# Economics of Groundnut Production in Malawi

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Groundnut (*Arachis hypogaea)* is an important legume crop in the smallholder agriculture in Malawi, providing approximately 25% of the agricultural income. Until late 1980s, groundnut was Malawi's fourth most important export crop product after tobacco, sugar, and tea (Babu et al. 1995). Groundnut is also important in the diet, being the major source of vegetable protein and edible fat, in rural Malawi. The haulms are a rich protein feed for livestock. The crop is a valuable component in maize *(Zea* mays)-based cropping system and improves soil fertility (Chiyembekeza et al. 1998).

Groundnut is grown mostly by smallholder farmers and almost 70% of the crop is grown in central Malawi. However, many farmers including estate farmers are now realizing the importance of groundnut, especially with the unfavorable tobacco markets. The introduction of such high-yielding groundnut varieties as CG 7 coupled with the efforts of various non-governmental organizations (NGOs) and research and development organizations in seed production and delivery have played an important role in promoting groundnut production in the country. As a result, farmers are looking for information on groundnut production costs and the financial returns to investment in groundnut production.

To provide such information, an experiment was conducted at Chitedze Agricultural Research Station near Lilongwe, Malawi during the 2000/01 crop season. The purpose of the experiment was to estimate the production costs and profitability of groundnut at three different input levels (Table 1):

1. **Low input:** Smallholder farmers with seed as the major input; all field operations are carried out manually using family labor.
2. **Medium input:** Small-scale commercial farmers where all field operations are carried out using hired labor following recommended cultural practices (seed rate, spacing, and early planting).

**Table 1. Field operations and input levels for groundnut production in Malawi.**

| Field operation | Low input (LI) | Medium input (MI) | High input (HI) |
|---|---|---|---|
| Land preparation[1] | Manual | Manual | Tractor |
| Fertilizer | None | None | Triple superphosphate (at 87 kg $ha^{-1}$ as basal dressing) |
| Sowing[2] | Late | Early | Early |
| Seed source | Local seed | Basic seed (treated with thiram) | Basic seed (treated with thiram) |
| Seed rate | Low (40 kg $ha^{-1}$) | Optimum (80 kg $ha^{-1}$) | Optimum (80 kg $ha^{-1}$) |
| Interrow spacing | 90 cm | 75 cm | 75 cm |
| Intra-row spacing[3] | 20-25 cm | 15 cm | 15 cm |
| Top dressing | None | None | Gypsum (175 kg $ha^{-1}$ at pegging stage) |
| Weeding[4] | Manual | Manual | Chloroacetanilide + manual |
| Insecticide | None | None | Lambda cyhalothrin[5] |
| Fungicide | None | None | Chlorothalonil[6] |
| Harvesting | Manual | Manual | Manual |
| Stripping | Manual | Manual | Manual |
| Shelling and cleaning | Manual | Manual | Manual |

1. Land clearing and ridging was carried out using a hoe under LI and MI. Plowing, harrowing, and ridging under HI were carried out using a tractor.
2. Sowing was done by hand with the onset of first planting rains (23 Nov 2000) in MI and HI, and a week later (29 Nov 2000) in LI
3. Spacing between planting stations along the ridge.
4. Weeding was done twice in LI using a hoe and thrice in MI and Hi. Hand weeding (pulling weeds by hand) was also carried out once in MI and HI. Pre-emergence herbicide (chloroacetanilide) was applied soon after sowing in HI.
5. One spray to control aphids at seedling stage.
6. Two sprays at 60 and 80 days after sowing to control early leaf spot.

**Table 2. Cost of inputs and economic returns at three input levels for cultivation of groundnut in Malawi.**

| Description | Low input (LI) | Medium input (MI) | High input (HI) |
|---|---|---|---|
| **Inputs (cost in MK)** | | | |
| Seed[1] | 1,400 | 6,400 | 6,400 |
| Fertilizer[2] | 0 | 0 | 1,606 |
| Herbicide[3] | 0 | 0 | 2,220 |
| Insecticide[4] | 0 | 0 | 780 |
| Fungicide[5] | 0 | 0 | 940 |
| Top dressing* | 0 | 0 | 2,800 |
| Tractor cost[7] | 0 | 0 | 4,744 |
| Labor[8] | 20,750 | 31,881 | 35,781 |
| Packaging sacks | 1,150 | 1,900 | 2,950 |
| Total costs | 23,300 | 40,181 | 58,221 |
| **Outputs** | | | |
| Seed yield (t $ha^{-1}$) | 1.16 | 1.92 | 2.96 |
| Haulm yield (t $ha^{-1}$) | 2.95 | 2.72 | 3.05 |
| **Returns** | | | |
| Gross return (MK $ha^{-1}$)[9] | 40,689 | 67,150 | 103,419 |
| Net return (MK) | 17,389 | 26,968 | 45,198 |
| Benefit-cost ratio | 1.74 | 1.67 | 1,78 |

1. Cost of basic seed at MK 80 $kg^{-1}$ for MI and HI and local seed at MK 35 $kg^{-1}$ for LI.
2. Cost of triple superphosphate at MK 18.5 $kg^{-1}$ in HI.
3. Cost of herbicide at MK 2,220 $L^{-1}$ in HI at I L $ha^{-1}$
4. Cost of insecticide at MK I.950 $L^{-1}$ applied in HI at 40 ml $ha^{-1}$
5. Cost of chlorothalonil at MK 940 $L^{-1}$ applied in HI at 1 L $ha^{-1}$
6. Cost of gypsum at MK 16 $kg^{-1}$ applied in HI at 175 kg $ha^{-1}$.
7. Cost of diesel and daily wages for tractor operator for plowing and ridging in HI.
8. Cost of labor in days at MK 50 $day^{-1}$ for land preparation, ridging, planting, weeding, lifting, stripping, shelling, grading, and bagging.
9. Value of output at MK 35 $kg^{-1}$ seed

3. High input: Large-scale estate farmers where field operations are generally mechanized following recommended cultural practices and have high level of inputs.

