

Economical Communication and Finance for Evolving Farmer Producer Organizations (FPOs): The Hope & Inevitability for a Prosperous Rural Odisha

ABSTRACT

Farmer producer organizations (FPOs) help reduce risk, improve new corridors for entrepreneurship, and a new institutional expanse for redefining the value of agriculture for the 21st century. This organization has got the ability to usher a perennial impact on the farm community essential for their evolutionary growth. Economical communication of FPO members has been the driving force for further institutional growth and expansion both by time and space. This study aimed to estimate the inter and intra-level of interaction between sets of predicted variable, economical communication, and predictor variables (x_1-x_{24}) and to generate policy at the micro-level. The research design selected for the study was *ex post facto* design. One hundred (100) respondents were selected from two FPOs, fifty (50) from each FPO of Ranpur block of Nayagarh district of Odisha to conduct the study following the snowball sampling method. The correlation coefficients found that mean family education has been showcasing higher economical communication. Regression results implied that 24 causal variables together have contributed 66.70 percent of the variance in the consequent variable, economical communication (y). The results of path analysis revealed that the variable size of holding has got the highest indirect effect on economical communication. This empirical study has got tremendous policy implications for Odisha and anywhere in India as well.

Keywords: Economical communication, Farmer Producer Organization (FPO), institutional innovation, marketed surplus, size of holding

1. INTRODUCTION

Farmers in India are reeling under the stress of market and livelihood uncertainty and that is why their income and motivation are so fragile and volatile as well. They have been over decades in need of a kinship organization which would be institutional support for providing assured income, secured livelihood, and a friendly enterprise ecosystem. To make this a reality, FPOs are redefining and renewing agriculture's commercial dent through public-private partnerships, entrepreneurial ideas, business tactics, branding, and socialization. Economical communication lays the foundation for entrepreneurship and marketability, branding, and managing customer behavior. This goes truly incredible and inevitable while an FPO is perfectly set for attaining the status of (FPC).

It has been found that the perception of the registration process, company status, and benefits of transformation from FPO to FPC is still not clear, complete, and convincing. To make farmers strong and confident, they need to be properly directed into the process of entrepreneurial and economic communication through exposure visits, training, capacity building, motivation, and performance exercises.

Economic communication and finance play a critical role in the development of evolving farmer producer organizations (FPOs). FPOs are formed by smallholder farmers to enhance their bargaining power in the market by aggregating their produce and achieving economies of scale. The success of FPOs depends on the ability to access credit, manage finances, and communicate effectively with buyers and other stakeholders. In this discussion, we will explore the significance of economic communication and finance

in FPOs and compare it with sociodemographic studies in agricultural, rural, and indigenous areas of Latin America (Camacho et al. 2018; Montenegro et al. 2021a; 2021b).

Economic communication involves the exchange of information related to economic activities, such as production, marketing, and sales, between different stakeholders, including farmers, buyers, and government agencies. Effective economic communication enables FPOs to make informed decisions about pricing, marketing, and investment, which ultimately enhances their profitability. However, FPOs often lack the necessary skills and resources to engage in effective economic communication, which results in suboptimal market outcomes.

Finance is another critical aspect of FPOs' success. Smallholder farmers often lack access to formal financial services, making it challenging for them to invest in their farms and upgrade their production systems (Olivares et al. 2015; Olivares et al. 2016). FPOs can play a crucial role in providing access to credit and managing financial resources effectively. However, FPOs also face challenges in accessing finance due to limited collateral, insufficient credit history, and lack of financial literacy.

Sociodemographic studies in agricultural, rural, and indigenous areas of Latin America have highlighted the challenges faced by smallholder farmers in accessing credit and managing finances effectively (Olivares, 2012). These studies have identified factors such as limited education, inadequate infrastructure, and cultural barriers that hinder farmers' access to formal financial services (Olivares and Franco, 2015). Moreover, these studies have also highlighted the importance of social networks and community-based financial institutions in providing informal credit to farmers (Orlando 2014a; 2014b; Pitti et al. 2021).

