# Taro Research and Development in Fiji

**S. Chandra**
Assistant Director of Agriculture (Research)
Ministry of Agriculture and Fisheries
Fiji

## Abstract

Recent research and development in taro in Fiji are reviewed and the results of the important experiments are presented. Most of the work has been concentrated on accessions and varietal selections, growth studies of the plant, fertilizer responses and plant population studies, production systems and engineering research. Much work still remains to be done and suggestions for further research are outlined.

## Introduction

Taro (*Colocasia esculenta* (L.) Schott), known locally as dalo, is an important staple crop of the Fijians. In Fiji, taro is grown either under dryland or wetland culture. It is difficult to estimate the annual production area of taro in Fiji because most of the crop is grown for subsistence use. However, the latest agricultural census of 1968 (Casley, 1969) shows that 1200 ha of taro was grown in pure stands while another 3,400 ha was grown with other crops. Assuming a yield of 8 t/ha for pure stand taro and 4 t/ha for mixed crops, the annual production in Fiji could be 23,200 t. Almost all taro produced in Fiji is consumed locally and only a small percentage is exported, mostly to New Zealand and New Caledonia.

Root crops research in Fiji has only been done recently with most of the work carried out in the last 10 years. Because of the importance of taro in the diet of the Fijians, considerable research input has gone into this crop. The main thrust of research has been to increase taro yields by varietal selection, fertilizer response studies, optimum planting densities, examining cultural methods and production systems, and by pest, disease and weed control. The research was carried out at Koronivia, Waidradra and Dobuilevu Research Stations in the southeast of Viti Levu the main island in the Fiji group. Table 1 shows the climatic and soils data for these three stations.

The following account is a review of the important areas of taro research in Fiji. Emphasis is on works having a significant impact on the development of taro in Fiji.

## Accessions and Germplasm Collection

In a recent survey of root crop resources in Fiji, 152 accessions of taro were made (Annual Research Report, 1973). The cultivars were collected from all over Fiji, especially from the outlying islands. Description and color transparencies of the foliage, petioles and corms of each accession were made. The accessions were grouped according to the petiole color and were planted at the Koronivia Research Station. This germplasm collection served as a source for research material and extension use. Classification of the taro accessions is still to be carried out. Because of considerable mobilization of human and capital resources, classifications would be a worthwhile area for a new project on taro in Fiji.

Trials were conducted to measure the adaptations of some of these cultivars to a broad spectrum of the ecological conditions in Fiji which are the wet, intermediate and dry zones. Yields of up to 28 t/ha were recorded. Table 2 shows the results of the adaptability trials in order of rank. The cultivar Samoa shows wide adaptation range giving high yields in all taro growing areas in Fiji. Tausala ni Samoa has a similar range of adaptability at slightly lower yields. On the other hand, Samoa Oriori performs well in high rainfall regions. Vaivai Dina gives a lower yield than some other cultivars but has an excellent taste. For this reason it is preferred by the semi-subsistence producers.

## Varietal Selections

Considerable work has been carried out on varietal selections in Fiji and these have been reported in Annual Research Reports (1973-1977). The following results are from one dryland variety trial carried out between 1972 and 1973.

The trial was laid out at Waidradra and Dobuilevu Research Stations. The Waidradra trial was on humic latosol soil in which 10 varieties were used in a randomized block design replicated four times. The plant spacing was 60 cm x 60 cm. The plot size was 10.8 $m^2$. The trial was planted on October 13, 1972 and harvested on August 21, 1973. Fertilizer was applied at the following rates: 200 kgN/ha, 50 kgP/ha and 100 kgK/ha.

The Dobuilevu trial was on alluvial soil using 8 varieties in a randomized block design replicated four times. The plant spacing was 60 cm x 60 cm. The plot size was 8.9 $m^2$. The trial was planted on September 9, 1972 and harvested on June 25, 1973. Fertilizer was applied at the following rates: 100 kgN/ha, 50 kgP/ha and 100 kgK/ha. For both trials P and K were applied at planting and N was applied in split doses at 6 and 12 weeks after planting.

