



ECONOMICS OF MILLET PRODUCTION IN WUKARI LOCAL GOVERNMENT AREA, TARABA STATE, NIGERIA

Tikon, F. U., Egbeadumah, M. O. and Hassan, C. K.

Department of Agricultural Economics and Extension, Faculty of Agriculture and Life Sciences,
Federal University Wukari, Taraba State, Nigeria

Corresponding Author's email: fomatikon@fuwukari.edu.ng

Abstract

The study examined the economics of millet production in Wukari Local Government Area of Taraba State. A multistage random sampling technique was employed to select 120 respondents for the study. Data were collected with the aid of structured questionnaire and analyzed using frequency distribution, means and gross margin analysis. The average age of the farmers was 46 years with the highest proportion (45.0%) within the age range of 30 - 40 years. Majority were males (78%) and married (63%). Their mean household size was 5 persons, while the highest proportion (41%) had primary education. About 38.3% of the farmers had between 21 and 30 years of millet farming experience, while majority (58%) were non-cooperators. Their mean annual income was ₦76,853.00 per farmer with a cumulative gross margin of ₦3, 260,544.00. The study recommended policies that will promote increased millet production in the country, especially among the youths.

Keywords: Millet Production, Gross Margin Analysis, Youth, Wukari

Introduction

Millet is an important cereal crop, besides maize, wheat, and rice. It is a major food source for millions of people, especially those who live in hot and dry areas of the world. It is grown mostly in marginal areas under agricultural conditions e.g. limited rainfall, unsuitable for the cultivation of other cereals such as maize, wheat and rice (Adekunle, 2012). Millet is also a drought-resistant crop and can be stored for a long time without insect damage (Adekunle, 2012). Millet represents a unique biodiversity component in the agriculture and food security systems of millions of poor farmers in regions such as sub-Saharan Africa (Bhattacharjee *et al.*, 2007). Millet based foods and beverages are known worldwide and are still part of the major diet in most African countries (Obilana and Manyasa, 2002; Amadou *et al.*, 2011). It has been reported that millet has many nutritious and medical functions (Obilana and Manyasa, 2002; Yang *et al.*, 2012). Millet is unique among the cereals because of its richness in calcium, dietary fibre, polyphenols and protein (Devi *et al.*, 2011). Millet is also a major source of energy and protein for millions of people in Africa (FAO, 2009).

In most parts of the world, millet is grown as a subsistence crop for local consumption. Commercial millet production is risky, especially in Africa because the absence of large market outlets means that

fluctuations in output cause significant price fluctuations, particularly in areas where millet is the main food crop (FAO and ICRISAT, 1996). Future world trade in millet may be very difficult to project because of its small size, the unknown volume of unrecorded trade and uncertainties regarding supply and demand. If large surpluses of millet become available in some countries (for example Western Africa), trading opportunities in those regions would increase. However, in view of the huge distances and the high transportation costs, and the large variability of tradable volumes, any significant trade expansion is unlikely. Most international trade in millet is therefore, envisaged to remain largely restricted to border transaction among developing countries and limited but regular purchases by the developed countries as in the past (FAO and ICRISAT, 1996).

Millet is a cereal crop plant belonging to the grass family, Graminae. The term "millet" is used loosely to refer to several types of small seeded annual grasses belonging to species under the five genera in the tribe Paniceae, namely Panicum, Setaria, Echinochloa, Pennisetum and Paspalum, and one genus, Eleusine, in the tribe Chlorideae (FAO, 2001). There are many varieties of millet. The four major varieties are Pearl millet (*Pennisetum glaucum*), which constitutes 40% of total world production, Foxtail millet (*Setaria italica*),

Proso millet or white millet (*Panicum miliaceum*), and Finger millet (*Eleusine coracana*) (Yang *et al.*, 2012).

Millet is rich in carbohydrate and protein, as well as calcium, dietary fibre and polyphenols (Devi *et al.*, 2014). In addition, it has been reported that millet has many other nutritional and medicinal properties and functions (Obilana and Manyasa, 2002; Yang *et al.*, 2012). Millets are nutritionally comparable to major cereals and serve as good source of protein, micronutrients and phytochemicals (Saleh *et al.*, 2013). Millet contain fewer cross-linked prolamins, which may be an additional factor contributing to higher digestibility of the millet protein (Dayakar *et al.*, 2017). Millet also contributes to antioxidant activity with phytates, polyphenols and tannins present in it having important role in aging and metabolic diseases (Bravo, 1998). It is often ground into flour, rolled into large balls, parboiled, and then consumed as porridge with milk; sometimes millet is prepared and served as beverage (FAO, 2009). However, millet production is faced by several challenges such as crop failure and yield instability (CCN Kenya, 2013).

