DEPARTMENT OF AGRICULTURE
Ministry of Agriculture & Forests

Cost of Production of Field Crops and Horticultural Crops grown in Bhutan
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FOREWORD

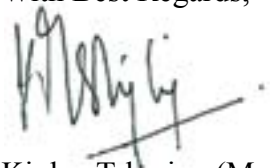
The Department of Agriculture (DoA), Ministry of Agriculture & forests (MoAF) is pleased to bring out its publication titled; "Cost of Production of Field Crops and Horticultural Crops grown in Bhutan" wherein the national average cost of production of all major crops grown in the country are calculated and estimated using reliable expenditure data from the field and taking into account the yield data from Agricultural Statistics 2015.

The Department would like to share copies of the document with all relevant agencies and expect that it would provide useful information to these agencies. We would like to however caution that the data provides the National Averages therefore, for any specific calculation that one requires for a particular crops grown in a particular place then it should be done accordingly taking into account the data pertaining to that particular place only.

The document is expected to play an important role to advance the understanding of the cost of production, to promote the field crops and horticulture related enterprises and to encourage and foster a better understanding between the agricultural investments and rural lending schemes.

The department would like to acknowledge the cooperation provided by the Research Development Centers (RDCs), the commodity coordinators and the Dzongkhag/Extension staffs in providing data from the field.

With Best Regards,



Kinlay Tshering (Ms.)
Director

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INTRODUCTION

Field crops and Horticultural crops are of great importance for increasing the share of agriculture in Gross Domestic Product in the country. Commercialization of high value and low volume crops farming in the country has been gaining momentum. Majority of the farmers are shifting from agronomic crops to horticultural crops in recent years. Recognizing the importance of these field crops and horticultural crops the Department of Agriculture, Ministry of Agriculture & Forests initiated data collection in 2017 to compile and assess the costs of production of various important crops grown in the country. Although there has been a documented cost of production for 17 major vegetables grown in the country in 2013, the department feels it is useful to update the information after every few years and also to include more crops in the list.

Furthermore, recent years have seen an increasing interest from youths and entrepreneurs to engage in agricultural related enterprises. Many financial institutes have also started expanding their credit facilities to such interested entities. Likewise many projects and programs of agriculture are also in need of information related to the cost of production of field crops and horticultural crops for various purposes. It is therefore essential that the Department of Agriculture come up with a publication indicating the cost of production of various crops grown in the country.

Objectives:

- To compile and collect data on various inputs used for growing field crops and horticultural crops in the county,

- To establish an average cost of production at national level for as many crops as possible.

Methodology:

- 10 Dzongkhags were selected for the data collection
- Development of data collection format
- Each Dzongkhag was asked to identify two/three major crops grown in their respective gewogs
- In each gewog, respondents were selected randomly (about 10% of the major growers of each crops in every gewog were selected)
- Explained & distributed the questionnaire to the District Agriculture Officers for further distribution to the respective Extension Officers
- A total of 594 filled-in questionnaires were received and used for the data analysis.
- Seed rates and cost per unit seeds have been used from the National Seed Center documents.
- National average yield of all crops have been taken from the Agriculture Statistics 2015.

DEFINITION AND CONCEPTS

The followings are the definitions and concepts used in the study:

Total Cost is an aggregate of fixed and variable costs incurred in the crop production.

Fixed Cost - are those that do not vary with size of enterprise and have no bearing upon decisions to increase or decrease production. It includes building cost, machinery cost, irrigation equipments, fencing costs, tools and implements. For ease of calculation a straight line depreciation method has been applied for all the fixed costs involved.

Total Variable Cost - are the costs at market price level and incurred in cash on items such as human labor, bullock labor, seed, manures, irrigation cost, fertilizers, plant protection aids, Farm Yard Manure (FYM), chemicals and other miscellaneous cost. For household farm labour involved the opportunity cost of labour has been reflected in the labour usage so that the cost of production is calculated based on actual inputs involved.

$$\textbf{Cost of Production} = \frac{\textbf{Total Cost}}{\textbf{Total Output}}$$

The total cost incurred in growing a particular commodity in a particular area of land divided by the total output produced in that particular area gives the Cost of Production per unit (i.e. Nu/kg).

In order to get a National level average cost of production, the average of the total costs incurred for a particular commodity from the 594 entries has been taken into account. For total output the average national yield of particular commodities from the Agriculture Statistics 2015 has been considered. Thus, the cost of production of every commodity has been worked out in this manner.

Human Labor - forms one of the important components of cost involved in cost of agricultural production. It is measured in terms of adult man-day (eight working hours) in the field. In this study women and man labour days are considered as equal.

Own Family Labor - It implies the labor contribution on farm by own family members. It is the main source of farm labor in case of small and medium sized farms. For estimating such costs, family labor has been valued as paid type of labor. Labor taken on exchange basis is also included in the family labor.