The results of the trial are presented in Table 3. Variety Kurokece performed poorly at both sites and was not included in the analysis. Dry matter percentage varies considerably between varieties, so comparisons were made on a dry weight basis. Consumers generally prefer varieties with a high dry matter percentage. On the dry weight basis, Samoa Oriori, Tausala ni Samoa and Kaboa were the best yielding varieties at Waidradra whereas Samoa, Tausala ni Samoa and Qawe ni Urau yielded best at Dobuilevu. The variety Mumu yielded the lowest at both sites. There was a significant in interaction trial x varieties except Samoa variety which was the top yielder at Dobuilevu but the lowest by a clear margin at Waidrada.

The Samoan varieties, Samoa, Samoa Oriori and Tausala ni Samoa are single-stemmed varieties and these produce large well-shaped corms which are preferred for export. High yields, high corm dry matter percentage and low sucker numbers indicate that the assimilates in these varieties are stored in the main corm rather than used for sucker production (Annual Research Report, 1975). However, these Samoan varieties generally take longer to mature (10 to 12 months) compared to other varieties which mature in about 9 to 10 months.

Time of planting trials have shown that the best yields are obtained with taro planted between September and November. At this time of the year the plants receive larger amounts of rainfall, longer hours of sunshine and higher temperatures which are ideal for rapid growth (Sivan, 1970). Between May and October, taro growth is likely to be affected by low rainfall and low temperatures.

## Growth Studies

Growth and development studies enable the components of yield to be determined and if possible, to be modified, so that higher yields can be attained. Studies on growth of taro are few, the often cited one is by Plucknett and de la Pena (1971). In Fiji, research on growth in three varieties of taro have been carried out and this is briefly described below.

The varieties used were Hawaii, Qawe ni Urau and Tausala ni Samoa. These varieties have leaf angles varying from near vertical to almost horizontal and were considered as having sufficient diversity to enable general conclusions about taro growth to be drawn (Haynes, 1977).

The trial was planted on alluvial soil at Koronivia Research Station on October 15, 1973. The varieties were planted in main plots and replicated five times. The main plots were split for 24 dates of harvest. Plant spacing was 60 cm x 60 cm. Fertilizer was applied at the following rates: 200 kgN/ha, 50 kgP/ha and 200 kgK/ha. Nitrogen was applied in split applications 6 and 12 weeks after planting. Samples of 6 plants were taken from the subplots at two weekly intervals for 40 weeks after planting. At each harvest the mother plant and suckers were separated and dissected into lamina, petioles, corms and roots and their fresh weight were taken. Subsamples from these were oven dried at 80°C to constant weight to determine dry matter yield.

A generalized version of the growth changes in taro is shown in Figure 1. From this figure the following phases may be recognized: (a) an establishment phase which lasts for 6 weeks after planting, (b) a grand growth phase from 6 to 20 weeks after planting, and (c) maturity phase which lasts from 20-40 weeks during which time the total dry matter declines but corm dry matter continues to increase rapidly. The rate of dry matter accumulation in corms is rapid up to 32 weeks and remains high up to 40 weeks when it attains equilibrium with dry matter loss.

As a sequel to the above study, the growth of taro in the establishment phase was studied under conditions of low moisture stress and this is represented by the accumulation of dry matter in Figure 2. From this figure, it can be deduced that taro planting material can become established as independent plants as early as 4 weeks after planting. The growth of the taro plant was also shown to be sensitive to moisture stress. This is evidence that taro is highly adapted for growth under wet conditions.

A study of the duration of the leaf areas of different magnitude was also studied in the three cultivars and the results are presented in Table 4.

A leaf area index (L) of 3 is generally accepted as optimum for crop plants. Such a value is only reached by Hawaii and Qawe ni Urau after 16 weeks of growth and is maintained for 10 and 16 weeks, respectively. Subsequently L declines slowly for Hawaii and more rapidly for Qawe ni Urau. Tausala ni Samoa never attains the optimum L value, suggesting inefficient use of available solar radiation. These observations imply that intercropping with short-term crops, such as Chinese cabbage and cowpeas, is worth a trial in taro fields. Management of taro for more rapid development of leaf area is also indicated. The most likely ways of achieving this are through the addition of nitrogen fertilizer, closer spacing and by reducing soil moisture stress.

## Fertilizer responses

Some studies on fertilizer responses have been carried out on farmers' fields at Lomaivuna (Annual Research Report, 1973) and to a small extent at Koronivia Research Station (Berwick *et al.*, 1972). The results of the Lomaivuna trial are described below.