Although, there have been many studies on millet production in Nigeria, such studies by Oladimeji *et al.*, (2021) analysed economic efficiency and its determinants in Millet based production systems in the derived Savanna zone of Nigeria; Ali *et al.*, (2018) studied economics of Millet production in Funakaye local government, Gombe state, Nigeria and Adebayo *et al.*, (2008) studied economic analysis of millet production in Gamawa local government area of Bauchi state, Nigeria. However, limited research has been done in assessing the economics of millet production in

Wukari local government area, Taraba State. Thus, there is a need to fill this knowledge gap. It is on this premise that this study addressed the following research questions: What are the socioeconomic characteristics of the farmers in the study area? Is millet production profitable in the study area? The general objective of this study is to assess the economics of millet production in Wukari local government area, Taraba State, Nigeria.

This research is aimed at providing information on the economics of millet production in the selected study area. The findings will add to the existing body of knowledge and will prove vital to students, government agencies and researchers who are interested in understanding millet production. It will also help policy makers to formulate policies resulting in the initiation of programmes which will help to improve revenue and livelihood of farmers.

Methodology

The study was conducted in Wukari Local Government Area (LGA) of Taraba State, Nigeria (Figure 1). It covers an area of 4,308 km² and it is located between latitude 7°52'17.00"N, longitude 9°46'40.30"E and 152 meters above sea level. Demographic study put the population of Wukari LGA at 318,400 people (NPC, 2016). There are ten (10) wards in Wukari LGA: Akwana, Avyi, Bantaje, Chonku, Hospital, Jibu, Kente, Puje, Rafin Kada and Tsokundi. It is bounded in the north by Gassol LGA, in the east by Donga LGA, in the south by Benue State, and in the west by Nasarawa State and Ibi LGA of Taraba State. It is predominantly inhabited by the *Jukun* people.

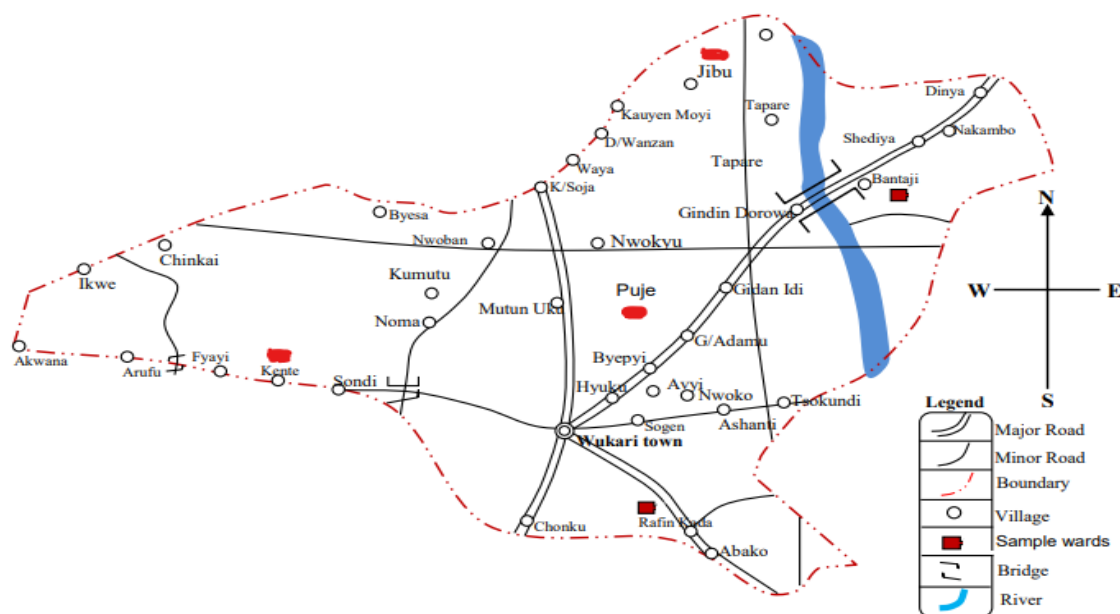


Figure 1: Map of Wukari Local Government Area showing sampled wards
Source: Adapted from Odiba *et al.* (2017)

