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RESEARCH ARTICLE

SMALL-SCALE FARMER'S PERCEPTION ON AGRICULTURAL MECHANIZATION ACASE STUDY IN BALCAD DISTRICT, HIRSHABELLE STATE OF SOMALIA

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Abstract

This study investigated small-scale farmer's perception on agricultural mechanization a case study in Balcad district, Hirshabelle State of Somalia. Through a descriptive survey design involving 50 respondents, data were collected on various aspects of mechanization. Results indicate that agriculture is the primary income source for 90% of respondents, with 56% possessing land sizes averaging 7 hectares. Tractors are predominant method of land plowing 56%, with 68% belonging to tractor groups, mainly comprising 10-20 members and fiat tractors being the most widely used 58% due to spare parts availability. Despite challenges like inadequate machinery and credit constraints, respondents perceive mechanization positively, with 84% acknowledging increased land productivity and 92% believing it improves socio-economic status. However, challenges persist, including limited enterprise support, insufficient machinery, extension services, and credit access. Moreover, 80% of respondents express dissatisfaction with current mechanization levels. These findings underscore the need for targeted interventions to address challenges and promote mechanization for sustainable agricultural development in Somalia.

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Introduction:-

Mechanization covered all levels of farming and processing technologies, from simple and basic hand tools to more sophisticated and motorized equipment. It eases and reduces hard labor, relieves labor shortages, improves productivity and timeliness of agricultural operations, increases resource-use efficiency, enhances market access and contributes to mitigating climate-related hazards. Sustainable mechanization considers technological, economic, social, environmental and cultural aspects when contributing to the sustainable development of the food and agriculture sector. Showed at the turn of the century the level, of mechanization in Africa was still dominated by hand-tool technology. It was especially prevalent in land preparation and crop husbandry activities in all four sub regions. Central Africa had 85% of its land entirely under this technology, followed by West 70%, Southern 54% and Eastern Africa 50 %. The lower figures for Southern and Eastern Africa are due to the data from two countries. In South Africa, large-scale farms dominate the agricultural sector and tractors are the main technology, while in Ethiopia, draft animal technology has been in use for several periods. Furthermore, stated that with the exception of South Africa and Ethiopia, agricultural mechanization was introduced in most countries in Africa during the colonial period, starting in the 1890s when much of the region came under colonial rule and after the colonial rule,

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Agricultural mechanization was regarded as high priority by the governments of the new independent states of Africa especially mechanization of the smallholder sector. The experience during the post-War years of implementation of various mechanization projects on the continent inspired confidence within the Africans to fully engage in agricultural mechanization for increased production since increased accessibility and effectiveness of agricultural mechanization can contribute to Africa's agricultural and economic transformation. (Adah, 2021).

Somalia is a country with a rich agricultural history, dating back to ancient times when it was a major exporter of frankincense, myrrh and other aromatic products. Agriculture is still the main source of livelihood for the majority of the population, accounting for about 60% of the gross domestic product (GDP) and employing about 65% of the labour force (FAO, 2019). The main agricultural products include cereals (mainly sorghum, maize and rice), pulses, oilseeds, fruits, vegetables, livestock and fish. Agriculture also contributes to the food security and nutrition of the population, as well as the foreign exchange earnings of the country.

However, the agricultural sector in Somalia faces many challenges, such as recurrent droughts, floods, pests, diseases, conflicts, insecurity, poor infrastructure, weak institutions, limited access to inputs, credit, markets and extension services, and low adoption of improved technologies and practices (FAO, 2019; IFAD, 2020). These challenges have resulted in low and unstable agricultural production and productivity, high post-harvest losses, low value addition, high food insecurity and poverty, and high dependence on food imports and humanitarian assistance.

