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Linkages in modern distribution channels formation: the study of factors affecting mountainous agricultural products consumption in Vietnam

Abstract

Food distribution system in developing countries, for instance in Vietnam, has rapidly transformed towards modern supply channels with high quality products. We observe that producers of the agricultural products at mountainous areas face significant challenges in accessing to modern distribution channels. In such condition, linkages appear as a key factor for small scale farmers connecting to markets. In this regard, the purpose of our research is to study the factors affecting linkages in the formation of modern distribution channels in view of consumption of mountainous agricultural products in Vietnam and developing countries in general.

In our research model, we tested 6 elaborated hypotheses focused on the issue of linkage in modern distribution channel formation and introduced 26 observed variables. We conducted the survey at 8 out of 11 districts of the mountainous areas of Thanh Hoa province of Vietnam in 2018 with 215 small farmers being the respondents.

The results indicates that linkages in modern distribution channels formation for mountainous agricultural consumption has strongly affected by a range of significant groups of factors, namely: natural conditions of the mountainous area; characteristics of agricultural products in the mountainous area; support of firms; government policies aimed at the formation of linkages; constraints in agricultural production; barriers to enter modern distribution channels.

The results of the undertaken regression analysis imply the following. 1) The requirements of modern distribution channels (brand name, prices, professional collecting, etc.) are big barriers for farmers in mountainous areas who want to access the market, which explains the reason why small farmers are motivated to use linkages in order to enter the modern distribution system. In fact, most agricultural products at mountainous areas are in a raw form, without packaging, labelling, and traceability, while small-scale farmers do not have enough capacity to keep to such standards. 2) Typical local products of mountainous areas tend to be formed by the linkage. This comes from the fact that popular agricultural products that are common for traditional markets or products with low value have little impact on the formation of the linkage while high-value products tend to join the linkage to reach larger markets beyond mountainous areas. From this point of view, linkages in the formation of the modern distribution system are required for typical local products in mountainous areas. 3) The role of firms in building linkages is crucial. Firms play an important role in supplying products from mountainous areas to the market. Whether the linkage becomes a success or not, depends on the level of involvement of firms. 4) It is necessary to have a strong policy (both from the part of local authorities and the government) in order to encourage firms, households and other stakeholders to be involved in the creation of linkages in mountainous areas. Since the market power is largely considered within the agricultural market, the government policy becomes very important in terms of helping small farmers to become stronger players in the market and encouraging firms to participate in the formation of linkages.

Obtained results correlate with several studies on linkages in developing countries, which are also linked to comparable cases of mountainous areas. We, therefore, propose recommendations for developing countries related to the issue of linkages in the formation of the modern distribution system. We emphasize that it is required to select products to build linkage models, to implement strong policies to attract enterprises to join linkages in mountainous areas, to build linkage models to add values to mountainous agricultural products connected to the requirements of modern distribution channels and, finally, to improve the production scale of mountainous farmers by conducting a land reform in order to create conditions for the formation of linkages and increase market power of middlemen in agricultural markets in the developing countries.

Keywords: Agricultural Product; Modern Distribution System; Distribution Channels; Logistics; Linkages; Mountainous Areas; Farmers; Vietnam

JEL Classification: Q25; C61; D61

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Формування зв'язків у сучасних каналах збуту: вивчення факторів,

що впливають на споживання гірської сільськогосподарської продукції у В'єтнамі

Анотація. Система розподілу продуктів харчування в країнах, що розвиваються, наприклад у В'єтнамі, швидко трансформувалася в сучасні канали поставок високоякісних продуктів. Ми спостерігаємо, що виробники сільськогосподарської продукції в гірських районах стикаються з серйозними проблемами при доступі до сучасних каналів збуту. У таких умовах зв'язки (кооперація) є ключовим фактором для дрібних фермерів, що підключаються до ринків. У цьому контексті метою нашого дослідження є вивчення факторів, що впливають на зв'язки при формуванні сучасних каналів розподілу з урахуванням споживання гірської сільськогосподарської продукції у В'єтнамі і в країнах, що розвиваються, в цілому. У нашій дослідницькій моделі ми протестували 6 розроблених гіпотез, сфокусованих на проблемі існування внутрішніх взаємозв'язків (кооперації) при формуванні сучасного каналу розподілу, і ввели 26 досліджуваних змінних. Ми провели опитування в 8 з 11 гірських районів провінції Тханьхоа у В'єтнамі в 2018 році серед 215 дрібних фермерів.

Результати показують, що на зв'язки при формуванні сучасних каналів збуту гірської сільськогосподарської продукції істотний вплив має цілий ряд груп факторів, а саме: природні умови гірської

місцевості; характеристика сільськогосподарської продукції в гірській місцевості; підтримка фірм; державна політика, спрямована на формування зв'язків; обмеження в сільськогосподарському виробництві; бар'єри для входу в сучасні канали збуту.