The study employed a multi-stage sampling technique in the selection of the respondents. In the first stage, Jibu, Bantaji, Puje, Kente, Tsokundi and Rafin-kada were purposively selected due to high prevalence of millet farming in the wards. In the second stage, four (4) villages each were purposively selected from each of the selected six (6) wards. In the final stage, five (5) farmers were selected from each of the twenty-four (24) villages, giving a total of 120 respondents. Data were collected using well-structured questionnaire administered to the respondents. Data were analyzed using means, frequency distribution, percentages and gross margin analysis. Gross margin (GM) is the difference between Gross or Total Revenue (GR/TR) and Total Variable Cost (TVC), while net farm income is the difference between GM and Total Fixed Cost (TFC) and the outcome signifies the profitability of an enterprise. A positive NFI shows that the enterprise is a profitable one and worth continuing.

$$GM = GR - TVC \dots \dots \dots (1)$$

Where,

GM = Gross Margin

GR = Gross Revenue

TVC = Total Variable Cost

Gross Revenue (GR) = Q.Py

Where,

Q = quantities of millet sold (Kg)

Py = Unit price of millet (# / Kg)

Results and Discussion

Table 1 shows the socio-economic characteristics of the millet farmers (respondents). From the table, about 45.0% of the millet farmers were within the ages of 30 and 40 years with a mean age of 46 years. This is an indication that the millet farming was mostly done by youths, who were within the active and productive age. This finding conforms to Anang *et al.* (2013) which showed that majority (80%) of millet farmers were in their youthful age. Afroz *et al.* (2009) indicated that middle aged farmers make better economic decisions that positively impact on profit. According to the result, majority (80%) of the millet farmers were males. This implies that men constitute a greater percentage of those involved in millet farming. The result is in agreement with Aiyeloja and Ogunjinmi (2010) that also reported the dominance of males (90%) in millet farming in Ondo State. For Okoye *et al.* (2006), men are the major players in agricultural production in most societies, and according to Ofuoku (2011), the involvement of more men than women in millet farming could arise from the labour-intensive nature of the enterprise and the greater skills with which men carryout agricultural operations relative to women. More so, farming in its self is quite strenuous and difficult, and only a few women can withstand the drudgery (Tikon *et al.*, 2018). The table also showed that greater proportion (63.3%) of the millet farmers were married, a less proportion (31.0%) were single, while only 10.0% were divorced and 6.7% widowed. The involvement of both male and female has helped to reduce drudgery, reduce time spent in intercultural operations, and increase the efficiency of

men and women, resulting in increased production and productivity of millet (Devkota *et al.*, 2016). The marital status of the millet farmers is expected to influence the value placed on profitable business management (Umar *et al.*, 2018). From the result, 45.0% of the respondents had household size between three and five persons, 37.5% had household size of less than three persons; while a very low proportion (17.5%) had 6 persons and above. The mean household size for millet farmers was 5 persons. This result agrees with the finding of Otiotoju and Arene (2010) that majority of the respondents (medium scale soya beans farmers in Benue State Nigeria) had the average family size of about 5 persons. This implies that respondents had moderate household sizes and are likely to enjoy family labour readily. A very small proportion (8.3%) of millet farmers had no formal education, 30.0% and 20.9% had both secondary and tertiary education, respectively, while a larger proportion (40.8%) had primary education. Sharada and Knights (2000) noted that education is important to the timing of adoption of new technology which improves the chances of the business being more profitable. Formal educational and training experience could expose the farmers to business management and processing operations skills. In addition, respondents' level of literacy can have positive effects in their involvement in the use of agricultural technology operations, which could enhance the profitability of their farming.