Farmer organizations are inclusive of the poor and are charged to become a market outlet for smallholder farmers (Tolno et al. 2015). FPOs consist of a collaborative network structure which has resulted in various innovative practices that are benefiting the stakeholders (Bikina et al., 2018). Institutional credit, informed and better decisions, access to better and improved inputs, effectiveness & efficiency in farming operations, and better marketing facilities are provided through the FPOs which leads to an increase in the income of farmers. (Sharma et.al., 2019) Information and awareness initiatives among the farmers are also responsible for farmers' participation and empowerment in FPOs. (Gurung and Choubey, 2022) To be commercially viable and competitive, many producer groups work to increase their members' access to agricultural technologies, extension information, and knowledge of risk-reduction and productivity-enhancing management techniques such as handling and storing grain after harvest. (Shiferaw et.al., 2011)

For better marketing opportunities, the utility of e-commerce platforms for a variety of agricultural activities such as bulk trading of produce, purchasing inputs, accessing market information, or crop management procedures is significant for FPO members. (Pendyala et.al., 2022) Expenditure and Communication Access have a significant impact on customer buying behavior and seller performance in the ambit of the retail chain in marketing. (Banik & Acharya, 2020) Input and credit delivery mechanisms are significant for the social ecology of entrepreneurial communication (Roy and Acharya, 2021). Trust and communication contributed to promoting paddy farmers' farm performance, especially profit, sales, cash flow growth, and developing long-term business relationships. (Iris et.al., 2021) FPO provided price-related information and the farmers perceived that FPO provides service-related factors to the farmers. (Gokul et.al., 2019) Farmers can benefit from playing an active role in the market economy if farmer organizations are strong and vibrant. (Millie et al. 2006) With this background, the study aimed to estimate the inter and intra-level of interaction between sets of predicted variable, economical communication and predictor variables (x_1 - x_{24}).

2. MATERIALS AND METHODS

2.1 Sampling Design

The present study was conducted in 2 farmer producer organizations (FPOs) from Ranpur block of Nayagarh district of Odisha. Purposive sampling methods were used to select the State, District, Block, and Villages. Hundred (100) respondents in total were selected from two FPOs, fifty (50) from each FPO to conduct the study following snowball sampling method.

2.2 Pilot Study

With the assistance of the research supervisor, a comprehensive list of responses was created. Before beginning this study, an informal conversation with several farmers, local authorities, livelihood mission officials and extension workers was held. The data were collected through a pilot survey and structured interview schedule.

2.3 Selection of variables and statistical tools

Appropriate operationalization and measurement of the variables have helped the researcher to land upon the accurate conclusions. Therefore, the selected variables for this study had been operationalized and measured in the following manner:

I) Independent variables II) Dependent variables. Independent variables selected for the study were age (x_1), education (x_2), no. of enterprise (x_3), year of enterprise (x_4), training exposure (x_5), family size (x_6), mean family education (x_7), material possessed (x_8), size of holding (x_9), size of homestead land (x_{10}), size of cultivated land (x_{11}), size of land under irrigation (x_{12}), no. of fragments (x_{13}), crop yield (x_{14}), livestock yield (x_{15}), cropping intensity (x_{16}), income (x_{17}), family expenditure (x_{18}), marketable surplus (x_{19}), marketed surplus (x_{20}), family labour (x_{21}), no. of male workers (x_{22}) no. of female workers (x_{23}) and dependency ratio (x_{24}).

Dependent variable selected for the study was Economical Communication (y).

Appropriate statistical tools have been used to carry out the study viz, Correlation coefficient, Multiple regression analysis, Step wise regression analysis and Path analysis with the help of IBM SPSS v26.0.

2.4 Pre-testing of interview schedule

In order to correct or remove any irregularities from the interview schedule, the pretesting of the schedule was carried out. Pre-testing is also undertaken to see if the prepared questionnaire is able to get the respondents to give honest and accurate responses. The respondents who are being questioned following the pre-test are excluded from the final sample.

2.5 Method of Data Collection

Personal interview of the respondents was performed. The medium of language was Odia which facilitated the data collection process in the state of Odisha. The ongoing investigation and work schedule were hampered by the COVID-19 outbreak in India. Despite this, the researcher made every effort to have this study a success.

3. RESULTS AND DISCUSSION

The subjective information is measured utilizing explicit numerical methodology. Then data analysis i.e. Co-efficient of correlation, multiple regression analysis, stepwise regression analysis and path analysis has been done to evaluate the information.