Отримані результати корелюють з кількома дослідженнями зв'язків в каналах збуту в країнах, що розвиваються, які також пов'язані з порівнянними випадками гірських районів. Тому ми пропонуємо рекомендації для країн, що розвиваються, пов'язані з питанням створення зв'язків (кооперації) при формуванні сучасної системи розподілу. Ми підкреслюємо, що необхідно вибирати відповідні високоліквідні продукти для побудови моделей зв'язків, проводити ефективну політику залучення підприємств до створення зв'язків у гірських районах, створювати моделі кооперації для підвищення цінності гірської сільськогосподарської продукції в контексті виконання вимог сучасних каналів збуту, і, нарешті, підвищувати масштаби виробництва гірських фермерів шляхом проведення земельної реформи з метою створення умов для формування зв'язків і збільшення ринкової влади фермерів на сільськогосподарських ринках у країнах, що розвиваються.

Ключові слова: сільськогосподарська продукція; збут; сучасна система дистрибуції; канали розподілу; логістика; зв'язки; кооперація; гірські райони; фермери; В'єтнам.

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Формирование связей в современных каналах сбыта: изучение факторов, влияющих на потребление горной сельскохозяйственной продукции во Вьетнаме

Аннотация. Система распределения продуктов питания в развивающихся странах, например во Вьетнаме, быстро трансформировалась в современные каналы поставок высококачественных продуктов. Мы наблюдаем, что производители сельскохозяйственной продукции в горных районах сталкиваются с серьезными проблемами при доступе к современным каналам сбыта. В таких условиях связи (кооперация) являются ключевым фактором для мелких фермеров, подключающихся к рынкам. В связи с этим целью нашего исследования является изучение факторов, влияющих на связи в формировании современных каналов распределения с учетом потребления горной сельскохозяйственной продукции во Вьетнаме и в развивающихся странах в целом.

В нашей исследовательской модели мы протестировали 6 разработанных гипотез, сфокусированных на проблеме существования внутренних взаимосвязей (кооперации) при формировании современного канала распределения, и ввели 26 наблюдаемых переменных. Мы провели опрос в 8 из 11 горных районов провинции Тханьхоа во Вьетнаме в 2018 году среди 215 мелких фермеров.

Результаты показывают, что на связи при формировании современных каналов сбыта горной сельскохозяйственной продукции существенное влияние оказал целый ряд групп факторов, а именно: природные условия горной местности; характеристика сельскохозяйственной продукции в горной местности; поддержка фирм; государственная политика, направленная на формирование связей; ограничения в сельскохозяйственном производстве; барьеры для входа в современные каналы сбыта.

Полученные результаты коррелируют с несколькими исследованиями связей в каналах сбыта в развивающихся странах, которые также связаны с сопоставимыми случаями горных районов. Поэтому мы предлагаем рекомендации для развивающихся стран, связанные с вопросом создания связей (кооперации) при формировании современной системы распределения. Мы подчеркиваем, что необходимо выбирать подходящие высоколиквидные продукты для построения моделей связей, проводить эффективную политику по привлечению предприятий к объединению связей в горных районах, создавать модели кооперации для повышения ценности горной сельскохозяйственной продукции в контексте выполнения требований современных каналов сбыта, и, наконец, повышать масштабы производства горных фермеров путем проведения земельной реформы с целью создания условий для формирования связей и увеличения рыночной власти фермеров на сельскохозяйственных рынках в развивающихся странах.

Ключевые слова: сельскохозяйственная продукция; сбыт; современная система дистрибуции; каналы распределения; логистика; связи; кооперація; горные районы; фермеры; Вьетнам.

1. Introduction and Purpose

The food distribution system in developing countries, for instance in Vietnam, is in the process of transformation towards a modern distribution channel (Maruyama & Trung, 2007, 2010, 2012). The emergence of this modern channel offers many opportunities for farmers in delivering their agricultural products to cities and urban areas (Reardon, Timmer, Barrett, & Berdegue, 2003; Hernández, Reardon, & Berdegue, 2007; Reardon, Timmer, & Minten, 2012). Although the distribution system is strong and developed, and provides opportunities for producers of agricultural products, including small scale farmers in developing countries, consumption of the related products is still mainly by traditional distribution channels (Thanh, 2017). Significant challenges of small scale farmers helping the latter to access the modern distribution system can be seen as requirements regarding high quality products, professional collection and supply, in view of negotiations with enterprises (Aku, Mshenga, Afari-Sefa, & Ochieng, 2018).