The trial consists of two series of NPK factorial on humic latosol and alluvial soils. Fertilizer levels were at the following rates: O, 100, 200 kgN/ha, O, 25, 50 kgP/ha and O, 100, 200 kgK/ha. Phosphorus and potassium were applied at planting and nitrogen was applied in split doses at 6 and 12 weeks after planting. The variety planted was Tausala ni Samoa at a spacing of 60 cm x 60 cm. The trial was planted on November 23, 1972 harvested in September, 1973.

Both series of experiments gave optimum economic response with 100 kg/ha of N. The yield on humic latosol was twice that on alluvial soil. Nitrogen increased both the total plant yield and corm yields but it slightly reduced the dry matter of the corms. There was no response to P and K inspite of a response in an earlier series of trials on humic latosols. More work needs to be done on a wide range of soil types to determine: (a) the fertilizer needs of taro and (b) the varietal difference response.

## Plant Population Studies

Spacing experiments have been conducted at Waidradra and Koronivia Research Stations (Sivan *et al.*, 1972). Table 5 shows the results of these experiments.

Spacing of 60 cm x 60 cm was found to give the highest marketable size corms for all the three cultivars. The mean weight of the corms at 90 cm x 120 cm spacing was 1.1 kg whereas at 60 cm x 45 cm spacing it was 0.73 kg. The suggestion that there is a spacing and variety interaction merits further study. In practice, however, the relative merits of very close spacing for different varieties is likely to depend more on varietal differences in production of suckers ( a critical factor in continuous high population culture) rather than slight varietal differences in the form of the yield spacing curve (Berwick *et al.*, 1972).

The effect of spacing and nitrogen interaction was studied in another trial. Two spacing levels were used with plants 100 cm x 100 cm and 50 cm x 50 cm apart. Nitrogen was applied at two levels, 0 and 200 kg/ha and split in two doses at 6 and 12 weeks after planting. A basal fertilizer of 50 kg/ha of P and 100 kg/ha of K was used. The trial was conducted at Koronivia Research Station on a sandy clay loam soil using the variety Qawe ni Urau. The results are shown in Table 6.

It was found that the closer spacing not only doubled the yield but also doubled the response to N. The closer spacing tended to decrease the mean corm size and in the absence of N, most of the corms were less than 0.45 kg and of little commercial value. However, with N most of the corms were in the preferred market range of 0.45-0.90 kg and only 10 percent of the corms were less than 0.45 kg.

## Planting Material Responses

Surveys carried out show a large variation in the origin and size of planting material used for planting by the farmers. As many as five categories were recognized and these are presented in Table 7.

It has been observed that the size of the planting material, whether it be tops or suckers, does influence the yield of taro (Ching, 1971). For example, in an experiment in Fiji, taro corm yield was reduced when the planting material with a basal diameter of less than 2.5 cm was used. As long as the planting material exceeds 2.5 cm up to just over 5 cm at the base there appears to be no significant difference in yield.

## Production Systems Studies

Most of the farmers in Fiji still plant taro the traditional way. This involves manual land preparation using forks or by plowing with draft animals such as bullocks and horses. Once the land preparation is finished, deep holes are made with a thick wooden stick. The taro tops or suckers are placed into the holes and the rest of the space is filled in with loose soil. Such a cultural method requires considerable inputs of manual labor. In an effort to reduce the labor requirements in taro production, four types of production technologies were evaluted by Haynes (1977) at the Koronivia Research Station.

These production technologies are summarized in Table 8.

System 1 was designed to simulate the technology of subsistence production as near as possible. The object was to see the extent to which subsistence technology could be transferred to commercial production. Sub-plots were established in which weeds were removed before planting and later controlled by hand weeding with a cane knife. In system 2, the land was plowed by oxen and ridges were made with a walking tractor (Kubota of 6.5 hp.). In system 3, the taro was planted by hand in a furrow made by a tractor fitted with a rotovator and a single furrow ridging body. In system 4, a four-wheeled 55 hp tractor was used for land preparation. The tractor was fitted with a three furrow ridging body on which two men sat and planted the taro. The results of this study showed that all the four production technologies were adaptable in the prevailing farming system but their appropriateness depended on the needs of the farmers.

