Perception of Pastoralists on Dairy Production Technologies in Oyo State, Nigeria

Percepción de los pastores sobre tecnologías de producción lechera en el estado de Oyo, Nigeria

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ABSTRACT

This paper assessed the perception of pastoralists on the introduced Dairy Production Technologies (DPTs) in Oyo State, Nigeria. It specifically identified DPTs introduced to the pastoralists and examined their perceptions towards the DPTs. Multi-stage sampling procedure was used to select 216 respondents from 27 pastoral communities across two Dairy Development Programme (DDP) operating locations in the study area. Interview schedule was used for quantitative data collection while in-depth interview and Focus Group Discussion Guides were used to elicit qualitative information. Data were analysed through Software Package for Social Science (SPSS) version 20 and summarized using means, percentages, frequency counts and standard deviations while Pearson correlation analysis was used to draw inferences on hypothesis. The results showed almost all the respondents indicated they were aware of all the DPTs introduced to them except animal health record. Pastoralists' perception varied with respect to each of the technological components, however, majority of the respondents (77.3 %) showed indifferent perception to DPTs. Also, positive and significant relationship existed between pastoralists' household size (r = 0.768), age (r = 0.264), dairy years of experience (r = 0.248) and their perception of the DPTs. It is recommended that the concerns of pastoralists on 'uncertainties/risk' and 'cost' should be addressed if dairy development efforts are to be meaningful among the pastoralists in Nigeria.

Keywords: Dairy technology, Perception, Pastoralists, Nigeria

RESUMEN

Este documento evaluó la percepción de los pastores sobre las tecnologías de producción láctea (DPT) introducidas en el estado de Oyo, Nigeria. Identificó específicamente las DPT presentadas a los pastores y examinó sus percepciones hacia las DPT. Se utilizó un procedimiento de muestreo de etapas múltiples para seleccionar a 216 encuestados de 27 comunidades pastorales en dos ubicaciones operativas del Programa de Desarrollo Lechero (DDP) en el área de estudio. El programa de entrevistas se utilizó para la recopilación de datos cuantitativos, mientras que las guías de entrevistas en profundidad y los grupos de discusión se utilizaron para obtener información cualitativa. Los datos se analizaron a través de Software Package for Social Science (SPSS) versión 20 y se resumieron utilizando medias, porcentajes, recuentos de frecuencia y desviaciones estándar, mientras que el análisis de correlación de Pearson se utilizó para extraer inferencias sobre hipótesis. Los resultados mostraron que casi todos los encuestados indicaron que estaban al tanto de todas las DPT que se les presentaron, excepto el registro de salud animal. La percepción de los pastores varió con respecto a cada uno de los componentes tecnológicos, sin embargo, la mayoría de los encuestados (77,3%) mostró una percepción indiferente a las DPT. Además, existía una relación positiva y significativa entre el tamaño del hogar de los pastores (r = 0,768), la edad (r = 0,264), los años de experiencia en la lechería (r = 0,248) y su percepción de las DPT. Se recomienda que se aborden las preocupaciones de los pastores sobre "incertidumbres / riesgo" y "costo" para que los esfuerzos de desarrollo de la lechería sean significativos entre los pastores de Nigeria.

Palabras clave: tecnología láctea, percepción, pastores, Nigeria

INTRODUCTION

Agriculture plays an important role in economic growth, enhancing food security, poverty reduction and rural development. It is the main source of livelihood for around 2.5 billion people; produces an average of 23.7 million tons of food; and also accounts for 29% of GDP and 65% of jobs for people in the developing world (Convention on Biological Diversity, 2016). Smallholder agriculture is identified as a vital development tool for achieving the sustainable development goals. Nigeria is predominantly an agricultural country that depends on small scale farmers using their own traditional farming technologies. This has resulted into decrease in per capital food supply, increased domestic food demand and a widened supply gap which has consequently led to increase in food import bills over the years (FAO, 2012). There is therefore an urgent need to reduce the gap in food demand and supply.