About 38.3% of the millet farmers had between 21 and 30 years of millet farming experience. Very few (17.5%) had experience of between 31 and 40 years, while 16.7% had between 41 and 50 years. The mean farming experience of the farmers was 20 years indicating that the farmers in the study area were experienced in millet farming. Okoye *et al.* (2008) reported that farmers count more on their experience than educational attainment in order to increase in their productivity. Number of years of experience could improve skill and better approaches to millet farming practices. Majority of millet farmers (56.7%) had annual income of between N50, 000.00 and N100, 000.00 with 28.3% less than N 50,000.00. The mean annual income value of the millet farmers was N76, 853.00. This implies that there was a significant increase in farmers' revenue which possibly could be attributed to the commercialized nature of the area with high demand of millet products or market availability, motor-able roads, good advertisement of products and possibly proper loan utilization. About 57.5% of the millet farmers do not belong to any cooperative society, while 42.5% were members. Cooperative societies provide millet farmers with better credit facilities and better agricultural-based information which may in turn ensure better allocation of resources and profitability (Yamusa and Adefila, 2014).

Profitability of millet farming

From the result in Table 2, the farms generated a gross margin of N3, 260,544.00 and net farm income of N2, 074,379.00 during the production period. This implies that the gross margin and net farm income per farmer

was N27, 171.20 and N17, 286.49 respectively. The return per naira invested was N1.90. This implies that for every one naira spent on millet production, a return of N.90 was made. Since the ratio is greater than one, it implies that millet farming in the area is profitable, worth sustaining. This agrees with the findings of Yusuf *et al.* (2008) and Sarojani *et al.* (2020).

Conclusion

The study investigated the economics of millet production in Wukari LGA of Taraba State, Nigeria. The farmers were predominantly male and married, with primary level of education and average household size of 5 persons. The average age of the farmers was 46 years, while average farming experience and farm income was 20 years and N17, 286.49 respectively. Majority of the farmers were non-cooperators. The gross margin of the farmers was N3, 260,544.00, while their net income was N2, 074,379.00 with return on investment of 1.90. The study recommends policies that promote increased millet production in Nigeria, particularly, among the youths.

References

- Adebayo, E.F., Mohammed, A.N. and Mshelia, S.I. (2008). Economic analysis of millet production in Gamawa local government area of Bauchi state, Nigeria. *Nigerian Journal of Rural Sociology*, 1 (8): 27-32.
- Adekunle, A. A. (2012). Agricultural innovation in Sub-Saharan Africa: Experiences from multiple Stakeholder Approaches. Forum for Agricultural Research in Africa, Ghana. ISBN 978-99888373-2-4.
- Afroz, A., Hanaki, K. and Hasegawa-Kurusu, K. (2009). Willingness to Pay for Waste Management Improvement in Dhaka City, Bangladesh. *Journal of Environmental Management*, 90(9): 492-503.
- Aiyeloja, A.A. and Ogunjinmi, A.A. (2010). Poverty Alleviation Potential of Snail Farming in Ondo State, Southwest Nigeria. *International Journal of Agricultural, Biosystems Science and Engineering*, 4(12): 58-62.
- Ali, A., Adam, A.G. and Abdullahi, A.Y. (2018). Analysis of the Adoption of Millet Production Management Practices among Farmers of Funakaye Local Government Area, Gombe State, Nigeria. *Journal of Agriculture and Environment*, 14(2): 73-80.
- Amadou, I. Gbadamosi, O.S. and Le, G.W. (2011). Millet-based traditional processed foods and beverages: A Review. *Cereal Foods World*, 56(3): 115-121.
- Anang, B.T., Zakaria, A. and Yusif, S. (2013). Production Constraints and Measures to Enhance the Competitiveness of the Tomato Industry in Wenchi Municipal District of Ghana. *American Journal of Experimental Agriculture*, 3(4): 824-838.
- Bhattacharjee, R., Khairwal, I. S., Bramel, P. J. and Reddy, K. N. (2007). Establishment of a Pearl Millet [*Pennisetum glaucum* (L.) R. Br.] Core Collection Based on Geographical Distribution and Quantitative Traits. *Euphytica*, 155: 35–45.
- Bravo, L. (1998). Polyphenols: chemistry, dietary sources, metabolism and nutritional significance. *Nutrition Reviews*, 56: 317–333.
- CCN Kenya, (2013). Kitui county consultative workshop on sustainable utilization of natural resources, climate change network of Kenya.
- Dayakar, R. B., Bhaskarachary, K., Arlene, C. G.D., Sudha, D. G. and Vilas, A. T. (2017). Nutritional and Health benefits of Millets. ICAR Indian Institute of Millets Research (IIMR) Rajendranagar, Hyderabad, Pp. 112
- Devi, P. B., Vijayabharathi, R., Sathyabama, S., Malleshi, N. G. and Priyadarisin, V. B. (2014). Health benefits of finger millet (Eleusine coracana L.) Polyphenol and dietary fibre: A Review. *Journal of Food Science Technology*, 51:1021-1040.
- Devkota, R., Khadka, K., Gartaula, H., Shrestha, A., Karki, S., Patel, K. and Chaudhary, P. (2016). Gender and labour efficiency in finger millet production in Nepal. Pp. 75-95
- FAO and ICRISAT (1996). Food and Agriculture Organization and ICRISAT. The world sorghum and millet economies: facts, trends and outlook. A joint study by the Basic Foodstuffs Service, FAO Commodities and Trade Division and Socioeconomics and Policy Division of ICRISAT. Rome, Italy: FAO, and Patancheru 502324, Andhra Pradesh, India: ICRISAT
- FAO (2001). Food and Agriculture Organization Millet: Post-harvest operations. INPhO – Post-harvest Compendium.
- FAO (2009).. Food and Agriculture Organization. Sorghum and Millet in Human Nutrition. Food and Nutrition Series. No. 27. United Nation Food and Agriculture Organization, Rome, 2008.
- NPC (2016). National Population Commission Population by State and Sex. <http://web.archive.org/web/20110519235026/http://www.population.gov.ng/files/nationafinal.pdf>
- Obilana, A.B. and Manyasa, E. (2002). Millets. In: P.S. Belton and J.R.N. Taylor (Eds.). pp. 177-217. Pseudo cereals and less common cereals: Grain properties and utilization potential. Springer-Verlag: New York.
- Odiba, J. O., Matthew, O. A. and Chrysanthus, A. (2017). Evaluation of the Physicochemical and Heavy Metal Content of Ground Water Sources in Bantaji and RafinKada Settlements of Wukari Local Government Area, Taraba State, Nigeria. *Journal of Environmental Chemistry and Ecotoxicology*, 9(4): 43 - 53 , Doi:10.5897/Jece2017.0416.
- Ofuoku, A. U. (2011). Effect of Community Participation on Sustainability of Rural Water Projects in Delta Central Agricultural Zone of Delta State, Nigeria. *Journal of Agricultural Extension and Rural Development*, 3(7): 130. <http://academic>