Although mountainous areas provide indispensable goods including various kinds of special and high value agricultural products, small scale producers in such regions face many significant constraints (Yen, Visser, Hoanh, & Stroosnijder, 2013; Wehrli, 2014). For instance, among such constraints there are factors such as poor infrastructure, weak capacity to adding value of products and a small amount of land for cultivation. According to the General Statistics Office of Vietnam (GSO, 2018), among the total number of households using agricultural land, 36.1% were using under 0.2 ha per one household and only 2.3% were using 5.0 ha or more per household. Such difficulties result in constraints for small-scale farmers in their desire to deliver goods to the modern market of mountainous agricultural products. Under such conditions, the linkage between farmers and entrepreneurs or different types of cooperative formation can be seen as a crucial factor supporting small-scale farmers who want to access the modern market (Moustier, Tam, Anh, Binh, & Loc, 2010).

Thanh Hoa is a province in North Central Coast Vietnam. This is a relatively large province, which ranks fifth in area and as third in population among 63 central administrative subdivisions. This region has many potentials and strengths that need to be exploited in order to develop the country's socio-economic standing. In recent years, many products of the region have approached the market demand. However, the majority of products are mostly consumed via the traditional distribution channel. One of the reasons for such a situation is due to the limited linkage to the formation of the modern distribution channel in terms of mountainous agricultural product consumption. It is the fact that the linkage is small, and the related entities are concentrated only in some specific areas, which weakens the possibility of adding the product value in order to access modern markets.

Based on such observations, the formation of linkage in mountainous areas becomes a key factor to boost agricultural products through modern distribution channels.

The objective of this paper is to study the factors affecting linkages in the formation of modern distribution channels in view of consumption of mountainous agricultural products. Since there are many similarities between mountainous areas of Vietnam and other comparable cases related to significant problems which farmers face with regard to their adaptation to modern market conditions, therefore, the authors of this paper propose to research the model and policies relating to this issue with regard to developing countries in general.

2. Brief Literature Review

In developing countries, the issue of linkages in the trend of market-oriented reforms has been considered in several researches. For example, Kirsten Sartorius (2002) provide a theoretical review determining the topicality of related issues in developing countries. They argued that the key factors for the linkages to be successful include: strict demands for consistency, quality and food safety; a high rate of product rejection by agribusiness firms and traders; low capacity of bargaining position of farmers. Dannson et al. (2004) summarized linkages related to strengthening farm agribusiness in Africa with regard to countries such as Ghana, Nigeria, Kenya, Uganda, and South Africa, while Minot (2018) studied the issue of contract farming in developing countries focusing on patterns, impacts and policy implications.

If we look for the issue of linkage in specific cases of mountainous areas, we can learn from some comparable regions. Studying the development of mountain regions, Yen et al. (2013) addressed the general question of why mountains matter for sustainable development, while Wehrli (2014) emphasized on the constraints of the agricultural production in the Northern

upland of Vietnam. Both of these studies demonstrate the constraints of mountain regions in view of social and economic development in general and mountainous agricultural production in particular. Some other studies can be seen as those analyzing the changing food system and resilience, as in the case of the mountains of Northern Pakistan (Spices, 2018), or Malta Orange production in the mountains of the State of Uttarakhand (India). Those works study the mountain farmers' marketing challenges and links between farmers and entrepreneurs (Choudhary, Kunwar, & Rasul, 2015), including the case of the mountains of Northern Peru in view of markets, healers, vendors and collectors (Bussmann, & Sharon, 2009). Masakure and Henson (2005) analyzed the factors affecting the linkage formation for agricultural production in Zimbabwe. The authors focused on the characteristics of natural conditions, product characteristics, household head characteristics, and determined enterprises as factors affecting the development linkage in the consumption of agricultural products.

If we study the linkage in agricultural market related to the imperfect competition approach, there are several theoretical reviews. For instance, Nourse (1922) was one of the earliest authors who researched that issue. The study indicates that there is an imbalance in market power between farmers and agricultural production firms of agricultural intermediate consumption to the consumer market. Also, the author recommends that farmers work together as cooperatives to increase market power. Roger and Sexton (1994), Sexton and Lavoie (2001), McCorriston (2002), and Myers, Sexton and Tomek (2010) emphasize the existence of imperfect market competition in the agricultural market. From that observation, they analyze various aspects in order to improve farmers' market power to reach the market. The authors argue that fragmented production, insecure prices and competitive markets are the causes of limited market power of small-scale producers. As a consequence, linkages in agricultural production and consumption should appear as an important solution to improve market power and market access, including modern distribution channels.

In the case of Vietnam, Moustier et al. (2010) mentioned the role of cooperatives in promoting the consumption of agricultural products through distribution channels. Through cooperatives, farmers can access modern markets by adding the value products. Dung (2015) studied the factors affecting to the linking businesses and farmers. They showed that the efficiency of linkages depends on both factors from production households and enterprises.

We observe that the above researches analyze both theoretical and empirical about different aspects of linkages for small-scale farmers in developing countries in general, and for mountainous areas in particular. However, studies related to the formation of modern distribution channels for consumption mountainous agricultural products are still limited. This is the reason why this paper addresses the question of factors affecting linkages in the formation of modern distribution channels for the consumption of mountainous agricultural products.