Agricultural technologies are seen as an important route out of poverty in most of the developing countries. However, the rate of adoption of these technologies has remained low in most of these countries (Mwangi and Kariuki, 2015). Increasing agricultural productivity is critical to meet expected rising demands and as such, it is instructive to examine recent performance in cases of modern agricultural technologies. Dairy, basically the production of fresh milk and milk products, at present, is reported to have a significant potential, particularly in high value added products such as yoghurt, cheese and butter to the urban areas (FAO, 2007). In Nigeria, the dairy sector has two major industrial components; traditional and commercial. The traditional dairy industry is known to be dominated by the Fulani pastoralists (nomadic and settled) who produce, process and market fresh milk and milk products, though at subsistence level, with little emphasis on economic consideration for dairy "business". The commercial industry is solely engaged in the processing of milk to produce high value added products. They are characterized by huge operational plants and commercial distribution of products to an array of consumers. The dairy sector presents opportunities for employment generation and poverty alleviation.

The modern approach to agricultural research and extension, however, has been to emphasize comprehensive package of technologies. Few farmers are able to adopt the whole package of technological components without considerable adjustment. Several productivity enhancing technologies and improved practices have been promoted and introduced to the milk producers engaged in the Dairy Development Programme (DDP). Dairy Production Technologies (DPTs) refer to the introduced dairy technological package as promoted by the DDP. The technology package comprises several components tailored to addressing specific aspects of dairy production practices such as nutrition, milking techniques (hygiene and handling), productivity enhancing services etc., leading to quality and safe milk harvest at farm level. However, these exclude any form milk processing (value addition) - Dairy Transformation Implementation Plan, 2012.

Perception is the process of identifying, discriminating, recognizing and judging objects, processes, qualities or relations in our environment by means of sensory information (Schmitz. 2012). Similarly, Salako and Odetunde (1998) defined perception as the way the brain meaningfully organizes the information received from the environment through various senses such as feeling, tasting, seeing, hearing, position and smelling. Perception is a function of interaction between man and his environment. It is a function of present, past and future experiences, incorporating motives, contexts, need, expectations, goals and people and the necessity to communicate with them. Perception is a psychological term that involves the process an individual undergoes to understand his environment (both social and physical

world) through his senses (Alabi, 2010). Perceptual process, according to Ibeh (2001), has a nature which focuses on the representation of the world of objects (social or non-social) and events that constitute the physical environments. Thus, the focus is on how things appear to man and not on the objective event itself. This is mediated by man's neural mechanism and his psychological make up at the given time. This implies that no matter how important or good a thing is, it may remain redundant until it appears important or needed to man. Therefore, except pastoralists in Oyo state perceive the need and importance of using the introduced dairy technologies, they may not adopt/use them since the actual usage/adoption of dairy technologies among pastoral milk producers in Oyo state is dependent on farmers' perception of it.

According to Mwangi and Kariuki (2015), many studies have been conducted on innovation and uptake of new technologies in developing countries over the years. In addition, the process of adoption and the impact of adopting new technology on smallholder farmers have been studied. However, new agricultural technologies are often adopted slowly and several aspects of adoption remain poorly understood despite being seen as an important route out of poverty in most of the developing countries. This may be due to the farmers' psychological view of the technologies. The Dairy Development Programme (DDP) is a recent advancement to improve dairy production in Nigeria. It calls for the involvement of pastoralists that contribute over 90 per cent of total national milk supply though with low productivity. The intensification of smallholder dairy production typically involves the adoption of technologies that address production and management issues of milk producers. These technologies were introduced to pastoralists in the DDP. The characteristic of a technology is a precondition of adopting it (Doss, 2003, Ekong, 2010 and Mignouna *et al*. 2011). The problem identified, therefore, centered on understanding the perception of milk producers (pastoralists) on the introduced dairy production technologies. The study examined the perception of pastoralists on the introduced DPTs in Oyo State, Nigeria. Specifically, it identified the DPTs introduced to the pastoralist, examined their perception towards the introduced DPTs and determined the relationship between socio-economic characteristics of pastoralists and their perception about the DPTs.