Table-1: Coefficient of Correlation (r): Economical Communication (y) Vs. 24 Independent Variables (x₁-x₂₄)

Sl. No.	Independent Variables	'r' Value	Remarks
1	Age (x ₁)	-0.109	
2	Education (x ₂)	0.004	
3	Number of enterprise (x ₃)	0.219	*
4	Year of enterprise (x ₄)	0.249	*
5	Training exposure (x ₅)	0.143	
6	Family size (x ₆)	0.023	
7	Mean family education (x ₇)	0.329	**
8	Materials possessed (x ₈)	0.288	**
9	Size of holding (x ₉)	0.255	*
10	Size of homestead land (x ₁₀)	0.051	
11	Size of cultivated land (x ₁₁)	0.282	**
12	Size of land under irrigation (x ₁₂)	0.325	**
13	Number of fragments (x ₁₃)	0.541	**
14	Crop yield (x ₁₄)	0.336	**
15	Livestock yield (x ₁₅)	0.198	*
16	Cropping intensity (x ₁₆)	-0.130	
17	Income (x ₁₇)	0.235	*
18	Family expenditure (x ₁₈)	0.097	
19	Marketable surplus (x ₁₉)	-0.336	**
20	Marketed surplus (x ₂₀)	-0.272	**
21	Family labour (x ₂₁)	0.087	
22	No of male workers (x ₂₂)	0.594	**
23	No of female workers (x ₂₃)	0.399	**
24	Dependency ratio (x ₂₄)	0.092	

**Correlation is significant at the 0.01 level

*Correlation is significant at the 0.05 level

3.1 Coefficient of Correlation (r): Economical Communication (y) Vs. 24 Independent Variables (x₁-x₂₄)

Table-1 presents the coefficient of correlation between Economical Communication (y) and 24 independent variables. It has been found that the following variables viz. marketable surplus (x₁₉) and marketed surplus (x₂₀) of FPO members are having negative but significant correlation with the

dependent variable. The variables number of enterprise (x_3), year of enterprise (x_4), mean family education (x_7), materials possessed (x_8), size of holding (x_9), size of cultivated land (x_{11}), size of land under irrigation (x_{12}), number of fragments (x_{13}), crop yield (x_{14}), livestock yield (x_{15}), income (x_{17}), no. of male workers (x_{22}) and no. of female workers (x_{23}) have recorded positive significant correlation with the dependent variable. The correlation coefficients reveal that respondents having higher mean family education (x_7) have exhibited a stronger association with the consequent variable, economical communication. It might be due to the fact that educated respondents play a pro-active role while contributing towards economical communication. The respondents having more no. of enterprises (x_3), having more experience in the year of enterprises (x_4) and more no. of materials possessed (x_8) have also shown a significant relationship with economical communication. The size of holding (x_9), size of cultivable land (x_{11}), and land under irrigation (x_{12}) have also come up as significant variables with economical communication. It shows that the more the area of land owned by the farmers, the more will be an inclination towards involving in economical communication. It has also been revealed that the fragmentation of land plays a significant role in economical communication. The more the number of fragments of land, the more will be diverse information accessed by the farmer respondents. It has also been evinced that crop yield (x_{14}), livestock yield (x_{15}) along with income (x_{17}) exhibited a strong association with the consequent variable, economical communication. Also, the independent variables marketable surplus (x_{19}), marketed surplus (x_{20}), no. of male workers (x_{22}) and no. of female workers (x_{23}) have been intrigued with the consequent variable. These have correlated with the access and utilization of various sources of economical information by the FPO members. Similar studies have found that mean family education has significant relationship with economical communication. (Roy & Acharya, 2021)

Table-2 :Multiple Regression Analysis: Economical Communication (y) vs. 24 Causal Variables (x_1 - x_{24})

Sl. No.	Variables	Reg. Coef. B	S.E. B	Beta	t Value
1	Age (x_1)	0.069	0.121	0.069	0.568
2	Education (x_2)	-0.164	0.123	-0.164	-1.330
3	Number of enterprise (x_3)	0.100	0.130	0.100	0.764
4	Year of enterprise (x_4)	-0.003	0.092	-0.003	-0.035
5	Training exposure (x_5)	0.097	0.126	0.097	0.772
6	Family size (x_6)	0.037	0.104	0.037	0.356
7	Mean family education (x_7)	0.151	0.085	0.151	1.774
8	Materials possessed (x_8)	0.221	0.097	0.221	2.286
9	Size of holding (x_9)	-0.839	0.532	-0.839	-1.575