3. Purpose

The paper aims at addressing the question of factors affecting linkages in the formation of modern distribution channels for the consumption of mountainous agricultural products in Vietnam. We propose the empirical model with six groups of factors having impacts on the linkage formation. At the same time, we make an international comparison by linking the obtained results with the theoretical review from the case of other comparable regions. This result gives us opportunities to propose a policy to form an approach towards implication of linkages in terms of modern distribution channels related to the consumption mountainous agricultural products in developing countries.

4. Data and methods

4.1. Research model

We have largely considered the factors affecting the linkage, which are mentioned in Kirsten and Kurt (2002), Key and Runsten (1999), Parasuraman, Zeithaml and Berry (1988), Masakure (2005), as well as Dung (2015). Based on such a theoretical framework, we have determined the following factors: (i) support of firms; (ii) government policy, (iii) constrains in agricultural production. One of the difference of this proposed model is that it is not only based on the context of mountainous region but also associated with barriers making it difficult to enter modern distribution channels. Based on such an observation, the research model is directly introduced basing on the factors of: natural conditions of mountainous areas, characteristics of agricultural products in

mountainous areas and a group of factors related to barriers which make it difficult to enter modern distribution channels. Based on such a consideration, the research model is constructed as presented in Figure 1.

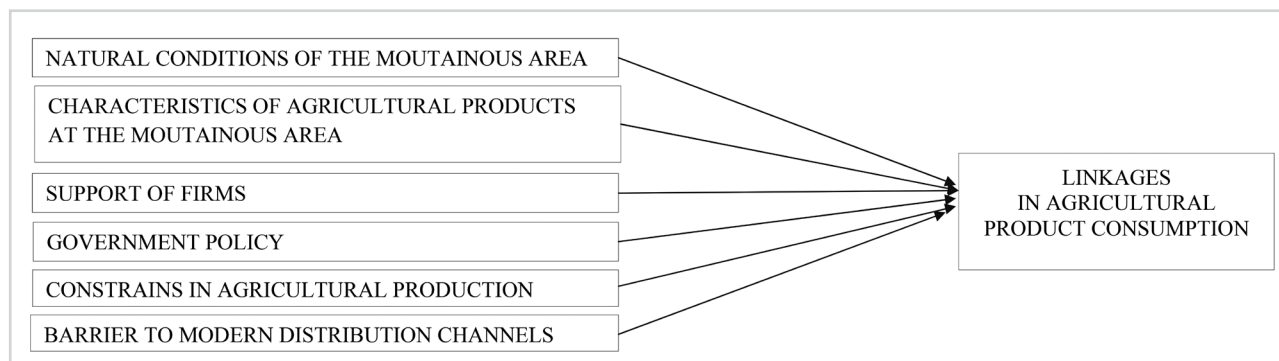


Figure 1:

Research model

Source: Compiled by authors based on theoretical frameworks in 4.1. and the context of Thanh Hoa province mountainous region

Under such a consideration of the model, we have set the following hypotheses:

Hypothesis	Content
H1	Characteristics of natural conditions in mountainous areas positively affect linkages in the formation of modern distribution channels in view of consumption of mountainous agricultural products.
H2	Characteristics of agricultural products in mountainous areas positively affect the linkages.
H3	Support of firms positively affects the linkages in the formation of modern distribution channels in view of consumption of mountainous agricultural products.
H4	Government policies positively affect the linkages in the formation of modern distribution channels in view of consumption of mountainous agricultural products.
H5	Constraints in agricultural production positively affect the linkages in the formation of modern distribution channels in view of consumption of mountainous agricultural products.
H6	Barriers to enter the modern distribution channel market positively affect the formation of modern distribution channels in view of consumption of mountainous agricultural products.

Based on such a consideration, the scale of factors of the research model is presented in Table 1.

4.2. Sampling Research

According to Hair, Black, Babin, Anderson and Tatham (2006), the general rule for the minimum sample size of the exploratory factor analysis, as well as of multivariate regression analysis, is five times as big as the observed variables number. In our research model, we introduce 26 observed variables. The authors determined the sample size to be 215 observers. We conducted the survey in 2018 at 8 out of 11 districts of the mountainous areas of Thanh Hoa province, with farmers being the respondents. To minimize possible errors and ensure that the research data are accurate, the authors placed 230 samples. The respondents were surveyed by the method of selecting favourable patterns adjusted according to their gender and age, thus ensuring objectivity and reliability.

The results of the statistical description of the characteristics of the model are reflected in Table 2.

We observe that the sample reflects factors such as gender, age, scale of production and training level in the mountainous area. For instance, it can be seen that most of the households in this area cultivate small land plots, i.e. smaller than 0.5 ha. Besides, only a small number of households already have the required technologies and knowledge in production.