Hired Labor - is the non-family labor employed for farm work on payment on wages in cash, kind or both. On the basis of work nature, the wage rate in this study has been considered as equal for men and women.

Depreciation - is calculated on the basis of purchase value and economic life of an asset. The economic life of an asset is provided by the company. The formula for calculating annual depreciation cost is as follows:

Depreciation Cost = (Purchase value – Scrap value)/Economic life of the farm asset.

NATIONAL AVERAGE COST OF PRODUCTION 2017

Category of crops for which data was collected and analyzed to compute the National average cost of production are as follows:

- *Cereals* (paddy, maize, barley, wheat, buckwheat, quinoa & mustard)
- *Spices* (ginger, garlic and cardamom)
- *Vegetables* (potato, cabbage, cauliflower, radish, eggplant, chili, onion, tomato, carrot, broccoli, pea, beans, sparrow gourd and spinach)
- *Mushroom* – Shitake and Oyster
- *Fruits* (apple, pear, peach, papaya, banana, mandarin, persimmon, avocado, mango, plum, guava, litchi, passion fruit, pomegranate, jackfruit and walnut).

Table 1: Cereals Average cost of production

Sl. No.	Cereal Name	Expenditure (Nu/acre)	Yield (Kg/acre)	Cost of Production (Nu/kg)
1.	Paddy	60,900	1627	37.43
2.	Maize	23,360	1474	15.85
3.	Barley	21,910	714	30.69
4.	Wheat	20,600	770	26.75
5.	Buckwheat	16,150	628	25.72
6.	Quinoa	34,450	649	53.08
7.	Mustard	17,000	382	44.50

Table 2: Spices Average cost of production

Sl. No.	Spices Type	Expenditure (Nu/acre)	Yield (Kg/acre)	Cost of Production (Nu/kg)
1.	Ginger	74,450	2024	36.78
2.	Garlic	36,350	712	51.05
3.	Cardamom	57,600	197	292.39

Table 3: Vegetables Average cost of production

Sl. No.	Vegetable Name	Expenditure (Nu/acre)	Yield (Kg/acre)	Cost of Production (Nu/kg)
1.	Potato	69,315	4111	16.86
2.	Cabbage	30,670	2309	13.28
3.	Cauliflower	37,945	1541	24.62
4.	Radish	20,500	2077	9.87
5.	Eggplant	26,910	1510	17.82
6.	Chili	43,250	1691	25.58
7.	Onion	32,400	1121	28.90
8.	Tomato	26,830	1422	18.87
9.	Carrot	39,900	1955	20.41
10.	Broccoli	30,450	1334	22.83
11.	Pea	35,180	1240	28.37
12.	Beans	33,000	1200	27.50
13.	Sparrow/ Slipper gourd	13,150	1350	9.74
14.	Spinach/sag/ mustard green	21,750	1114	19.52

Table 4: Mushroom Average cost of production

Shitake Mushroom

No. of billets	Total Expenditure (Nu)	Total Yield (kg)	Cost of Production (Nu/kg)
Estimate for 5000 billets	243,800	1500	162.53
Estimate for 10000 billets	406168	3000	135.39
Average	324,984	2,250	149

Oyster Mushroom

No. of billets	Total Expenditure (Nu)	Total Yield (kg)	Cost of Production (Nu/kg)
Estimate for 600 plastic bags (i.e.1 ton straw)	104,027	2160	48.16

Note: Yield of shitake is estimated at 0.3 kg/billet and yield of oyster is estimated at 1.2 kg/plastic bag.

Table 5: Fruits Average cost of production

Sl. No.	Fruit Name	Expenditure (Nu/acre)	Yield (Kg/acre)	Cost of Production (Nu/kg)
1.	Apple	1,31,020	5370	24.40
2.	Pear	1,30,125	9845	13.22
3.	Peach	1,35,050	6265	21.56
4.	Papaya	1,20,675	10235	11.79
5.	Banana	1,24,175	6230	19.93
6.	Mandarin	1,30,110	3401	38.26
7.	Persimmon	1,36,390	6981	19.54
8.	Avocado	1,39,920	4100	34.13
9.	Mango	1,31,325	2016	65.14
10.	Plum	1,35,060	8950	15.09
11.	Guava	1,21,200	4000	30.30
12.	Litchi	1,17,780	1701	69.24
13.	Passion fruit	2,75,250	6750	40.78
14.	Pomegranate	1,26,000	4500	28
15.	Jackfruit	1,15,950	7240	16.02
16.	Walnut	1,40,120	2800	50.04
17.	Kiwi	2,94,700	4480	65.78
18.	Pineapple	18,360	360 nos.	51.00 (per no.)

NOTE: For all fruits it has been assumed that the total expenditure includes drip irrigation cost of Nu.30,000/acre/year and electric fencing cost of Nu.20,000/acre/year.