MATERIALS AND METHODS

The study was conducted in Oyo State, Nigeria. The sample framework for the study hinged on milk producing households in Fulani settlements around Milk Collection Centers (MCCs). One MCC was situated in each of Oyo West, Iseyin, Itesiwaju and Ibarapa East Local Government Areas (LGAs). They are Fashola in Oyo West LGA, Iseyin in Iseyin LGA while

Alaga and Maya-Eruwa were situated in Itesiwaju and Ibarapa LGAs respectively. A multistage sampling procedure was used to select respondents for the study. At first stage, two MCCs (Fashola and Alaga) were purposively selected because of their longer years of operation in dairy activities. Fulani settlements attached to the chosen MCCs are sixty seven. At second stage, forty percent of the number of Fulani settlements attached to each of the chosen MCCs was proportionately selected, making a total of 27 settlements. At the last stage, eight respondents (pastoral households) were purposively sampled from each of the selected settlements, because not all households were engaged in the DDP, which led to a sample size of 216 respondents for the study. Structured interview schedule and a combination of Key Informant Interview and Focus Group Discussion were used to elicit quantitative and qualitative data from the rspondents respectively. The primary data were collected from the respondents using structured interview schedule containing closed ended questions, on relevant information as regards the objectives of the study. Data were coded, processed, summarised and analysed through Software Package for Social Science (SPSS) version 20 using and summarized using frequency counts, percentages, means and standard deviation while chi-square and correlation analyses were used to determine the relationship between pastoralist' perception and their socio-economic characteristics.

The dependent variable for this study was perception on the DPTs. This expresses the thoughts or feelings of the respondent about the technologies. It was measured by asking respondents to react to an array of 20 perceptional statements, and their response on a five-point Likert scale were scored as follows: 1 (Strongly disagree); 2 (Disagree); 3 (Undecided); 4 (Agree); 5 (Strongly agree) for positive statements. Negative statements were scored in the reversed order. The total perceptional scores were categorized into positive, indifferent and negative using the mean plus or minus standard deviation method. Also, respondents were asked to indicate the dairy programme technologies introduced to them and each technology identified was scored one point.

RESULTS AND DISCUSSION

1. Identification of Dairy Production Technologies

The result in Table 1 show that all (100%) the pastoralists identified hand washing, use of clean clothes, giving of colostrum to calf after birth, use of sieve/mesh and use of milk record were the dairy production technologies introduced to them to improve their dairy production. Majority of pastoralists also indicated that commercial feed (95.8%), teat cleaning (91.7 %), use of milk can (89.8%) and washing utensils with food grade detergents (88.4%) were introduced to them in that order; while none of them acknowledged that the use of

animal health record was disseminated to them. This result implies that most of the respondents were aware of all the DPTs introduced to them to boost their milk production activities as this could influence the adoption of DPTs. This is because awareness of agricultural technology stimulates farmers' interest in the innovations/technologies and could influence the adoption of the technologies (Adesoji *et a*l. 2020).

Table 1: Distribution of Dairy Production Technologies

Dairy production technologies	Frequency	Percentages
Hay making	174	80.6
Forage cultivation	152	70.4
Commercial feed	207	95.8
Artificial insemination	154	71.3
Colostrum for calf	216	100
Cleaning of calf nostrils	43	19.9
Navel cutting	112	51.8
Udder cleaning	163	75.5
Teat cleaning	198	91.7
Hand washing	216	100
Clean clothes	216	100
Sieves/mesh	216	100
Milk can	194	89.8
Washing utensils with food grade detergent	191	88.4
Milk production record	65	30.8
Animal health record	0	0
Milk sales record	216	100
Input expenditure record	40	18.5

Source: Field Survey, 2018

2. Perception of pastoralists about the dairy production technologies

Results in Table 2 showed the ranked mean order of respondents' perception towards the dairy production technologies. 'Paying prompt attention to milking procedures and handling prevent contamination and spoilage' (mean= 5.00) ranked first among the perceptional statements. This was closely followed by 'Milk cans keep fresh milk safer than calabashes or plastic containers' (mean=±4.40), 'good husbandry practices can be reduced the incidence of diseases and also can be reduced the cost of veterinary services' (mean=

4.37) and in that order. The ranked mean values reported above showed that pastoralists had positive perceptions about the following elements of the technological package: milk hygiene practices, milk cans and husbandry practices. The order of ranking of these positive statements reflects the relative importance of pastoralists ascribed to the perceived benefits of milk hygiene practices, use of milk cans and husbandry practices. Hence, pastoralists had a good perception of the benefits of the dairy production technologies. The result confirmed the findings of Truong Thi and Ryuichi (2002) that farmers may have positive perception to a new technology but could face problems in technology application due to inadequate capital, lack of extension service and other resources.

