Current Status, Constraints and Potentials of Rainfed Finger Millet Cultivation in Monaragala District in Sri Lanka

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Abstract
Finger millet is well adapted for the low input environments, especially for less water and minimal levels of fertilizer. This crop is cultivated by farmers with less effort using their experience of long term conventional methods. Finger millet has high nutritional and medicinal values. However, the local gene pool has reduced in the crop varieties with the gradual reduction of cultivation extent with the time. A survey was conducted with the objectives of assessing current status, constraints and potentials associated with finger millet cultivation in Thanamalwila Divisional Secretariat in Monaragala District. Five villages were selected as the representative area of finger millet cultivation in the region and twelve farmers of each village who cultivate finger millet were randomly selected as the sample of the survey. A structured questionnaire was used to collect the information. According to the results, majority of farmers cultivated under rainfed condition and the only 17% used irrigation facilities. Only 12% of farmers increased their finger millet cultivated area while 37% has reduced the area of cultivation. About 67% of households consumed less than 100kg of small millets per year. Farmer awareness on the available technologies to enhance yield is one of the constraints identified in the survey. Crop damage from wild animals, pests and diseases, heavy rains during harvesting period, difficulties in processing and low-price farm gate price were the other constraints. Introduction of suitable technologies, increase of cultivable land area and promoting consumption could be applied to promote finger millet cultivation in Sri Lanka.

Key words: Finger millet, Cultivation, Constraints, Consumption, Potentials
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Introduction
Finger millet remains the food of the lower socio-economic groups and traditional consumers, because of its coarse texture and intense colour of seed coat. Finger millet is rich in proteins and sulphur containing amino acids. Also, it is recommended for diabetic patients due to its low glycemic index with high fibre. It has been proved to be very effective in controlling blood glucose level of diabetes. Consumption of finger millet prevents constipation and cholesterol (Hittalmani, 2004). Presently, finger millet is grown in Anuradapura, Monoragala, Hambantoda Kegalla, Ratnapura, Ampara, Badulla and Jaffna districts in Sri Lanka. Finger millet plays a major role in rain fed farming in the area covered by the survey. This crop is traditionally grown on newly cleared lands during *maha* season and usually planted without land preparation in rainfed uplands in the Dry zone of Sri Lanka. It is one of the few crops that can be grown in low land paddy fields during *yala* season if water logging is prevented. Finger millet grows well in all well-drained soils but silt loams are the most desirable. It grows well on Reddish brown earth, calcic red yellow latasols and sandy regosols (Ponnuthurai.S 1986). Despite the ability of growing under dry zone conditions and producing a considerable amount of yield, cultivated land area has continually dropped due to many reasons. But, finger millet is the second staple food of the selected area and people of the area engage in this cultivation in *Yala* and *Maha* seasons. They gain a higher production in *Maha* season than in the *Yala* season. Finger millet is well adapted for low input cropping systems. It has high nutritional and medicinal values. However, cultivation and production is under stagnation while local gene pool has narrowed down significantly with time. This survey was conducted to determine the production levels and consumption pattern of finger millet in the area and find out the potentials for cultivation and constraints faced by farmers of rainfed systems in Thanamalwila area.

Materials and Methods
This survey was carried out in the Divisional Secretariat division of Thanamalwila, in Monaragala district, Sri Lanka. It belongs to one of the highest finger millet cultivation districts in Sri Lanka. Total land area of the Uva province is 8438.4 km^2, which is about 13% of the total land area of the country. Monaragala district covers about 5545.6 km^2 of land area while

Thanamalwila DS division covers a land area of 1343.1km² which is about 2% of the total land area of Sri Lanka. Farmers in this area are cultivating mainly under rainfed condition. The selected sample consisted of sixty farmers who are cultivating finger millet. The area covered by the survey consisted of five villages named Mahawewa, Sooriyaara, Kumaragama, Kalawelgala and Kahakurullanpelessa. Twelve farmers of each village were selected as the sample by using purposive sampling technique.

In this survey selected farmers were interviewed using a pre-tested questionnaire which was formulated for the task of gathering primary data. Also, field observations, formal and informal discussion with community helped to gathered relevant information. Both qualitative and quantitative data were collected.

Results and Discussion

Results of the survey were based on the information obtained from the field survey. Age range of the respondents was in between 20 to 60 years. Majority (41.67%) are belonging to forty-one to fifty age category. After school education, most of them in young generation have moved to the cities for seeking jobs hence only about 10% of the young generation is engaging in the cultivation.

Majority of finger millet farmers (80%) have their own lands for cultivation and other 20% have encroached government lands especially for upland rain fed cultivation. The area is mainly under rain-fed cultivation as there is no major irrigation scheme. There are some farmers in the area who practice irrigation in small scale using their own agro-wells and water streams. However, in severe droughts, the amount of available water from other sources is not sufficient to fulfill the water demand for the field crops. About 83% of farmers do not have any irrigation facility.