One of the key challenges facing the agricultural sector in Somalia is the low level of agricultural mechanization. According to the FAO (2019), the level of mechanization in Somalia is one of the lowest in the world, with only 0.1 tractors per 1,000 hectares of arable land, compared to the average of 13.6 tractors per 1,000 hectares in sub-Saharan Africa and 200 tractors per 1,000 hectares in the world. Most of the agricultural operations in Somalia are still done manually or with the use of animal traction, which are labour-intensive, time-consuming, costly and inefficient. The use of animal traction is also constrained by the availability, health and cost of draft animals, as well as the suitability of the soil and terrain for animal ploughing. The limited use of agricultural machinery and equipment in Somalia has implications for the timeliness, quality and scale of agricultural operations, as well as the drudgery and health of the farmers, especially women and youth, who bear the brunt of the manual labour.

The low adoption of agricultural mechanization in Somalia can be attributed to various factors, such as the high cost and scarcity of machinery and equipment, the lack of spare parts and maintenance services, the inadequate skills and knowledge of the farmers and service providers, the poor road and transport networks, the weak policy and institutional support, and the socio-cultural and environmental factors that influence the farmers' preferences and decisions (FAO, 2019; IFAD, 2020). Moreover, the civil war and political instability that have plagued Somalia for decades have disrupted the agricultural sector and hindered the development and dissemination of agricultural mechanization.

Despite these challenges, there are also opportunities and potentials for promoting agricultural mechanization in Somalia, such as the availability of land and water resources, the favorable agro-climatic conditions, the diversity of crops and livestock, the growing demand for food and agricultural products, the increasing population and urbanization, the emergence of private sector and civil society actors, the presence of development partners and donors, and the ongoing peace and state-building processes (FAO, 2019; IFAD, 2020). Moreover, there are some examples of successful initiatives and innovations in agricultural mechanization in Somalia, such as the use of small-scale and appropriate machinery and equipment, such as two-wheel tractors, power tillers, water pumps, threshers, shellers, mills and solar dryers, that are affordable, accessible, adaptable and suitable for the smallholder farmers and the local conditions (FAO, 2019; IFAD, 2020). These initiatives and innovations have demonstrated positive impacts on the agricultural production and productivity, income and livelihoods, food security and nutrition, and gender and social inclusion of the farmers and rural communities.

Therefore, there is a need and scope for scaling up and out the agricultural mechanization in Somalia, by addressing the existing challenges and constraints, and building on the existing opportunities and potentials, in order to enhance the agricultural sector's performance and contribution to the economic and social development of the country. This study aims to assess the current status, drivers, impacts and challenges of agricultural mechanization in Somalia, and to provide recommendations and policy implications for improving and promoting agricultural mechanization in the country.

Objectives:-

The main objective of the study is to ascertain small-scale farmers' perception on agricultural mechanization a case in Balcaddistrict, Hirshabelle State of Somalia. Specifically, the study seeks to:

1. To study the perception of small-scale farmers on various aspects of agricultural mechanization.
2. To assess the current level of agricultural mechanization among small-scale farmers.
3. To determine the specific needs and preferences of small-scale farmers concerning agricultural mechanization.

Significance of the study

The findings of this study will help to inform the farmers in Balcad district about the existing mechanization systems and how they can be used effectively for better and increased production since some farmers are ignorant about the availability of some of these systems. The findings of this research were an addition to the existing data that can be used by other academicians in making their own research or pursuing different tasks while using the available data. The collected data were also conveyed into useful information to be used by extension workers in transforming agriculture to mechanization on a sustainable ground. Ultimately, my research contributed to economic and social development of our globalized society, forming the foundations of government policies that will significantly avert the problems associated with agriculture mechanization by small scale farmers.

Research Methodology: -

The study was carried out in Balcad District. Balcad is one of the districts of Middle Shabelle region of Somalia. It is located about 36 kilometres northeast of the capital city of Mogadishu. This district was chosen as there is a substantial number of smallholder farmers who depend on agriculture as means of livelihood. The study adopted a descriptive survey design. The numbers of respondents were limited to 50 only. The data for the present study have been collected from both primary and secondary sources.

Primary Data

Primary data has been collected using survey method. To conduct survey among respondents, well-structured questionnaire has been prepared and collected information by meeting 50 farmers. Respondents for the present study were chosen by using random sampling technique. The area preferred for the present study is limited to Balcad district.