The least ranked perceptional statements of the respondents towards the DPTs were 'Feed conservation calls for additional costs with small returns' (mean= 2.57); 'Conception of cow through artificial insemination (AI) is not certain and therefore time-wasting' (mean= 2.28); 'The expected results from AI take a long time to manifest' (mean= 2.28); 'Supplementary feeding using commercial feed is more expensive than using crop residues' (mean= 2.26); 'There was an abundance of naturally grown forages that does not warrant any conservation' (mean= ±1.84); 'Record keeping is for the literate only' (mean= 1.79); 'Natural pastures cost less (if any) than cultivated fodder' (mean= 1.78); 'Hay making is difficult and there is no point practicing it' (mean= 1.64). The negative perceptions of pastoralists, denoted by low mean values showed their concern for the cost implication and complexity of the elements of the package of the dairy production technologies. For example, milk producers tend to perceive hay making as labour intensive and difficult, and as such might not be ready to incur additional investment both in terms of human and time resources. The implication of this is that pastoralists may seek other alternatives to using hay such as 'cut, carry and feed' system for silage. Similarly, the length of time taken for the expected results for AI services and the expertise required might pose a source of unsatisfaction to pastoralists. According to Shehu, *et al.* (2010), the disadvantages of AI are that: proper implementation requires special training, skill and practice; it requires more labour, facilities and managerial skill than natural service; and preservation and transportation of semen is difficult under severe climatic conditions like those prevailing in most parts of Nigeria. Moreover, the relatively expensive price of commercial feeds might warrant pastoralists to consider other means of supplementing animal's diet such as cassava peels, maize husks and other crop residues. Also, the beliefs and habits of pastoralists on the abundance of natural pastures might pose a situation where feed conservation is not warranted. Moreover, forage cultivation calls for additional resources which the pastoralists might not want to take a risk of.

Table 2: Perception of respondents about the DPTs

Perceptional Statements	Ranked mean
Paying prompt attention to milking procedures and handling prevent contamination and spoilage.	5.00
Milk cans keep fresh milk safer than calabashes.	4.40
Good husbandry practices can reduce incidence of disease and reduce cost of veterinary services	4.37
Cultivation of forage can be used to reduce cost of feeding.	4.08
Milk benefits from commercial feeds offset costs.	4.06
Commercial dairy feeds are fortified with essential nutrients needed to boost milk yield.	3.93
Using a sieve/mesh while decanting collected milk is important	3.97
Improved dairy animals through Artificial Insemination (AI) gives more milk per lactation than existing local breeds	3.77
The practice of exclusively giving colostrums ('early milk') for a few weeks to new born calf reduces milk volume to be sold. -	3.63
Dairy business decision making can be easily made with proper records.	3.62
Acquiring an improved cattle breed can increase the milk yield	3.57
Cleaning of teats of cow before and after milking is unnecessary	3.04
Feed conservation calls for additional costs with small returns.	2.57
The expected results from AI take a relatively long time to manifest.	2.28
Conception of cow through AI is not certain and therefore time wasting.	2.28
Supplementary feeding using commercial feeds is more expensive than using crop residues.	2.20
There is abundance of naturally grown forages that it does not warrant any conservation.	1.84
Record keeping is for the literate ones only.	1.79
Natural pastures cost less (if any) than cultivated fodder.	1.78
Hay making is difficult and there is no point practising it.	1.64

Source: Field Survey, 2018

The following excerpts from Focus Group Discussion lent credence to the positions of pastoralists as of what they regarded of the dairy production technologies.

It is easy to implement while some are difficult to practice. Allowing calf to enjoy as much milk as possible during early weeks is the easiest. My concern for hay making include:

who to go in search for grasses cut them, sun-dry and so forth. It would be an extra burden to add this to the task of grazing. It is encourage to grow naturally available; even in abundance.

The overall implication of the findings is that more of a negatively changed factors, the less would be the likelihood of adopting the innovative technologies. In the same vein, the less of a negative perception of a milk producer has towards the technologies the higher the likelihood of adopting them. This findings supports the works of Ekong (2010) that aside the characteristics of an innovation, habits, risk aversion could also inhibit acceptance of change.