Majority are small scale farmers (56%) who cultivated less than half an acre mostly in-home gardens. About 27% were medium scale growers, who cultivate in between half an acre and an acre. Large scale farmers are only 17%, who cultivated more than an acre. Most of them are cultivating in government encroached lands.

Most farmers were aware about the finger millet variety which they cultivate. Majority of farmers (83%) cultivate traditional cultivars such as Kiri kurakkan, Galmora and Mahagalmora. Only 17% of farmers were cultivating improved varieties recommended by Department of Agriculture.

The source of seeds is important for better production of a crop. Collected data revealed that 75% of the farmers have used their own seeds from the previous harvest. From the rest of the farmers, majority have borrowed or purchased the seeds from the neighbor farmers without considering the quality of the seeds. Only 8.33% of farmers used purchased seeds from non-government organizations, government departments (Department of Agriculture, Agrarian service centers) and private sellers.

Average yield of finger millets is about 216kg/Acre, a large portion of the production is used for consumption and little amount kept as seeds for next season.

When considering the consumption of finger millet of the sample households, it was found that all the farmers are consuming finger millets and consumption of finger millets is common in the area. Majority is consumed less than 100kg/year while more than 30% consumed more than 100kg/year in house hold.

Consumption of small millets has been changed during the period of last ten years due to several reasons. According to the data, the consumption pattern of the majority of villagers (52%) was not changed. The increment of consumption (12%) is less when compared with the decline of consumption (37%). Main reasons for the decline of consumption were reduced extent of cultivation, less palatability and difficulties in preparation within a short period of time.

According to some respondents (12%) the consumption and cultivated extent has been increased during the last ten years, the awareness of health benefits of finger millet over many chronic diseases such as diabetes and cancers has lead for this change. Some farmers (37%) reduced the cultivated area of finger millet due to the threat from wild animals, pests and disease attacks, unavailability of good quality seeds and uncertainty of harvest due to changing rainfall pattern.

Average annual production of finger millet in the area is 216.17kg/Acre while the potential yield at research level is about 500kg/Acre (http://www.agridept.gov.lk). A Farmer's yield is comparably very low when compared with the potential yields of recommended varieties.

About 16% of respondents knew that the yield can be increased by applying technologies, but they were not aware of available and applicable technologies which can be used to improve yield. Only 10% of respondents used some fertilizers but they do not follow fertilizer recommendations. Among respondents only 11.7% of them practiced row seeding and chemical weed control. Majority of the finger millet farmers (83.3%) do not use practices such as row seeding or transplanting and applying recommended fertilizers for their cultivation.

Major constraints have been identified in four categories. They are related to production, harvesting, post harvesting and marketing. Wild animal damages and less awareness on improved technologies for yield enhancement are the constraints related to production. Other dominant constraints are pest (stem borer) and disease (Fungal) problems, lack of good quality seeds, insufficient rainfall and crop damage due to heavy rain at maturity. Wild animal damage is most prominent in the area due to its close proximity to Udawalawe National Wildlife Park.

Among the harvesting related constraints, heavy rain in the harvesting period, damages from animals in harvesting stage, labor shortage, drying and rotting of the harvest due to pest and fungal attack are dominant issues in the area. Farmers are facing difficulties in processing due to absence of machineries for harvesting and threshing, storage pest attacks are the dominant constraints related to post harvest practices.

Low price for their production in harvesting period, high price fluctuation and consequent price uncertainty, absence of organized market are the main market constraints for finger millet cultivation in the area.

Conclusions

Majority of farmers (83.33%) cultivate finger millet under rain fed condition in the area while 16.67% use irrigation. Another 36.67% of farmers have reduced their cultivated area while 11.67% increased and 51.67% experienced no change.

There are available arable lands in the area. Unavailability of water sources for cultivation and less awareness on improved varieties, appropriate technologies for cultivation which will enhance yield such as improved planting methods, use of fertilizers, control weeds and methods to control diseases and pests are less. Only a few of farmers (16.7%) are using simple agronomic practices focused on high yield.

Average production is low (216.17kg/Acre) in the area compared to the potential yield (500kg/Acre). Majority of people have reduced the consumption of finger millet (52%); some people (12%) have increased the consumption due to health concerns. Crop damage due to wild animals, pest (Stem borer) and disease (Fungal) problem, lack of good quality seeds, insufficient rain and crop damage due to heavy rain in mature stage are dominant production related constraints in the area.

Among the harvesting related constraints, heavy rain in the harvesting period, damages from animals in harvesting stage, labor shortage, drying and rotting of the harvest due to pest and fungal attack are dominant issues. Unexpected rains at harvesting stage causes difficulties at processing and drying leading to consequent reduction of the quality of harvest. Threshing is difficult and laborious due to absence of machineries for processing. Low price in harvesting period, high price fluctuation and consequent price uncertainty, absence of organized markets are the main market constraints of finger millet cultivation in the area.

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