Such studies give considerable insight into the efficiency of energy use in agricuture. In Fiji, much work has been carried out on incorporating energetic measures, such as efficiency ratios in the analysis of crop production practices and these have been reported recently by Chandra *et al.* (1973, 1974, 1976) and Chandra and De Boer (1978c). The world energy crisis of the 1970's has focused attention on the development of low technology agricultural systems in Fiji. This is becase Fiji depends entirely on imported fossil fuels for its energy sources. It may well be that in the smallholder farming system in Fiji, which is the dominant form of agriculture, the most appropriate production technology is a combination of manual, animal and small tractor based systems (Chandra, 1979).

## Engineering Research

Engineering research to reduce the labor requirements in the cultivation and harvesting of taro and cassava is of major concern for the development of root crops in Fiji (Chandra and Sharma, 1979). Recently, a tractor drawn taro planter was developed by the Agricultural Engineering Section at the Koronivia Research Station (Sharma, 1978). Figure 3 shows a photograph of this planter which is a simple machine consisting of a series of attachments to a tractor-drawn ridger. The design features include a wooden box for carrying the planting material, seats for the two planters and covering devices for filling the soil around the plants in the furrows. The time required in picking and placing the planting material synchronizes very well with the recommended spacing between plants which is 60 cm, provided the tractor speed is kept at 6 km per hour.

Table 9 shows the data obtained when the planter was evaluated under field conditions at the two localities. The data clearly shows that the taro planter is more efficient than the traditional method in terms of time and planting costs. Other advantages of this machine are: (a) it can be easily dismantled or assembled on the farm, (b) the planting material can be set to any desired depth and down to 15 cm in the furrows, (c) the survival of the plants is high because enough moisture becomes available to the plants early since the soil is well packed around them by the covering devices, and (d) planting is quick, in straight lines and at uniform spacing. This facilitates the inter-row cultivation for the control of weeds and the application of fertilizers during early stages of growth.

## Conclusions and Research Needs

This review of taro research and development in Fiji concentrated on the significant advances on this important staple crop. The major areas of interest have been in: (a) accessions and germplasm collection, (b) varietal selections, (c) growth studies,

(d) fertilizer responses, (e) plant population studies, (f) planting material responses, (g) production system studies and (h) engineering research.

Considerable research still remains to be done. These needs are described below. The work on accessions and germplasm collection needs to be followed up with a classification of the taro varieties for agronomic use. Such a project is beyond local means and is suggested that this could be a worthwhile area for an overseas funded project in Fiji.

The fertilizer response studies have not been conclusive with regard to the requirements for P and K or the interaction of these elements with N, although the response to N itself has been demonstrated. Research should be carried out on the response of different varieties of taro to NPK inputs on the major soil groups in all the three climatic zones. The results of such studies would be extremely useful for extension purposes and should make a significant impact on the development of taro as a crop

Although a study has been done in Fiji on wetland production of taro with inconclusive results, this is an important area for further research. The rationale for this research is that the vast areas of the unused low-lying land, comprised mainly of gley soils, in the Rewa River basin could be used for production. Since this area is only 20 km from the Suva urban area, where over 130,000 people live, the production of wetland taro, which may be of lower corm size and quality, should find ready consumers among the low income dwellers if the price was competitive with the dryland produced taro. Because of the high production levels per unit area per unit time, root crops such as taro offer the best possibility to meet the demands for low priced foods from the urban poor.

Because of the escalating world price of fossil fuels, such as oil, and the complete dependence of the Fiji economy on imported fuel, it is imperative that careful thought be given to the type of farming system most suitable to the national economy. An agriculture wholly dependent on oil consuming machines is too vulnerable to the exigency of world order and it may not be the appropriate technology in Fiji. It is therefore necessary to investigate the different types of production systems and the different levels of production for taro in Fiji, taking into account manual and animal power. Such low energy agricultural systems may be particularly suitable in Fiji where most of the farms are smallholdings of 2-4 has.

## References


ANNUAL RESEARCH REPORTS (1973-1977) Department of Agriculture, Fiji.

BERWICK, J.; F. BIUTISUVA; L.V. RATUVUKI; A.V. KAMILO and RAGHWAIYA 1972. Dalo *(Colocasia esculenta)* fertilizer, variety, weed control, spacing and palatability trials. *Fiji agric. J. 34:* 51 - 57.

CASLEY, D.J.L. (1969) *Report on the census of agriculture,* 1968. Legislative Council Pap. No. 28 of 1969, Govt. Printer, Suva.