Secondary Data

The secondary data has been collected from the various articles, journals, books, websites and other internet sources.

Result and Discussions:-

Table 1:- Sex.

Particulars	Frequency	Percent
Female	15	30.0
Male	35	70.0
Total	50	100.0

Source: (primary data)

The above table clearly shows that 70% of the respondents are Male and 30% of the respondents are Female.

Table 2:- Age.

Particulars	Frequency	Percent
20-30	8	16.0
35-40	32	64.0
45-50	10	20.0
Total	50	100.0

Source: (primary data)

The above table clearly shows that 64% of the respondent's age are between 20-30, 20% of the respondent's age are between 35-40 and 16% of the respondent's age are between 45-50.

Table 3:- Marital Status.

Particulars	Frequency	Percent
Married	29	58.0
Single	21	42.0
Total	50	100.0

Source: (primary data)

The above table clearly shows that 58% of the respondents are married and 42% of the respondents are single.

Table 4:- Source of income.

Particulars	Frequency	Percent
Agriculture	45	90.0
Business	5	10.0
Total	50	100.0

Source: (primary data)

The above table clearly shows that 90% of the respondent's income depend on agriculture and 10% of the respondent's income depend on business.

Table 5:- Land size.

Particulars	Frequency	Percent
10 hectares	13	26.0
3 hectares	9	18.0
7 hectares	28	56.0
Total	50	100.0

Source: (primary data)

The above table clearly shows that 26% of the respondents have 10 hectares, 18% of the respondents have 3 hectares and 56% of the respondents have 7 hectares.

Table 6:- How do you plough your land?

Particulars	Frequency	Percent
Use of animals	4	8.0
Use of hoes	18	36.0
Use of tractors	28	56.0
Total	50	100.0

Source: (primary data)

The above table states that 8% of the respondents are using animals for land ploughing, 36% of the respondents are using hoes for land ploughing and 56% of the respondents are using tractors for land ploughing.

Table 7:- Do you belong to any tractor group?

Particulars	Frequency	Percent
No	16	32.0
Yes	34	68.0
Total	50	100.0

Source: (primary data)

From the above data it can be analysed that 68% of the respondents indicated that they belong to a tractor group and 32% of the respondents stated that they do not belong to a tractor group.

Table 8:- What is the size of your tractor group?

Particulars	Frequency	Percent
10-20	42	84.0
20-30	8	16.0
Total	50	100.0

Source: (primary data)

From the above data it can be analysed that 84% of the respondents are indicated that their tractor group size ranges from 10 to 20 and 16% of the respondents are stated that their tractor group size ranges from 20 to 30.

Table 9:- Which tractor manufacturers is your choice?

Particulars	Frequency	Percent
CASE IH	7	14.0
FIAT	29	58.0
JOHN DEERE	1	2.0
MASSEY FERGUSON	13	26.0
TOTAL	50	100.0

Source: (primary data)

The above table states that 26% of the respondents are using Case IH tractors, 58% of the respondents are using Fiat tractors, 2% of the respondents are using John Deere tractors and 14% of the respondents are using Massey Ferguson tractors.

Table 10:- Give a reason for your answer of tractor manufacturers selection.

Particulars	Frequency	Percent
It's cheap to maintain	16	32.0
Its fast	5	10.0
Spare parts are available	29	58.0
Total	50	100.0

Source: (primary data)

From the above data it can be analyzed that 58% of the respondents are prioritize the availability of spare parts, 32% of the respondents are considered affordability of maintenance and 10% of the respondents indicated that the speed of tractor influenced their choice of brand.

Table 11:- Do you have different types of farm implements?

Particulars	Frequency	Percent
No	34	68.0
Yes	16	32.0
Total	50	100.0

Source: (primary data)

From the above data it can be analyzed that 68% of the respondents have no different types of farm implements and 32% of the respondents have different types of farm implements.

Table 12:- How do harvest your crops?

Particulars	Frequency	Percent
Machine	10	20.0
Manual	40	80.0
Total	50	100.0

Source: (primary data)

The above table states that 80% of the respondents are using manually for harvesting crops and 20% of the respondents are using machines for harvesting crops.