- journals.org/JAERD.
- Okoye, B.C., Onyenweaku, C.E., Ukoha, O.O., Asumugha, G.N. and Aniedu, O.C. (2008). Determinants of Labour Productivity on Small Holder Cocoyam Farmers in Anambra State, Nigeria. *Academic Journals Scientific Research and Essay*, 3(11): 559–561.
- Oladimeji, Y. U., Offokansi, C. C. and Egwuma, H. (2021). Analysis of Economic Efficiency and its Determinants in Millet Based Production Systems in the Derived Savanna Zone of Nigeria. *Alanya Academic Review*, 5 (1): 177-192.
- Otitoju, M. and Arena, C.J. (2010). Constraints and determinants of technical efficiency in medium scale soyabean production in Benue State, Nigeria. *African Journal of Agricultural Research*, 5(17): 2276–2280.
- Saleh, A.S.M., Zhang, Q., Chen, J. and Shen. Q. (2013). Millet grains: Nutritional Quality, Processing, and Potential Health Benefits. *Comprehensive Reviews in Food Science and Food Safety*, 12: 281-295.
- Sarojani, K., Shruthi, L., Suvama, H., Geeta, N. and Sneha, S. (2020). Millet Processing: A Profitable Enterprise. *The Pharma Innovation Journal*, 9(12), 1421-145. <http://www.thepharmajournal.com/>
- Sharada, W. and Knight, J. (2000). Education externalities in rural Ethiopia: Evidence from Average and Stochastic Frontier Production Functions. CSAE Working Paper Series 2000-04, Centre for the Study of African Economies, University of Oxford.
- Tikon, F.U., Onyekuru, N.A. and Effiong, M.O. (2018). Structural Effects of 2010-2015 Fertilizer Policy on Farmers' Resource Use in Nigeria: Evidence from Taraba State. *Nigerian Agricultural Policy Research Journal* 4 (1): 13 - 3 . <http://www.aprnetworkng.org/>
- Umar, M., Zainalabidin, M., Mad, N. S. and Juwaidah, S. (2018). Impact of Inputs Costs on Farm Profitability: An Evaluation of Pearl Millet Production in Northwestern Nigeria, *Journal of Asian Scientific Research*, 7(12): 471-482.
- Yamusa, I. and Adefila, J. O. (2014). Farmers' Cooperatives and Agricultural Development in Kwali Area Council Federal Capital Territory Abuja, Nigeria, *International Journal of Humanities and Social Science*, 4 (1): 161-169
- Yusuf, O., Haruna, V., Yusuf, H.O. and Ugbabe, O.O. (2008). Factors Determining Intercropping by Small Scale Melon Production in Kogi Central Zone of Kogi State, Nigeria. In: Aiyedun, E.A., Idrisa, P.O, Nmadu, J.N(eds). Agricultural Technology and Nigerias Economic Development. Proceedings of Nigerian Association of Agricultural Economists, 7th-10th October, 2008, held at University of Abuja, Nigeria. Pp. 120-126.
- Yang, X., Wan, Z., Perry, L., Lu, H., Wang, Q., Zhao, C., Li, J., Xie, F., Yu, J., Cui, Wang, T., Li, M. and Ge, Q. (2012). From the modern to the archeological: starch grains from millets and their wild relatives in China. *Journal of Archeological Science*, 39: 247-254.