CHANDRA, S.; J.P. EVENSON and A.J. DE BOER (1973) Root crop production in a Fijian village. *Proceedings of the Third International Symposium on Tropical Root and Tuber Crops,* Ibadan, Nigeria.

CHANDRA, S.; A.J. DE BOER and J.P. EVENSON 1974. Economics and energetics: Sigatoka Valley, Fiji. *World Crops 26,* 1: 34 - 37.

CHANDRA, S.; J.P. EVENSON and A.J. DE BOER (1976) Incorporating energetic measures in an analysis of crop production practices in Sigatoka Valley, Fiji. *Agricultural Systems 1:* 301 - 311.

CHANDRA, S. and A.J. DE BOER 1978c. Productive efficiency of Fijian and Indian farming systems in semi-subsistence agriculture Part 6: Energetic efficiency analysis and results. *Fiji agric. J. 40:* 37 - 50.

CHANDRA, S. 1979. Low technology agriculture and development in Fiji. *Proceedings 49th ANZAAS Congress,* Auckland, New Zealand.

CHANDRA, S. and A.P. SHARMA (1979) Current status of agricultural mechanization in Fiji. *Agricultural Mechanization in Asia:* (In Press).

CHING, K.W. 1971. Effect of cultural method and size of planting material on yield of *Colocasia esculenta. South Pacific Commission, Internal Circular, Tropical Crop* No. 31.

HAYNES, P.H. 1977. Root crop agronomy and production, Fiji. *UNDP FAO Terminal Report,* 44 p. 249.

PLUCKNETT, D.L. and R.S. DE LA PENA 1971. Taro production in Hawaii. *World Crops 23:* 244 - 249.

SHARMA, A.P. 1978. Design, development and evaluation of a tractor-drawn dalo *(Colocasia esculenta)* planter in Fiji. *Fiji agric. J. 40:* (In Press).

SIVAN, P. (1970) Dalo growing research in the Fiji Islands. *Proceedings of the Second International Symposium on Tropical Root and Tuber Crops.* Vol. 1: 151-154.

SIVAN, P.; A.J. VERNON and C. PRASAD 1972. Dalo (Taro) spacing trials 1971. *Fiji agric. J. 34:* 15 - 20.

Table 1. Climatic and soils data for three research stations.

| | Waidradra | Stations<br>Koronivia | Dobuilevu |
|---|---|---|---|
| Mean annual rainfall (mm) | 3650 | 3300 | 2710 |
| Bright sunshine per annum (hours) | 1400 | 1680 | 1500 |
| Mean temperature (°C) | 23.6 | 28.3 | 24.4 |
| Mean maximum temperature (°C) | 27.9 | 29.5 | 29.0 |
| Mean minimum temperature (°C) | 19.4 | 24.9 | 19.8 |
| Soil group | Humic latosol | Alluvial | Nigrescent |
| Soil texture | clay | sandy clay loam | sandy clay |
| Soil pH | 4.90 | 5.30 | 5.50 |

Table 2. Order of Rank of Taro Cultivars Based on Corm Dry Matter Production at Three Research Stations.

| Cultivars | Waidradra | Stations<br>Koronivia | Dobuilevu |
|---|---|---|---|
| Samoa | 1 | 2 | 2 |
| Samoa Oriori | 2 | 8 | 7 |
| Tausala ni Samoa | 4 | 1 | 4 |
| Tausala ni Mumu | 7 | 4 | 1 |
| Toakula | 6 | 6 | 3 |
| Volo | 4 | 6 | 4 |
| Vaivai Dina | 3 | 9 | 4 |
| Kaboa | 9 | 3 | 7 |
| Hawaii | 10 | 4 | 7 |
| Qawe ni Urau | 8 | 9 | 10 |