Table 13:- Mechanization has increased land productivity.

Particulars	Frequency	Percent
No	8	16.0
Yes	42	84.0
Total	50	100.0

Source: (primary data)

The above table states that 84% of the respondents agree that mechanization has increased land productivity and 16% of the respondents disagreed that mechanization has increased land productivity.

Table 14:- Modern mechanization has improved the socio-economic status of farmers.

Particulars	Frequency	Percent
No	4	8.0
Yes	46	92.0
Total	50	100.0

Source: (primary data)

The above table states that 92% of the respondents agree that modern mechanization has improved the socio-economic status of farmers and 8% of the respondents disagreed that modern mechanization has improved the socio-economic status of farmers.

Table15:- Are you involved in mechanizing agriculture?

Particulars	Frequency	Percent
No	11	22.0
Yes	39	78.0
Total	50	100.0

Source: (primary data)

The above table states that 78% of the respondents are involved in mechanizing agriculture and 22% of the respondents are not involved in mechanizing agriculture.

Table 16:- Have you attended any mechanization training?

Particulars	Frequency	Percent
No	46	92.0
Yes	4	8.0
Total	50	100.0

Source: (primary data)

The above table states that 92 % of the respondents are not participatedmechanization training and 8% of the respondents are participated mechanization training.

Table 17:- Which challenges are involved in mechanizing agriculture?

Particulars	Frequency	Percent
Enterprises that do not support mechanization model	10	20.0
Inadequate machinery	21	42.0
Inadequate mechanization extension	3	6.0
Lack of adequate credit and finance to farmers	16	32.0
Total	50	100.0

Source: (primary data)

The above table states that 42% of the respondents identified Inadequate machinery as significant challenge, 32% of the respondents pointed out the challenge of limited access to credit and finance,20% of the respondentshighlighted enterprises that do not support mechanization model and 6% of the respondents cited lack of adequate credit and finance to farmers as significant challenge.

Table 18:- Are you okay with the level of mechanization in your area?

Particulars	Frequency	Percent
No	40	80.0
Yes	10	20.0
Total	50	100.0

Source: (primary data)

The above table states that 80% of the respondents indicated that they are not satisfied with the current level of mechanization in their area and20% of the respondents expressed satisfaction comfortable with the current level of mechanization in their area.

Conclusion:-

Based on the finding of this study, agriculture is the primary source of income 90% of the respondents, with 56% having land sizes of 7 hectares. The predominant method of land plowing is the use of tractors 56%, while 68% of the respondents belong to a tractor group, with 84% of those tractor groups have a size of 10-20 members. Fiat tractors are the most widely used 58%, primary due to the availability of spare parts.

Despite challenges such as inadequate machinery and credit constraints, the study indicates positive perception towards mechanization. Respondents acknowledge the benefits of mechanization, with 84% believing it has increased land productivity and 92% stating that modern mechanization has improved the socio-economic status of farmers. A significant portion 78% of the respondents is actively involved in mechanizing agriculture, although only 8% have attached mechanization training.

However, challenges persist, including limited support from enterprises for mechanization models, inadequate machinery, insufficient extension services, and a lack of credit and finance for farmers. Furthermore, the majority 80% of respondents express dissatisfaction with the current level of mechanization in their area.

Recommendations:-

Based on the findings of the study, the following recommendations were made:

- 1) The government and non-governmental organizations should work to improve access to agricultural machinery and their spare parts. This could involve initiatives such as subsidies, grants and loans to small scale farmers for purchasing and or renting machinery, as well as establishing distributions networks for spare parts in rural areas.
- 2) Mechanization training programs should be expanded to reach more farmers, particularly to those who are currently not involved in mechanizing agriculture.
- 3) Financial institutions and government agencies should develop tailored financial products and credit schemes to meet the needs of smallholder farmers seeking to mechanize their operations.
- 4) Extension services should be strengthened to provide farmers with technical assistance, information and guidance on agricultural mechanization.

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