Three blocks, one hectare each, unreplicated, were planted to groundnut variety CG 7 to simulate the three input levels in groundnut production. Details of field operations and inputs applied in the three different input levels are presented in Table 1. Field operations, input levels, and crop management practices were carried out based on what is actually practiced by fanners in the defined input levels. Data on cost of various inputs as well as yield of pods, seed, and haulms were systematically collected.

## Groundnut production costs

Production costs included costs of labor for land preparation, sowing, weeding, spraying of pesticides, lifting, stripping, shelling, grading, and bagging; chemicals (herbicides, insecticides, fungicides, fertilizers); seed; fuel for tractor; and packaging sacks. The production costs [calculated at US$ 1 = Malawi Kwacha (MK) 651 were MK 58,221 (US$ 894) in high input, MK 40,181 (US$ 617) in medium input, and MK 23,300 (US$ 359) in low input (Table 2). Chemicals and machinery were the sources of high production costs in high input level. Overall, stripping, and shelling were the major labor demanding activities in groundnut production and contributed about 40% to the total production cost at all three input levels.

## Net output

Net output in high, medium, and low input levels was 2.96 t $ha^{-1}$, 1.92 t $ha^{-1}$, and 1.16 t $ha^{-1}$, respectively. A net output of 2.96 t $ha^{-1}$ in high input compares well with high input systems in other groundnut-producing countries such as USA, Australia, Argentina, and Brazil where net output of 2.0 to 4.0 t $ha^{-1}$ have been reported

(Freeman et al. 1999). The average groundnut yield among smallholder farmers using local varieties is about 0.45 t $ha^{-1}$. A net output of 1.16 t $ha^{-1}$ therefore represents a yield advantage of 0.71 t $ha^{-1}$. This yield advantage therefore represents the benefit that farmers would get simply by replacing local groundnut varieties with improved groundnut varieties such as CG 7.

## Net benefit

The net benefits in high, medium, and low input levels were MK 45,198 (US$ 695) $ha^{-1}$, MK 26,968 (US$ 415) $ha^{-1}$, and MK 17,389 (US$ 268) $ha^{-1}$, respectively. The value of haulms is not included in the analysis since information on prices of haulms is not available in Malawi. These results therefore represent lower bound of likely returns to farmers investing in groundnut production.

The results have shown that there are quite substantial returns to groundnut production at all input levels. The benefit-cost ratio of greater than one at all input levels simply suggests that it is worthwhile investing in groundnut production. Since 65% of Malawi's population is poor, cultivation of improved groundnut varieties can therefore play an important role in alleviating poverty in the smallholder sector.

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## References

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# Groundnut Releases

## New Groundnut Released in Malawi

P Subrahmanyam of ICRISAT-Lilongwe, Malawi reports that the Agricultural Technology Release Committee of the Government of Malawi has approved the release of ICG 12991 for cultivation in Malawi. ICG 12991 is a high-yielding, short-duration variety with resistance to groundnut rosette. This is the first rosette resistant short-duration variety released in the southern and eastern Africa region.

About 18% of Malawi's groundnut area is covered with 1CRISAT/DARTS developed improved varieties. With the recent releases (two in 2000 and one in 2001), and available funds from the ICRISAT/USAID Project for seed multiplication, the area under improved varieties will further increase. About US$ 0.35 million may be generated for groundnut seed production during 2001 through the revolving fund.

## New Groundnut Varieties Released in Indonesia

Three groundnut varieties have been released recently for cultivation in Indonesia. Of these, ICGV 86031 and 87358 are direct introductions from ICR1SAT. In Indonesia, groundnut varieties are named after animals, so the former has been named as Kancil (mouse deer) and the latter as Turangga (horse).

Kancil is reported resistant to bacterial wilt and *Aspergillus flavus,* and tolerant to rust, leaf spot, and leaf chlorosis. It contains 50% oil and 30% protein. In the tests conducted at ICRISAT, it showed resistance to thrips, jassids, leaf miner, *Spodoptera,* and bud necrosis virus. It is also insensitive to photoperiod. Turangga is reported resistant to bacterial wilt, and moderately resistant to rust, leaf spot, and *A. flavus.* It is also tolerant to drought stress and shading. It has 47% oil content.

Sima, the third variety, is selected from a cross between ICGV 87165 and Majalengka. It is reported moderately resistant to *A. flavus* and tolerant to rust, leaf spot, drought, and acid soils. It contains *43%* oil and 22% protein. ICGV 87165 is an interspecific derivative developed at ICRISAT.

Till date, Indonesia has released six varieties of groundnut, which either originate from ICRISAT or are derived from ICRISAT-bred materials. The earlier three releases include ICG 1697 as Singa, ICG 1703 as Panter, and ICGV 86021 as Jerapah.