5. Results and Discussions

5.1. Factor and reliability analysis

In this section, the exploratory factor analysis (EFA) is conducted to divide the influential group of variables (factors) out of 26 studied and then move to test for the reliability analysis.

Table 1:
Scale of factors of the research model

Factors	Denote
NATURAL CONDITIONS OF THE MOUNTAINOUS AREA	
The condition of the infrastructure of the mountainous area	A1
The weather of the mountainous area	A2
The feature of production land in the mountainous area	A3
CHARACTERISTICS OF AGRICULTURAL PRODUCTS IN THE MOUNTAINOUS AREA	
Special products linked with local condition	B1
Popular agricultural products	B2
The amount of products in each harvesting time	B3
Raw agricultural products which have no processing yet	B4
SUPPORT OF FIRMS	
Large scale firms	C1
Firm support input for farmers in production	C2
Firm support farmers in distribution productsq	C3
Firm willingness to share risks with farmers	C4
Firms having modern technology for agricultural production	C5
GOVERNMENT POLICIES AIMED AT THE FORMATION OF LINKAGES	
Policy for the development of linkages at mountainous areas	D1
Loan policy for agricultural production	D2
Policy for training and developing capacity for farmers	D3
Policy to reduce taxes for linkage firms	D4
CONSTRAINTS IN AGRICULTURAL PRODUCTION	
Natural disasters and epidemics in production	E1
High cost in input production	E2
Difficulties in accessing finances	E3
Low capacity in catching up modern technologies in agricultural production	E4
Small-scale production	E5
BARRIERS TO ENTER MODERN DISTRIBUTION CHANNELS	
The requirement of professional collection of the products	G1
The requirement of supplying of large amounts each time	G2
The requirement of brand names, packing or product origin information	G3
The requirement of supplying via contracts	G4
Limited market information	G5

Source: Compiled by the authors based on theoretical frameworks in 4.1. and the context of the Thanh Hoa province mountainous region

Table 2:
Descriptive statistics of the sampling

Targets	Frequency (person)	Percent (%)	Incremental (%)
Gender	Female	106	49.0
	Male	109	51.0
Age of the head of the household	From 20 to 25 years old	11	5.1
	From 25 to 30 years old	27	12.6
	From 30 to 40 years old	47	21.8
	Above 40 to 50 years	79	36.8
	Above 50 years old	51	23.7
Scale of production	Land scale < 0.2 ha	91	42.3
	From 2.2-0.5 ha	96	44.5
	>0.5 ha	28	13.02
Training level	Postgraduate	-	
	University	-	
	Intermediate	23	10.6
	Other	128	59.5

Source: Compiled by the authors based on the 2018 survey

Exploratory factor analysis. We observe that the result of Barlett’s test is $\text{Sig.} = 0.000 < 0.05$ and the auditing KMO test (Kaiser-Meyer-Olkin Measure of Sampling Adequacy) is $0.887 > 0.5$ (Table 3).

The Rotated Component Matrix shows that after analyzing factors using EFA, the variables are still divided into 6 groups; the variable groups are divided into factor groups following to the composition of the initial hypothesis as in the previous section. In Table 4, there are still variables which ensure the weight scale (> 0.50). Thus, the observed variations of these scales meet the requirements for the subsequent analysis. In other words, the EFA model is suitable with all scale factors, namely natural conditions of the mountainous area, characteristics of agricultural products in the mountainous area, support of firms, government policies aimed at the formation of linkages, constrains in agricultural production and barriers to enter modern distribution channels (Table 4).

Based on the results of the exploratory factor analysis, we can summary the group factors which are to be put in the next step of analysis at Table 5.

Reliability analysis. If we consider the factors which are in the result of EFA in the previous section, we now have to analyze the scale reliability of the variable group and give a detailed analysis of each factor group, providing synthetic results of measuring scale (Table 6).

Table 3:
KMO and Bartlett’s Test

Kaiser-Meyer-Olkin measure of sampling adequacy.		.887
Bartlett’s test of sphericity	Approx. Chi-Square	5331.773
	df	325
	Sig.	.000

Source: Compiled by the authors based on the EFA by SPSS. 20.0

Table 4:
Rotated Component Matrix^a

	Component					
	1	2	3	4	5	6
C3	.878					
C2	.852					
C1	.839					
C4	.837					
C5	.800					
E5		.874				
E4		.860				
E1		.849				
E2		.820				
E3		.734				
G4			.841			
G1			.804			
G2			.762			
G5			.761			
G3			.712			
B4				.861		
B1				.861		
B2				.813		
B3				.813		
D1					.863	
D3					.837	
D2					.834	
D4					.826	
A1						.853
A3						.838
A2						.802

Notes: Extraction Method: Principal Component Analysis.

Rotation Method: Varimax with Kaiser Normalization.

^a - Rotation converged in 6 iterations.

