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**Abstract**

Agricultural production cost study provides very usefully, practical value information for evolving sound production plans and improving farm efficiency. An understanding of the economics of okra ([Abelmoschus esculentus (L.) Moench]) production is essential to help farmers developed an appropriate agricultural policy to maximize yield and profits. The study was conducted in Al-Qasim district, Babylon Province, Iraq, to identify the economics of okra production. One hundred and twenty okra farmers were randomly selected. Cost and returns analysis indicate that the overall average cost of okra production was $1776·ha-1, and per hectare cost of production increased with an increase in farm size. Family labor accounted for the highest percentage of the total cost of production. Overall average returns and profit per hectare, benefit-cost ratio, rate of return ratio, and operating ratio of okra production indicated okra production was profitable. Focuses more attention on medium-scale okra farms, and increasing dependence on mechanization can contribute to increasing return and profitability.

**Keywords**: budgetary analysis, cost benefit analysis, gross margin, input use, profitability

**Introduction**

Vegetables are the most remunerative agricultural activity for small and marginal farmers, it is the main sources of farm income for small and limited resource farmers (FAO, 2015, 2020). There is an increase in demand for the vegetable crop.

Okra [*Abelmoschus esculentus* (L.) Moench] is one of the most important summer vegetable crops in Iraq, but productivity is low (CSO, 2020; FAO, 2021). With increased demand and low productivity, farmers use large-scale production. High levels of productivity is not obtained due to un inefficient use of available agricultural resources and difficulty in obtaining economic resources ( World Bank, 2015, 2017; FAO, 2017). It is necessary to evaluate agricultural

economic policies of producers. Economics of okra production is essential to develop appropriate agricultural policy.

Studies have examined economics of okra production (Kumar et al., 2015; Godambe et al., 2016; Ekunwe et al., 2017; Udemezue, 2017; Krishna and Sing, 2018; Kushwaha et al., 2018; Rami et al., 2018; Ucha et al., 2018; Maduwanthi and Karunarathna, 2019; Osalusi et al., 2019; Tegar, 2019) and it was found that okra production was more profitable, cost of family labor was the highest among production costs, per hectare cost of okra production increases with an increase in farm size, and the highest return was on medium farms.

Local studies of the economics of agricultural production provide useful information for policy-makers at the international level in setting those policies and directing agricultural production processes to get maximum output and profits from the efficient use of limited resources.

Okra production, in Iraq, is primarily done by small-scale farmers, and there is a need to evaluate their agricultural production process to identify its efficiency and profitability. This study was undertaken to estimate costs and return of okra production determine profit measures of small scale okra production.

**Materials and methods**

The study was conducted in the AL-Qasim district, Babylon province, located between 32° and 33.25° North latitude and 44°to 45° East longitude. The population for the study consisted of 320 okra farmers in the district, who generally cultivate okra in the same way; 20 were chosen to test the reliability of the questionnaire. From the 300 remaining, 120 were selected at random to provide data between 15 and 30 November 2020. The instrument used was a 2-part questionnaire. The first part included socioeconomic characteristics: age, education level, years of experience in okra cultivation, and area cultivated with okra. The second part included data

related to costs of okra production [included; tillage costs (plowing, harrowing, and furrowing, that done by tractor), materials costs (seed, fertilizers, pesticides, herbicides), labor costs (land preparation, sowing, fertilizer application, pesticides, and herbicides application, weeding, watering and harvesting), irrigation costs(water pumping and river cleaning, done by machines), marketing costs (packing and transportation)], the marketed quantities of okra and the price received.

Data collected from respondents were analyzed using frequency counts, percent, and means, and the economic indices total cost, gross return, profit, cost-benefit ratio, rate of return ratio, and operating ratio. Cost of production was calculated with total expenditure on labor, fertilizer, seed, tillage, plant protection, irrigation, and marketing. Gross return was calculated by multiplying the yield of okra with the price received. Cost-Benefit ratio is a relative measure is used to compare benefits per unit of cost to analyze financial efficiency of farmers. The rate of return ratio represents the financial empowerment for a further business venture. The operating ratio is used to estimate the relative expenditure in okra production.

**Results and discussion**

**Characteristics of Okra Farmers**

Responses of respondents varied (Table 1). The majority of okra farmers were young, and in their active and productive years, this could help them to effectively undertake agricultural production, and carry out the work required (Ekunwe et al., 2018; Udemezue, 2017). Respondents were well educated with most having a secondary school and above education which should increase farm productivity and return (Eric et al., 2014; Udemezue, 2017; Paltasingh and Goyari, 2018; Korgitet, 2019). Okra farmers several years of experience which contributes to increased production and productivity (Udemezue, 2017; Ainembabazi and

Mugisha, 2014). Most were small-scale farmers, small scale farms use more inputs and engage more workers, which affects their returns and profit (FAO, 2015). Increasing farm size has a positive impact on farmer net profit, and economic, technical, and labor efficiency (Ren et al., 2019).

