019.
- Lenjiso, B. M., J. Smits, and R. Ruben 2016. Smallholder milk market participation, dietary diversity and nutritional status among young children in Ethiopia. *J. Gender Agri. Food. Secur.* 1: 129-147.
- Likert, R. 1932. A technique for the measurement of attitudes. *Arch Psychol.* 140:1-55.
- Ma, W. and A. Abdulai. 2016. Does cooperative membership improve household welfare? evidence from apple farmers in China. *Food Policy.* 58:94-102.
- Markelova, H., R. Meinzen-Dick, J. Hellin, and S. Dohrn. 2009. Collective action for smallholder market access. *Food Policy.* 34: 1-7.
- Mojo, D., C. Fischer, and T. Degefa. 2016. Collective action and aspirations: the impact of cooperatives on Ethiopian coffee farmers aspirations. *Ann. Public Coop. Econ.* 87: 217-238.
- Mojo, D., C. Fischer, and T. Degefa. 2017. The determinants and economic impacts of membership in coffee farmer cooperatives: Recent evidence from rural Ethiopia. *J. Rural Stud.* 50:84-94.
- Moktan, M. R., L. Norbu, and K. Choden. 2016. Can community forestry contribute to household income and sustainable forestry practices in rural area? A case study from Tshapey and Zariphensum in Bhutan. *Forest Policy Econ.* 62:149-157.
- Mphande, F. A. 2016. *Infectious Diseases and Rural Livelihood in Developing Countries.* Springer, NewYork.
- National Statistics Bureau. 2018. *Statistical Yearbook of Bhutan 2018.* RGoB, Thimphu, BT.
- Nugusse, W. Z., G. V. Huylenbroeck, and J. Buysse. 2013. Household food security through cooperatives in Northern Ethiopia. *Int. J. Coop. Stud.* 2: 34-44.
- Ortmann, G. F., and R.P. King. 2007. Agricultural cooperatives II: Can they facilitate access of small-scale farmers in South Africa to input and product markets? *Agrekon* 46: 219-244.
- Perman, R., Y. Ma, J. McGilvray, and M. Common. 2003. *Natural Resource and Environmental Economics.* 3<sup>rd</sup> Edition. Pearson Education, London, UK.
- Philip, K. 2003. *Co-Operatives in South Africa: Their Role in Job Creation and Poverty Reduction.* South African Foundation, Brighton, UK.
- Roy, D., and A. Thorat. 2008. Success in high value horticultural export markets for the small farmers: The case of Mahagrapes in India. *World Dev.* 36:1874-1890.
- Sonam, T., and N. Martwana. 2011. Smallholder dairy farmers' group development in Bhutan: strengthening rural communities through group mobilization. *Khon Kaen. Agri. J.* 39: 413-428.
- Tabachnick, B. G., L.S. Fidell, and S.J. Osterlind. 2001. *Using Multivariate Statistics.* 7<sup>th</sup> Edition. Pearson, New York.
- Tenzin, G., and K. Natsuda. 2016. Social capital, household income, and community development in Bhutan: A case study of a dairy cooperative. *Dev. Pract.* 26: 467-480.
- Tenzin, G., K. Otsuka, and K. Natsuda. 2015. Can social capital reduce poverty? A study of rural households in Eastern Bhutan. *Asian Econ. J.* 29: 243-264.
- Valentinov, V. 2007. Why are cooperatives important in agriculture? An organizational economics perspective. *J. Inst. Econ.* 3: 55-69.
- Wanyama, F., P. Develtere, and I. Pollet. 2008. Encountering the evidence: co-operatives and poverty reduction in Africa. *J. Coop. Stud.* 41: 16-27.
- Wiggins, S., J. Kirsten, and L. Llambi. 2010. The future of small farms. *World Dev.* 38:1341-1348.
- Wossen, T., T. Abdoulaye, A. Alene, M.G. Haile, S. Feleke, A. Olanrewaju, and V. Man-yong. 2017. Impacts of extension access and cooperative membership on technology adoption and household welfare. *J. Rural Stud.* 54:223-233.
- Zeuli, K., and J. Radel. 2005. Cooperatives as a community development strategy: Linking theory and practice. *J. Regional Anal. Policy.* 35: 43-54.
- Zeuli, K. A., and R. Cropp. 2004. *Cooperatives: Principles and Practices in the 21st Century.* University of Wisconsin, Wisconsin, WI.
- Zeweld, W., G. V. Huylenbroeck, and J. Buysse. 2015. Household food security through cooperative societies in Northern Ethiopia. *Int. J. Dev. Issues.* 14: 60-72.