Source: Compiled by the authors based on the EFA by SPSS. 20.0

Table 5:
Factors and item after EFA

No	Factors	Item
1	Natural conditions of the mountainous area	A1, A2,A3
2	Characteristics of agricultural products in the mountainous area	B1, B2, B3, B4
3	Support of firms	C1, C2, C3, C4, C5
4	Government policies aimed at the formation of linkages	D1, D2, D3, D4
5	Constraints in agricultural production	E1, E2, E3, E4, E5
6	Barriers to enter modern distribution channels	G1, G2, G3, G4, G5

Source: Compiled by the authors based on the EFA by SPSS. 20.0

Table 6:
Summary results of measuring scale of the variables

Item	Corrected item-total correlation	Cronbach's alpha if item deleted
Scale related to the factor of natural conditions of mountainous area: Cronbach's Alpha = 0.919		
A1	.874	.852
A2	.757	.910
A3	.884	.846
Scale related to the factor of characteristics of agricultural products in the mountainous area: Cronbach's Alpha = 0.928		
B1	.848	.902
B2	.825	.910
B3	.814	.914
B4	.850	.901
Scale related to support of firms: Cronbach's Alpha =0.972		
C1	.918	.966
C2	.939	.962
C3	.923	.965
C4	.923	.965
C5	.893	.970
Scale related to the factor of government policies aimed at the formation of linkages: Cronbach's Alpha =0.869		
D1	.731	.830
D2	.704	.839
D3	.721	.832
D4	.733	.828
Scale related to the factor of Constraints in agricultural production: Cronbach's Alpha =0.928		
E1	.846	.906
E2	.819	.911
E3	.719	.927
E4	.857	.903
E5	.823	.910
Scale related to the factor of barriers to enter modern distribution channel: Cronbach's Alpha= 0.921		
G1	0.815	0.899
G2	0.777	0.907
G3	0.76	0.91
G4	0.819	0.898
G5	0.808	0.901
Scale related to the linkage in the formation of modern distribution channels: Cronbach's Alpha= 0.683		
DGC1	.472	.677
DGC2	.630	.628
DGC3	.413	.631

Source: Compiled by the authors based on summary results from the reliability analysis by SPSS 20.0

Based on the results of the EFA and the Cronbach's Alpha reliability test, there are 29 variables, including dependent variables with 3 items, namely DGC1, DGC2, DGC3, which are presented in the factor analysis.

Correlation analysis. In order to move to the correlation analysis, we set a model with the variables based on the results of the EFA and the reliability analysis. The model is defined as follows:

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + U_i, \quad (1)$$

where:

Dependent variable Y : Linkages in agricultural product consumption;

Independent variable Y_i :

X_1 : Natural conditions of the mountainous area;

X_2 : Characteristics of agricultural products in the mountainous area;

X_3 : Support of firms;

X_4 : Government policies aimed at the formation of linkages;

X_5 : Constraints in agricultural production;

X_6 : Barriers to enter modern distribution channels.

The results of the correlation analysis are presented in Table 7. The correlation analysis shows that, the independent variable is correlated with the dependent variable. Also, it proves that there is no correlation between independent variables in the model.

Regression analysis and explanation of the results

After evaluating the level of measurement and scale, the authors created a regression analysis model to assess the level of impact factors to the linkage in agricultural product consumption through modern distribution channels. The results of the regression analysis are presented in Tables 8, 9 and 10.

Table 7:
Correlations

Correlations		Y	X1	X2	X3	X4	X5	X6
Y	Pearson Correlation	1	0.623***	0.558***	0.659***	0.544***	0.278***	0.629***
	Sig. (2-tailed)	.	0	0	0	0	0	0
	N	215	215	215	215	215	215	215
X ₁	Pearson Correlation	0.623***	1	0.517***	0.64***	0.479***	0.123**	0.539***
	Sig. (2-tailed)	0	.	0	0	0	0.039	0
	N	215	215	215	215	215	215	215
X ₂	Pearson Correlation	0.558***	0.517***	1	0.482***	0.400***	0.151**	0.39***
	Sig. (2-tailed)	0	0	.	0	0	0.015	0
	N	215	215	215	215	215	215	215
X ₃	Pearson Correlation	0.659***	0.640***	0.482***	1	0.514***	0.178***	0.497***
	Sig. (2-tailed)	0	0	0	.	0	0.005	0
	N	215	215	215	215	215	215	215
X ₄	Pearson Correlation	0.544***	0.479***	0.400***	0.514***	1	0.200***	0.467***
	Sig. (2-tailed)	0	0	0	0	.	0.002	0
	N	215	215	215	215	215	215	215
X ₅	Pearson Correlation	0.278***	0.123**	0.151**	0.178***	0.2***	1	0.204***
	Sig. (2-tailed)	0	0.039	0.015	0.005	0.002	.	0.002
	N	215	215	215	215	215	215	215
X ₆	Pearson Correlation	0.629***	0.539***	0.39***	0.497***	0.467***	0.204***	1
	Sig. (2-tailed)	0	0	0	0	0	0.002	.
	N	215	215	215	215	215	215	215

Source: Compiled by the authors based on the results of the correlation analysis by SPSS. 20.0

Table 8:
Model Summary^a

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.795 ^b	.632	.621	.35779	.632	56.868	6	199	.000

Notes: ^a - Dependent Variable Y .