**Table 1.** Socioeconomic characteristics of okra farmers (N=120).

| Characteristic | Category | N | % |
|---|---|---|---|
| Age (years) | <30 | 27 | 22.5 |
| | 30-45 | 57 | 47.5 |
| | >45 | 36 | 30.0 |
| Educational level | <secondary | 41 | 34.2 |
| | secondary | 57 | 47.5 |
| | >secondary | 22 | 18.3 |
| Years in okra cultivation | <10 | 13 | 10.8 |
| | 10-20 | 36 | 30.0 |
| | >20 | 71 | 59.2 |
| Area cultivated with okra(ha) | <1 ha | 18 | 15 |
| | 1-2.5 ha | 87 | 72.5 |
| | >2.5 ha | 15 | 12.5 |

**Cost of Okra Production**

Average cost·ha$^{-1}$ of input factors varied (Table 2). Overall average cost of okra production was highest on large farms followed by medium and small farms. Per hectare cost of okra production increased as farm size increased (kushwaha et al., 2018; Rami et al., 2018), in conventional farming, farmers use more input, with low productivity and quality, so production costs will be increased. Family labor accounted for the highest percent of total cost of production , Kumar et al. (2015), Godambe et al. (2016), Ekunwe et al. (2017) and Kushwaha et al. (2018). Family labor in small scale farm is substantial, this farm is not conducive to any form of mechanization, but labor demand depends partly on the level of mechanization, so, the gradual mechanization of small-scale family farming reduces manual work, arduousness of farm work, and improves productivity per hectare (FAO, 2016). After plowing and constructing furrows, all activities and

management of okra production are done manually, especially harvest. okra pods need to be harvested about three times a week. Pods should be harvesting correctly at the proper time, and handle carefully to prevent bruising both during harvest and packing operations, as a result, the need for human labor increases. The highest labor cost was on small farms followed by medium farms and large farms. The cost of family labor decreases when farm size increases (Rami et al., 2018), because the same number of family members participate in the agricultural production processes, regardless of farm size, thus, keeping the same number of family laborers with the increase in the cultivated area means fewer labor costs.

Other major component costs were seed, fertilizer, marketing, tillage, irrigation, and plant protection.

**Table 2.** Cost of okra production per hectare ($·ha$^{-1}$).

| Factors | Farm category | | | | | | Overall average | |
|---|---|---|---|---|---|---|---|---|
| | small | | medium | | large | | | |
| | cost | % | cost | % | cost | % | cost | % |
| Labor | 750 | 46 | 652 | 36.3 | 650 | 34 | 684 | 38.3 |
| Fertilizer | 250 | 15 | 292 | 16.2 | 292 | 15 | 278 | 15.6 |
| Seed | 229 | 14 | 292 | 16.2 | 354 | 19 | 292 | 16.4 |
| Tillage | 104 | 06 | 121 | 06.7 | 133 | 07 | 119 | 06.7 |
| Plant protection | 63 | 04 | 79 | 04.4 | 79 | 04 | 74 | 04.1 |
| Irrigation | 79 | 05 | 113 | 06.3 | 113 | 06 | 102 | 05.7 |
| Marketing | 167 | 10 | 250 | 13.9 | 292 | 15 | 236 | 13.2 |
| Total | 1642 | 100 | 1799 | 100 | 1913 | 100 | 1785 | 100 |

## Returns of Okra Production

The overall average returns and profit per hectare of okra production varied with farm size (Table 4), but okra production was profitable. Medium farms had the highest returns and profit followed by large, and small farms. The overall average benefit-cost ratio indicated okra cultivation provides a return on investment. The rate of return ratio, and operating ratio of okra production indicated production of okra was profitable.

**Table 3.** Returns and profit of okra production per hectare ($\$\cdot ha^{-1}$).

| | Farm category | | | |
|---|---|---|---|---|
| Economic factors | small | medium | large | Overall average |
| Returns | 5000 | 8350 | 6750 | 6700 |
| Costs | 1642 | 1799 | 1913 | 1785 |
| Profit | 3358 | 6551 | 4837 | 4915 |
| Benefit cost ratio | 3.04 | 4.64 | 3.52 | 3.75 |
| Rate of Return Ratio | 2.04 | 3.64 | 2.52 | 2.75 |
| Operating ratio | 0.33 | 0.21 | 0.28 | 0.26 |

## Conclusion and Recommendations

Okra farmers were young, well educated, several years of experience, and small scale farm. Okra production costs were highest on a large farm, while family labor was the highest of the total cost. Medium farms had the highest returns and profit, the overall average of returns, profit, benefit-cost ratio, rate of return ratio, and operating ratio indicated that okra production was profitable and suitable for doubling farmer's income. It is likely that focuses more attention on medium-scale okra farmers, through adequate extension courses, toward improving their production and productivity. Improvement of agricultural machinery especially at harvest time will greatly affect okra production costs and make it more profitable.

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