Table 3. Corm Yields of Taro Varieties

| Variety | Fresh Corm Yield (t/ha) | Dry Matter % of Corms | Corm Dry Matter Yield (t/ha) |
|---|---|---|---|
| WAIDRADA | | | |
| Samoa Oriori | 20.0 | 29.9 | 6.0 |
| Tausala ni Samoa | 19.9 | 28.2 | 5.6 |
| Kaboa | 19.8 | 28.4 | 5.6 |
| Vaivai Dina | 18.5 | 29.3 | 5.4 |
| Volo | 21.8 | 23.6 | 5.2 |
| Toakula | 18.3 | 27.4 | 5.0 |
| Qawe ni Urau | 19.3 | 25.1 | 4.8 |
| Samoa | 15.3 | 29.9 | 4.6 |
| Mumu | 20.4 | 22.5 | 4.6 |
| SE ± | 1.36 | 0.74 | |
| DOBUILEVU | | | |
| Samoa | 25.3 | 32.7 | 8.3 |
| Tausala ni Samoa | 24.2 | 30.3 | 7.3 |
| Qawe ni Urau | 24.9 | 28.8 | 7.2 |
| Vaivai Dina | 19.7 | 32.7 | 6.4 |
| Volo | 23.3 | 25.5 | 5.9 |
| Qere | 23.5 | 25.0 | 5.9 |
| Mumu | 17.6 | 20.7 | 3.6 |
| SE ± | 1.41 | 1.27 | |

**Table 4. Duration in Weeks of Leaf Areas of Different Magnitude for Three Taro Cultivars.**

| | Leaf Area Index | | | | |
|---|---|---|---|---|---|
| | < 1 | > 1 < 3 | 3 | < 3 > 1 | < 1 |
| Hawaii | 10 | 6 | 10 | 22 | – |
| Qawe ni Urau | 10 | 6 | 6 | 14 | 12 |
| Tausala ni Samoa | 10 | 6 | | 18 | 10 |

**Table 5. Yield of Taro Varieties at Different Spacing.**

| Spacing (cm) | Plants/ha | Yield in t/ha | | |
|---|---|---|---|---|
| | | Tausala ni Samoa | Kurokece | Qawe ni Urau |
| 90 x 120 | 9,000 | 10.0 | 9.0 | 8.3 |
| 90 x 90 | 11,950 | 12.0 | 11.8 | 13.8 |
| 90 x 60 | 17,930 | 14.8 | 11.3 | 15.3 |
| 60 x 60 | 26,900 | 17.0 | 17.1 | 24.1 |
| 60 x 45 | 35,860 | 20.0 | 20.3 | 26.1 |
| SE | | ±1.2 | ±1.7 | ±1.7 |

**Table 6. Effect of Spacing and Nitrogen on Taro Corm Yield, Corm Size and Sucker and Sucker Number.**

| Treatments | Corm Yield t/ha | Mean Corm Size (kg) | Suckers Per Plant |
|---|---|---|---|
| Wide No | 6.5 | 0.65 | 2.7 |
| $N_1$ | 11.5 | 1.16 | 10.1 |
| Close No | 14.5 | 0.37 | 0.4 |
| $N_1$ | 24.6 | 0.63 | 2.6 |
| SE | ±0.53 | ± | ±2.41 |

Table 7. Variation in Taro Planting Material as Purchased from a Typical Farmer.

| Origin of Planting Material | Number | Petiole Dry Matter (%) | Corm Dry Matter (%) |
|---|---|---|---|
| Large heads | 24 | 43.0 | 74.5 |
| Large whole corms | 15 | 16.0 | 69.0 |
| Medium heads | 8 | 16.0 | 32.5 |
| Medium whole corms | 32 | 22.0 | 73.0 |
| Small (all types) | 21 | 12.0 | 34.0 |

| Size Variation in Planting Material | Mean | SE ± | CV % |
|---|---|---|---|
| Length (cm) 445-512 | 188.9 | 8.65 | 45.8 |
| Width at base (cm) 3.0-9.4 | 5.4 | 0.12 | 28.2 |

Table 8. Four Taro Production Technologies.

| Source of Motive Force | Capital Input | Labor Input |
|---|---|---|
| 1. Man | Low | High |
| 2. Animal | Low | Intermediate |
| 3. Walking tractor | Intermediate | Intermediate |
| 4. Wheeled tractor | High | Low |

**Table 9. Comparison of the Time and Labor Required to Plant One Hectare of Taro Using the Traditional Method and the Planter.**

| | Traditional Method Using Human and Animal Power | | Tractor-Drawn Planter | |
|---|---|---|---|---|
| | Time (manhours) | Cost (F$) | Time (manhours), | Cost (F$) |
| Taro mechanization plot – Muaniweni | 178 | 67 | 15 | 19* |
| Taro mechanization plot – Natogadravu | 217 | 82 | 22 | 27** |

* Includes the working cost of a 40 hp tractor

** Includes the working cost of a 35 hp tractor.