^b - Predictors: (Constant), X_6 , X_5 , X_2 , X_4 , X_3 , X_1 .

Source: Compiled by the authors based on the results of the correlation analysis by SPSS. 20.0

Table 9:
ANOVA^a

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	43.680	6	7.280	56.868	.000 ^b
	Residual	25.475	199	.128		
	Total	69.155	205			

Notes: ^a - Dependent Variable *Y*.

^b - Predictors: (Constant), X_5 , X_2 , X_4 , X_3 , X_1 .

Source: Compiled by the authors based on the results of the regression analysis by SPSS. 20.0

Table 10:
Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
1	(Constant)	.809	.190		4.251	.000
	X_1	.107	.047	.142	2.284	.023
	X_2	.152	.042	.188	3.594	.000
	X_3	.213	.049	.263	4.340	.000
	X_4	.081	.037	.117	2.191	.030
	X_5	.077	.032	.107	2.404	.017
	X_6	.162	.032	.272	5.002	.000

Note: ^a - Dependent Variable *Y*.

Source: Compiled by the authors based on the results of the Regression analysis by SPSS. 20.0

The results of the regression analysis show that the *R* Square coefficient of the model reached 0.632 and the adjusted *R* Square reached 0.621. This result implies that it has percentage of 63.2 affecting the development of linkages factors in the model.

Based on the regression analysis, we obtain the following model:

$$Y = 0.809 + 0.107X_1 + 0.152X_2 + 0.213X_3 + 0.081X_4 + 0.077X_5 + 0.162X_6 + U_i$$

The results of regression analysis model indicate that all the factors have influenced to the formation of the linkage. To be more precise, the influential degree of each factor group is expressed as follows. The most affected factors are: X_3 ($\beta = 0.213$), X_6 ($\beta = 0.162$) and X_2 ($\beta = 0.152$). These groups are «Support of firms» (X_3), «Barriers to enter modern distribution channels» (X_6) and «Characteristics of agricultural products in the mountainous area» (X_2). The next variable groups impacting factors are: X_2 ($\beta = 0.310$) and X_5 ($\beta = 0.302$). These are «Constraints in agricultural production» and «Government policies aimed at the formation of linkages». Finally, the factor of «Natural conditions of the mountainous area» has the least impact on the formation of linkages. The results of the regression analysis imply the following:

- 1) The requirements of modern distribution channels (brand name, prices, professional collecting, etc.) are big barriers for farmers in mountainous areas who want to access the market, which explains the reason why small farmers are motivated to use linkages in order to enter the modern distribution system. In fact, most agricultural products at mountainous areas are in a raw form, without packaging, labelling, and traceability, while small-scale farmers do not have enough capacity to keep to such standards. The above reason motivates farmers to join the linkage to improve the value of products connecting the market, especially the modern distribution channel market with strict requirements on quality and product design. Such results correspond to the study by Moustier et al. (2010) who emphasize that cooperatives are a key factor to support small farmers who want to access supermarkets with quality food in Vietnam. The results obtained in our research make sense in view of the theoretical review by Kirsten and Kurt (2002) regarding the role of contract farming for small-scale farmers in developing countries in terms of the changes in food and agricultural markets. The authors of the abovementioned research argue that strict demands for consistency, quality, food safety and due diligence, as well as weak bargaining position of farmers, are key factors for the success of linkages. In fact, those factors become a barrier for small-scale agricultural producers when

they want to take the advantage of modern distribution channels. Obviously, the results obtained by the authors of the present research are in line with both of the above studies which emphasize that the appearance of linkages is a crucial factor for small-scale farmers to access modern distribution channels.