3. Level of perception

Results in figure 3 show the categorization of respondents by their total perception of the DPTs. Majority of the respondents (77.3 %) had indifferent perception towards the DPTs as a whole, while few (11.1 % and 11.6 %) had negative and positive perception towards the DPTs respectively. Since majority of the pastoralists in the study area fell into the indifferent perception category, this could have negative influence on the adoption of these technologies, hence, there is need to encourage and motivate them towards the DPTs, while addressing the concerns of pastoralists on 'uncertainties/risk' and 'cost' in order to make change efforts meaningfully. This result disagrees with the report of Adisa *et al*. (2020) which reported that majority of rice farmers had favourable perception towards adoption of post-harvest technologies in Nigeria.
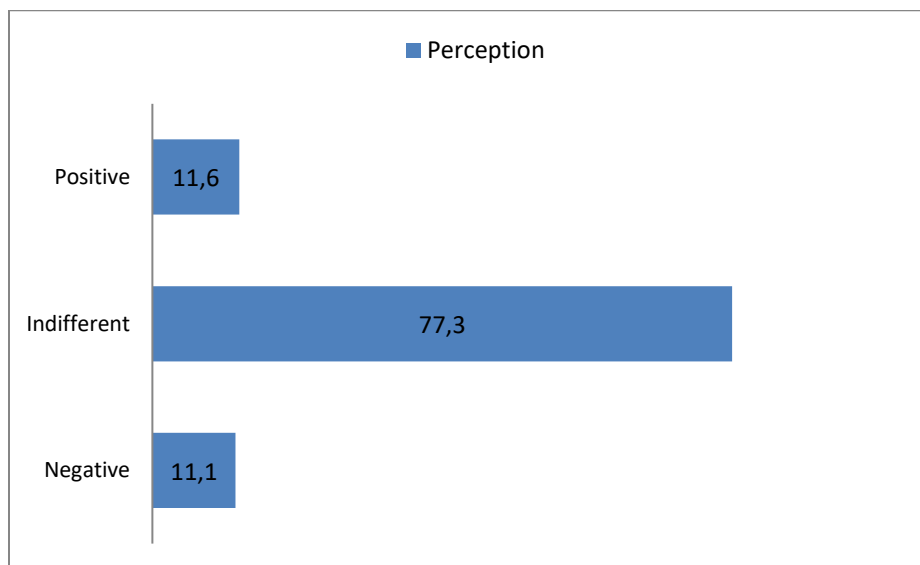

Fig 3: Distribution of respondents by perception level about the Dairy Production Technologies

Source: Field Survey, 2018

4. Hypothesis testing:

Results in Table 3 show that there existed a positive and significant relationship between pastoralists' household size (r = 0.768), age (r = 0.264), education (r = 0.273), dairy experience (r = 0.248), lactating cows (r = 0.315), milk yield (r = 0.380), income from milk sales (r = 0.384), and their perception of the DPTs. This implies that the higher these significant variables, the more favourable their perception towards the DPTs, which means that these variables influence perception towards adoption or utilisation of DPTs. This is similar to the findings of Alabi *et al*. (2018) which reported that years of education and income realized were significantly related to perceptions of maize farmers towards maize processing techniques.

Table 3: Results of correlation analysis between some selected personal and socio-economic characteristics of respondents and their perception on DPTs

Variable	r-value	p-value
Age	0.264**	0.001
Household size	0.768**	0.001
Years of Education	0.273**	0.001
Dairy Experience	0.248**	0.003
Herd size	0.237**	0.001
Lactating cows	0.315**	0.001
Average daily yield	0.380*	0.041
Average weekly milk sales/income	0.384*	0.030

**Significant at $p \leq 0.01$

*Significant at $p \leq 0.05$

Source: Field Survey, 2018

CONCLUSIONS AND RECOMMENDATION

All the respondents were aware of all the DPTs introduced to them with the exception of use of animal health record. The study concluded that majority of the respondents were indifferent to the DPTs. Hence, it is recommended that there is the urgent need to encourage and motivate the pastoralists towards the DPTs while addressing their concerns on 'uncertainties/risk' and 'cost'. The use of centrally located demonstration plots would reduce risk aversion of pastoralists and thus increase their probability of adoption of the DPTs.