10	Size of homestead land (x_{10})	0.082	0.068	0.082	1.204
11	Size of cultivated land (x_{11})	0.829	0.553	0.829	1.500
12	Size of land under irrigation (x_{12})	0.083	0.112	0.083	0.747
13	Number of fragments (x_{13})	0.246	0.095	0.246	2.588
14	Crop yield (x_{14})	0.204	0.085	0.204	2.392
15	Livestock yield (x_{15})	0.063	0.069	0.063	0.913
16	Cropping intensity (x_{16})	0.029	0.077	0.029	0.380
17	Income (x_{17})	-0.037	0.075	-0.037	-0.491
18	Family expenditure (x_{18})	-0.055	0.076	-0.055	-0.720
19	Marketable surplus (x_{19})	-0.113	0.083	-0.113	-1.372
20	Marketed surplus (x_{20})	-0.185	0.092	-0.185	-2.009
21	Family labour (x_{21})	-0.069	0.089	-0.069	-0.776
22	No of male workers (x_{22})	0.410	0.095	0.410	4.328
23	No of female workers (x_{23})	0.041	0.083	0.041	0.495
24	Dependency ratio (x_{24})	-0.077	0.070	-0.077	-1.090

R square: 72.50% ; The standard error of the estimate: 0.603

3.2 Multiple Regression Analysis: Economical Communication (y) vs. 24 Causal Variables (x_1 - x_{24})

Table-2 presents the full model of regression analysis between exogenous variable Economical Communication (y) vs. 24 causal variables. It was found that 24 causal variables together contributed 72.50 percent of variance in consequent variable Economical Communication (y). It was found that the size of cultivated land (x_{11}) has exerted the highest direct effect on Economical Communication (y). It means that those who were having highest size of land in possessions, they were accessing more economical information. So, big farmers can access fresh and effective economical information from all the possible sources whereas poor farmers are lagging behind.

Table-3 : Stepwise Regression Analysis: Economical Communication (y) Vs. 24 Causal Variables (x_1 - x_{24})

Sl. No	Variables	Reg.coef. B	S.E. B	Beta	t value
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1	No of male workers (x_{22})	0.489	0.074	0.489	6.574
2	Materials possessed (x_8)	0.243	0.068	0.243	3.571
3	Crop yield (x_{14})	0.206	0.064	0.206	3.216
4	Number of fragments (x_{13})	0.237	0.072	0.237	3.307
5	Marketed surplus (x_{20})	-0.200	0.062	-0.200	-3.235
6	Mean family education (x_7)	0.165	0.063	0.165	2.626

R square: 66.70% ; The standard error of the estimate: 0.596

3.3 Stepwise Regression Analysis: Economical Communication (y) Vs. 24 Causal Variables (x_1 - x_{24})

Table-3 represents step-down regression analysis. In stepwise regression analysis, it was discernible that the variables no. of male workers (x_{22}), number of fragments (x_{13}), materials possessed (x_8), marketed surplus (x_{20}), crop yield (x_{14}) and mean family education (x_7) were retained at the last step. It implies that fragmentation is not just physical disintegration of land masses. The socio-ecological behavior of farmers due to fragmentation of land has had a more psychic effect due to the stress associated with utilization of more labour, resources and time. Fragmentation leads to cost and energy prodigal nature of farmers. This also leads to the need of improvising economical communication of the FPO members. Also, mean family education came up as an important variable which implies that educated farmers are more involved towards economical communication. The r^2 value being 66.70%, these 6 variables have together contributed to 92 % of 72.50 % total variance of explicated variables to vindicate their distinctive contribution in characterising economical Communication. Similar studies have found that marketed surplus has significant relationship with economical communication. (Roy & Acharya, 2021)

Table-4 : Path Analysis: Decomposition of Total Effect into Direct, Indirect and Residual Effect: Economical Communication (y) Vs. 24 exogenous variables (x_1 - x_{24})

Sl. No	Variables	Total Effect	Direct Effect	Indirect Effect	Highest Indirect Effect
1	Age (x_1)	-0.109	0.069	-0.178	0.108 (x_2)
2	Education (x_2)	0.004	-0.161	0.165	-0.108 (x_9)
3	Number of enterprise (x_3)	0.219	0.100	0.119	0.132 (x_8)
4	Year of enterprise (x_4)	0.249	-0.004	0.253	0.357 (x_{11})
5	Training exposure (x_5)	0.143	0.095	0.048	-0.228 (x_9)