- 2) Typical local products of mountainous areas tend to be formed by the linkage. This comes from the fact that popular agricultural products that are common for traditional markets (local markets) or products with low value (vegetables, fruits, ordinary foods) have little impact on the formation of the linkage while high-value products tend to join the linkage to reach larger markets beyond mountainous areas. From this point of view, linkages in the formation of the modern distribution system are required for typical local products in mountainous areas. We have observed that the researchers study consumption of products in mountainous areas, yet they do not focus their attention on farmers' motivation in view of the formation of linkages. For instance, in the case of the Tyrolean mountains Wymann von Dach, Romeo, Vita, Wurzinger and Kohler (2013) present an experience when cooperation between farmers and supermarkets is a good way for organic mountain products to be successfully marketed. Another case is the Malta Orange product of the mountainous state of Uttarakhand in India (Choudhary et al., 2015). In this case, the Malta Orange accessed the market by strengthening its value chain through community-based development. Based on the two cases above, we can state that the consumption in mountainous areas is based on cooperative or value chain. However, the motivation related to the formation of linkages has not yet been discussed.
- 3) The role of firms in building linkages is crucial. Firms play an important role in supplying products from mountainous areas to the market. Whether the linkage becomes a success or not, depends on the level of involvement of firms. This is a logical result in several analyzed studies which shows that sharing of a firm (risk sharing, input and technical support, purchasing of products, etc.) is an important factor determining the success of related linkages in developing countries (Kirsten & Kurt, 2002; Masakure, 2005; Dung, 2015).
- 4) It is important to implement policies aimed at the formation of linkages. It is necessary to have a strong policy (both from the part of local authorities and the government) in order to encourage firms, households and other stakeholders to be involved in the creation of linkages in mountainous areas. Since the market power is largely considered within the agricultural market (Roger, & Sexton, 1994; Sexton & Lavoie, 2001; McCorrison, 2002; Myers et al., 2010), the government policy becomes very important on terms of helping small farmers to become stronger players in the market and encouraging firms to participate in the formation of linkages.

6. Policy Implications

6.1. Selecting typical local agricultural products to build linkage models

The obtained results show that local, potential, and high-value products are most typical when we imply the formation of linkages in order to access modern distribution channels. In fact, mountainous regions offer natural conditions to produce many different agricultural products. However, the scale of production and the value of the products are not at the same level. Based on such consideration, the governments at all levels should select groups of typical mountainous products in harmony with the developed planning strategy, production investment, marketing, and with regard to the established linkage between farmers and enterprises (cooperatives) to support small-scale farmers in their desire to access the market. The selected products should help to realize the potential of the market.

6.2. Implementing policies to attract enterprises to join the linkage

The results also show that enterprises have a great impact on linkages formation, playing a key role in forming and developing linkages in the production and consumption of agricultural products in mountainous areas. However, the mountainous areas may bring many constraints to firms engaged in the formation of linkages, for instance a poor condition of mountainous infrastructure or high risks in agricultural production. From that point of view, to attract businesses to mountainous areas, the government should have strong policies, including credit-related policies, tax support policies, or other related policies to attract businesses to the formation of linkages.

6.3. Building linkage models toward adding values for mountainous agricultural products connected to the requirement of modern distribution channels

The obtained results show that barriers to entering modern markets motivate farmers to use the linkage. This implies that small-scale farmers are interested in linkages to access the market. In view of the changing of the food market toward the modern distribution system, small-scale farmers are aware of the difficulties in accessing modern markets related to adding value to products, building brands, preservation and processing, which are the activities that small-scale farmers find difficult perform by themselves. Therefore, there should be a linkage model toward supporting farmers in marketing strategy and adding value to mountainous agricultural products in order to access modern distribution channels.

6.4. Improving the production scale of mountainous farmers by land reform policy

Production in mountainous areas is characterized as small-scale production. Also, difficulties related to agricultural may arise due to limited harvested quantity for each supply time. In this situation, a land reform can be an important solution to the problem of how to improve productivity. This tool, in turn, creates convenient conditions for middlemen in agricultural market to be involved in the formation of linkages, which will help the latter to increase their market power. The proposed policy of land reform under such conditions can be based on the theoretical model of the land reform policy in traditional food distribution in Vietnam proposed by Thanh (2018).

7. Conclusion

Consumption of mountainous agricultural products in developing countries faces many significant challenges in terms of accessing modern distribution channel markets. Despite the fact that mountainous regions have a variety of potential high-value local product, agricultural products in such regions are mainly consumed via traditional distribution system due to the requirements relating to modern channels including high quality of products and brand names, professional collection and transportation, preservations, contract negotiating, etc. Under such conditions, linkages in the formation of modern distribution channels become an important solution in order to support farmers accessing the modern distribution system.

We have analyzed the factors affecting linkages in the formation of the modern system of distribution in terms of consumption of agricultural products in mountainous areas. The obtained results show that barriers to enter modern distribution channels, characteristics of agricultural products in the mountainous area, support of firms, government policies aimed at the formation of linkages and constraints in agricultural production are key factors affecting to the linkage formation. These results correlate with several studies on linkages in developing countries, which are also linked to comparable cases of mountainous areas. We, therefore, propose recommendations for developing countries related to the issue of linkages in the formation of the modern distribution system. We emphasize that it is required to select products to build linkage models, to implement strong policies to attract enterprises to join linkages in mountainous areas, to build linkage models to add values to mountainous agricultural products connected to the requirements of modern distribution channels and, finally, to improve the production scale of mountainous farmers by conducting a land reform in order to create conditions for the formation of linkages and increase market power of middlemen in agricultural markets in developing countries.

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