Furthermore, pastoral households should be sensitized and encouraged to scale out 'dairy hubs', individually or collectively, for the intensification and commercialization of dairy production in order to increase dairy income and enjoy more economic benefits of dairy farming technologies.

REFERENCES

Adesoji S.A, Fabiyi E O and Famakinwa, M (2020). Adoption of Technologies Introduced by Community Based Agricultural Development Project among Farmers in Kwara State, Nigeria *Agricultura Tropica et subtropica 53(3)*127-135

Adisa, B. O, Famakinwa, M and Adeloye K. A. (2020). Adoption of postharvest Technologies among Small-holder Rice Farmers in Osun State, Nigeria. *Contemporary Agriculture 67*(1-2), 20-26

Ajala, M. K. (2000). 'Socio-economic factors influencing dairy among the agropastoralist in the Northern Guinea Savannah of Nigeria'. An unpublished PhD Thesis, Department of Agricultural Economics and Rural Sociology, faculty of Agriculture, Ahmadu Bello University, Zaria, Nigeria. Pp. 126-134

Alabi, D.L. Akintola, O. M. and Famakinwa, M. (2018). Perception of processors towards utilization of maize value addition techniques: Implications for rural entrepreneurship development - A study in Nigeria. *The Journal of Agricultural Science, 13(2)*142-152

Alabi, O. S. (2010), Analysis of Training Needs of Small Ruminant Farmers in Ekiti State, Nigeria. *Unpublished M.Sc Thesis*, Department of Agricultural Extension and Rural Development, Obafemi Awolowo University, Ile-Ife

Convention on Biological Diversity (2016). Sustainable Agriculture, CBD press brief. Available online at www.cbd.int/idb/2016

Doss, C. R. (2003).Understanding Farm Level Technology Adoption: Lessons Learned from CIMMYT's Micro-surveys in Eastern Africa. CIMMYT Economics Working Paper 03-07. Mexico, D.F.: CIMMYT.

DTIP (2012), Dairy Transformation Implementation Plan: Agricultural Transformation Action Plan, Office of the Honourable Minister of Agriculture, Federal Ministry of Agriculture and Rural Development, Abuja, February 2012.

Ekong E. E. (2010), Rural Sociology: An Introduction and Analysis of Rural Nigeria, Dove Educational Publisher, Uyo, Nigeria. 300-304.

FAO, (2007), Dairy development and internal dairy marketing structure: Policies, performance
and options. Food and Agriculture Organization, Rome

FAO, (2012). The milk and dairy market. Agricultural review for Africa and Europe No.37:
Food and Agriculture Organization, Rome

Ibeh, A. E. (2001), Adult perception, In: Oyedeji, L. (ed), Coping with learning in adult years.
Joja Educational Research and Publishers Limited, 148

Mignouna, B., Manyong, M., Rusike, J., Mutabazi, S. and Senkondo, M. (2011), Determinants
of Adopting Imazapyr-Resistant Maize Technology and its Impact on Household
Income in Western Kenya: *AgBioforum*, 14(3), 158-163.

Mwangi M. and Kariuki S. (2015), Factors Determining Adoption of New Agricultural
Technology by Smallholder Farmers in Developing Countries. *Journal of Economics and
Sustainable Development*: Vol. 6, No.5, 2015. Available online at www.iiste.org ISSN
2222-1700 (Paper) ISSN 2222-2855 (Online)

Salako, W. A. and Odetunde O. J. (1998), Introduction to psychology. Peerless Grace
Publishing Co. Ibadan, Nigeria, 22 – 33

Schmitz A. (2012). "Perception Process" in A Primer on Communication Studies (v. 1.0).
available   online   at   https://2012books.lardbucket.org/books/a-primer-on-
communication-studies/s02-01-perception-process.html

Shehu, B. M., Rekwot P. I., Kezi D. M., Bidoli, T. D. and Oyedokun, A. O. (2010), Challenges
to Farmers' Participation In Artificial Insemination (AI) Biotechnology In Nigeria: An
Overview. *Journal of Agricultural Extension* Vol. 14 (2), December 2010.

Truong Thi N. C. and Ryuichi Y. (2002). Factors affecting farmers' adoption of technologies in
farming system: A case study in OMon district, Can Tho province, Mekong Delta.
Omonrice 10: 94-100 http://clrri.org/ver2/uploads/noidung/10-12.pdf