6	Family size (x_6)	0.023	0.035	-0.012	-0.118 (x2)
7	Mean family education (x_7)	0.329	0.150	0.179	0.081 (x22)
8	Materials possessed (x_8)	0.288	0.220	0.068	-0.092 (x9)
9	Size of holding (x_9)	0.255	-0.818	1.073	0.803 (x11)
10	Size of homestead land (x_{10})	0.051	0.082	-0.031	0.058 (x11)
11	Size of cultivated land (x_{11})	0.282	0.809	-0.527	-0.812 (x9)
12	Size of land under irrigation (x_{12})	0.325	0.083	0.242	0.631 (x11)
13	Number of fragments (x_{13})	0.541	0.246	0.295	-0.361 (x9)
14	Crop yield (x_{14})	0.336	0.203	0.133	-0.079 (x9)
15	Livestock yield (x_{15})	0.198	0.063	0.135	0.147 (x11)
16	Cropping intensity (x_{16})	-0.130	0.029	-0.159	-0.169 (x11)
17	Income (x_{17})	0.235	-0.036	0.271	0.088 (x14)
18	Family expenditure (x_{18})	0.097	-0.054	0.151	-0.171 (x9)
19	Marketable surplus (x_{19})	-0.336	-0.114	-0.222	-0.095 (x9)
20	Marketed surplus (x_{20})	-0.272	-0.185	-0.087	-0.172 (x9)
21	Family labour (x_{21})	0.087	-0.067	0.154	-0.137 (x9)
22	No of male workers (x_{22})	0.594	0.411	0.183	0.229 (x11)
23	No of female workers (x_{23})	0.399	0.041	0.358	0.3 (x11)
24	Dependency ratio (x_{24})	0.092	-0.077	0.169	0.081 (x11)

Residual effect: 0.277 ; Highest Indirect Individual effect: x_9 (10)

3.4 Path Analysis: Decomposition of Total Effect into Direct, Indirect and Residual Effect: Economical Communication (y) Vs. 24 exogenous variables (x_1 - x_{24})

Table-4 evince that the variable size of holding (x_9) have got highest indirect effect of as much as 10 exogenous variables to impact on the consequent variable. It has got cause and effect relationship. When a farmer is having higher size of land holding, with propensity towards surplus generation agriculture could go stronger. No. of fragments (x_{13}) has exerted the highest total effect. It reveals that fragmentation of land resources has got significant effect in accessing different sources of economical information and cater to the needs of farmers. The residual effect been 0.277, it is to conclude that even with the

combination of 24 exogenous variables, 27.7 per cent variance in dependent variable could not be explained. This suggests the inclusion of more numbers of relevant and consistent variables for this framework of study. Similar studies have found that farm size has significant effect among SHGs in Gujarat (Patil et al., 2020)

Comparing the findings of these sociodemographic studies with the significance of economic communication and finance in FPOs, it becomes evident that FPOs can play a crucial role in addressing the challenges faced by smallholder farmers in accessing finance and engaging in effective economic communication (Guevara et al. 2012a; Cortez et al. 2016; Orlando et al. 2016). By aggregating their resources and negotiating as a collective, FPOs can access formal financial services and engage in effective economic communication, enhancing their profitability and contributing to rural development (Guevara et al. 2012b; Olivares et al. 2017; Pitti et al. 2020).

4. CONCLUSION

Poverty in rural Odisha, although reduced substantially, still it remains as serious concern towards fostering progress and prosperity of farmers ensuring food security of the state and nation at large. economic communication and finance are critical aspects of FPOs' success. FPOs can address the challenges faced by smallholder farmers in accessing finance and engaging in effective economic communication. Sociodemographic studies in agricultural, rural, and indigenous areas of Latin America have highlighted the importance of social networks and community-based financial institutions in providing informal credit to farmers. By comparing these findings, it becomes evident that FPOs can play a crucial role in enhancing smallholder farmers' access to formal financial services and improving their economic outcomes. The present study came up with a strong revelation in eliciting the fact that size of cultivated land, no. of male workers, number of enterprises, materials possessed, crop yield, mean family education and marketed surplus are of immense application to make the FPOs a performing business organization to serve the rising needs of the participating farmers and beyond. A series of socio-entrepreneurial research need to be organized at the grassroot level to elicit hard evidences as to evaluate and predict the present contribution of FPOs and the future strategies to make happy returns for millions working in open air ecosystem, a reality and possibility as well.