Table 1: Frequency distribution of the respondents according to their socio-economic characteristics

Variables	Frequency (N=120)	Percentages	Mean
Age			
Less than 30	15	12.5	
30 – 40	54	45.0	
41 – 50	29	24.2	
51 – 60	16	13.3	
61 and above	6	5.0	45.6 years
Gender			
Male	96	80.0	
Female	24	20.0	
Marital status			
Single	24	20.0	
Married	76	63.3	
Divorced	12	10.0	
Widowed	8	6.7	
Educational level			
No formal education	10	8.3	
Primary education	49	40.8	
Secondary education	36	30.0	
Tertiary education	25	20.9	
Farming experience (years)			
Less than 10 years	12	10.0	
10 – 20	17	14.2	
21 – 30	46	38.3	
31 – 40	21	17.5	
41 – 50	20	16.7	
51 and above	4	3.3	19.9 years
Annual income (₦)			
Less than 50,000	34	28.3	
50,000 – 100,000	68	56.7	
101,000 – 150,000	12	10.0	
151,000 – 200,000	3	2.5	
200,000 and above	3	2.5	₦76,853.00
Household Size			
Less than 3	45	37.5	
3 – 5	54	45.0	
6 and above	21	17.5	5 persons
Membership to farmers' cooperative society			
Member	51	42.5	
Non- member	69	57.5	

Source: Computed from field survey data, 2021

Table 2: Profitability analysis of millet farming of the respondents

Items	Inputs/unit	Unit cost	Quantity	Cost (₦)	% in cost Category
A Revenue/Gross return (GR)				4402982.20	
B Variable cost	Labor(Mandays)	8615.00	3.74	32220.10	2.820
	Seed (kg)	767.00	1375	1055120.00	92.357
	Clearing (₦)	30.16	9.8	295.568	0.026
	Threshing (₦)			5984.00	0.524
	OrganicManurecost (₦)	435.00	3.92	1705.20	0.149
	Ridging (₦)			1974.60	0.170
	Weeding (₦)	810.00	4.08	3304.80	0.029
	Transportation(per hour)			560.00	0.049
	Planting (₦)			2043.91	0.179
	Water/electricity(₦)			29064.00	2.500
	Harvesting (₦)			2508.00	0.219
	Storage (₦)			2718.00	0.238
	Inorganicfertilizer (₦)			3020.00	0.264
	Maintenance (₦)			1920.00	0.168
Total variable cost (TVC)				1142438.20	
C Gross margin (A-B)				3260544.00	
D Fixed cost	Land acquisition			1186165.0	
Total fixed cost (TFC)				1186165.0	
Total cost (TC)	TFC + TVC			2328603.2	
Net farm income (NFI)	TR – (TFC + TVC)			2074379.0	
Return per naira invested	GR/TC			1.90	
Net return on investment	NFI/TC			0.89	

Source: Computed from field survey data, 2021