REFERENCES

1. Acharya, S.K. & Banik, S. Customers' behaviour in retail chain marketing: the response analysis in Kolkata. SS Publishing House, New Delhi. 2020
2. Acharya, S.K. & Roy, S. Entrepreneurial communication in agriculture: The Probing and Perception. Astral International Pvt. Ltd., 2021.
3. Battu, P., Acharya, S.K., Manobharathi, K. & Haque, M. Entrepreneurial behaviour of Self-Help Groups: Enterprise, Income and Efficiency. Journal of Community Mobilization and Sustainable Development. 2022 : 17. 329-332.
4. Bikkina, N., Turaga, R.M. & Bhamoriya, V. Farmer Producer Organizations as Farmer Collectives: A Case Study from India. Development Policy Review. 2018 : 36. 669-687. 10.1111/dpr.12274.

5. Camacho, R., Olivares, B. and Avendaño, N. 2018. Agri-food landscapes: an analysis of the livelihoods of indigenous Venezuelans. *Revista de Investigación*. 42(93):130-153. <http://revistas.upel.edu.ve/index.php/revinvest/article/view/7505/4290>
6. Cortez, A., Olivares, B., Muñetones, A. & Casana, S. (2016). Strategic Elements of Organizational Knowledge Management for Innovation. Case: Agrometeorology Network. *Revista Digital de Investigación en Docencia Universitaria*. 10 (1): 68-81. <http://dx.doi.org/10.19083/ridu.10.446>
7. Gokul Vignesh, U., Balaji, P., Venkatesa Palanichamy, N. and Ashok, K.R. A Farmers Perception on Farmer Producer Organisation (FPO) and Extent of its Services to Farmers: A Case of D Millets. *Madras Agricultural Journal*, 2019 : 106.
8. Guevara, E., Olivares, B., and Demey, J. (2012a). Uso y demanda de información agrometeorológica en los sistemas de producción agrícola en Anzoátegui, Venezuela. *Revista Multiciencias*. 12 (4): 372-381. <https://n9.cl/yuyd>
9. Guevara, E., Olivares, B., and Demey, J. (2012b). Utilización de bioindicadores climáticos en sistemas de producción agrícola del estado Anzoátegui, Venezuela. *Revista Multiciencias*. 12 (2): 136-145. <https://n9.cl/ak22r>
10. Gurung, R., & Choubey, M. Determinants of agricultural households to join farmer producer organisations (FPOs) in Northeast India: evidence from Sikkim. *International Journal of Social Economics*, (ahead-of-print).2022.
11. Iris, F., Nawi, N.M., Man, N., Ramli, N. & Uddin, Md. Trust and Communication Influence on Farm Performance for Paddy Farmers: A Study in Bangladesh. *Asian Journal of Agriculture and Rural Development*. 2022 : 12. 75-81. 10.55493/5005.v12i2.4451.
12. Millie B.A., Nyakuni A. and Gideon S. 2006. Strengthening farmer's organizations: RELMA's experience in Eastern and Southern Africa. ICRAF Working Paper No. 23. 2006.
13. Montenegro, E; Pitti, J; Olivares, B. 2021a. Adaptation to climate change in indigenous food systems of the Teribe in Panama: a training based on CRISTAL 2.0. *Luna Azul*. 51 - 2, pp. 182 - 197. <https://n9.cl/qwwz>.
14. Montenegro, E; Pitti, J; Olivares, B. 2021b. Identificación de los principales cultivos de subsistencia del Teribe: un estudio de caso basado en técnicas multivariadas. *Idesia*. 39 - 3, pp. 83 - 94. <http://dx.doi.org/10.4067/S0718-34292021000300083>
15. Olivares, B. (2012). Valorización del conocimiento ancestral y local mediante la percepción del clima en comunidades agrícolas indígenas del Sur de Anzoátegui, Venezuela. *Revista UDO Agrícola*. 12 (2):407-417. <https://n9.cl/j8laq>
16. Orlando, B. (2014a). Relación de la naturaleza, el clima y la espiritualidad de las comunidades indígenas agrícolas Kariña del estado Anzoátegui, Venezuela. *Revista Tiempo y Espacio*. 61 (2): 129-150. <https://n9.cl/wx7q2>
17. Orlando, B. (2014b). Sistematización del conocimiento ancestral y tradicional de la etnia Kariña en el estado Anzoátegui, Venezuela. *Revista de Investigación*. 82 (38): 89-102. <https://www.redalyc.org/pdf/3761/376140397004.pdf>
18. Olivares, B. and Franco, E. (2015). Agrosocial diagnosis of the indigenous community of

Kashaama: An empirical study in Anzoátegui state, Venezuela. *Revista Científica Guillermo de Ockham*. 13 (1): 87-95. <http://dx.doi.org/10.21500/22563202.1691>.

19. Orlando, B., Cortez, A., Rodríguez, M.F, Rey, J.C. y Lobo, D. (2016). Desarrollo del sistema de información de la red de pluviómetros alternativos en medios rurales. Caso: Anzoátegui, Venezuela. *Acta Universitaria* 26 (4):65-76. DOI: 10.15174/au.2016.961
20. Olivares, B., Lobo, D., Cortez, A., Rodríguez, M.F. and Rey, J.C. (2017). Socio-economic characteristics and methods of agricultural production of indigenous community Kashaama, Anzoategui, Venezuela. *Rev. Fac. Agron. (LUZ)* 34 (2): 187-215. <https://n9.cl/p2gc5>
21. Olivares, B., Rodríguez, M.F, Cortez, A., Rey, J.C. and Lobo, D. (2015). Natural physical characterization of the Kashaama indigenous community for the purpose of sustainable land management. *Acta Nova*. 7 (2):143-164. <https://n9.cl/y642w>.
22. Olivares, B., Zingaretti, M.L., Demey Zambrano, J.A. and Demey, J.R. (2016). Tipificación de los sistemas de producción agrícola y la percepción de la variabilidad climática en Anzoátegui, Venezuela. *Revista FAVE - Ciencias Agrarias* 15 (2): 39-50. <https://doi.org/10.14409/fa.v15i2.6587>
23. Pitti, J., Olivares, B., Montenegro, E. (2020). Socioeconomic characterization of Bocas del Toro in Panama: an application of multivariate techniques. *Revista Brasileira de Gestao e Desenvolvimento Regional*, 16(3):59-71. <https://www.rbgdr.net/revista/index.php/rbgdr/article/view/5871>.
24. Pitti, J; Olivares, B; Montenegro, E. (2021). The role of agriculture in the Changuinola District: a case of applied economics in Panama. *Tropical and Subtropical Agroecosystems*. 25 - 1, pp. 1 - 11. <https://www.revista.ccba.uady.mx/ojs/index.php/TSA/article/view/3815>.
25. Patil N.D.C., Patel, J., Gattupalli, N., Bellagi, R. & Manunayaka, G. Direct and Indirect Effect between the Antecedent Characteristics of Women Self-help Groups of Gujarat and their Group Dynamics. *Asian Journal of Agricultural Extension, Economics & Sociology*. 2020: 38-42. 10.9734/ajaees/2020/v38i430335.
26. Pendyala, N., Rajasekaran, R., Manimekalai, R. & Duraisamy, M. Awareness Level of Members of Farmer Producer Organizations (FPOs) about E-commerce Platforms in Agriculture. *Asian Journal of Agricultural Extension, Economics & Sociology*. 2022 : 460-465.
27. Sharma, P., Upreti, H., Ojha, K. & Gupta, S. Role of Government, Private and Cooperative Stakeholders in Development and promotion of Financial Products: A Study of Farmers Producers Organisations (FPOs). *Int J of InnovTechn & Expl Engi*. 2019:8:19-28. <https://doi.org/10.35940/ijitee.L1004.10812S319>.
28. Shiferaw, B., Hellin, J. & Muricho, G. Improving market access and agricultural productivity growth in Africa: what role for producer organizations and collective action institutions?. *Food Sec*. 2011 : 3, 475–489 <https://doi.org/10.1007/s12571-011-0153-0>
29. Tolno, E., Kobayashi, H., Ichizen, M., Esham, M., & Balde, B. S. Economic analysis of the role of farmer organizations in enhancing smallholder potato farmers' income in middle Guinea. *Journal of agricultural science*. 2015: 7(3),123.

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