

Intervention and Impact of Machine Harvesting in tea among small farmers of Nilgiris District

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December 2013

**UPASI Krishi Vigyan Kendra
Glenview, Coonoor – 643 101, The Nilgiris**



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Foreword

Agriculture industry has been facing challenging situation in carrying out timely cultural operations. Increasing demand for labour and increase in wages almost left the small farmers stranded.

Intervention of agricultural technologies has become imperative in this present age to manage the raising challenging situations in the agricultural sector. Introduction of mechanisation in tea to carry out vital cultural operations and increase labour productivity with available labour is the need of the hour.

The mandates of KVK are Technology assessment, refinement and demonstration. Technology assessment is to assess the latest technology in the farmer's field to solve problems. The objective of front line demonstration is to demonstrate newly released crop production and protection technologies and its management practices in the farmers' fields under different agro climatic regions and farming situations.

With the above objective UPASI KVK carried out FLD on machine harvesting in tea. Inorder to know the adoption levels in the farmers field a study was conducted and details are presented in this booklet "**Intervention and Impact of machine harvesting in tea among small farmers of Nilgiris District**".

It is very encouraging to observe the way in which UPASI KVK has worked among small tea farmers and motivated them to adopt mechanisation for important tea cultural practices. This booklet reveals the advantages of adopting mechanisation in tea and will be a useful guide to extension personnel.

I congratulate Dr. G. Ramamoorthy, Programme Coordinator i/c and his team for taking the lead to introduce mechanisation in tea small sector and wish UPASI KVK success in all their future endeavours.

S. PRABHU KUMAR



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Foreword

UPASI Krishi Vigyan Kendra (UPASI-KVK) and Tea Board of India have been working in collaboration for the development of Tea among small tea growers since the inception of KVK in Nilgiris in the year 1983. With the primary objective of KVK being transfer technology from lab to land to the small farming community, Tea Board of India has been able to reach out to the small farmers in tea with the support of KVK.

UPASI-KVK and Tea Board of India have since then been working through different tea based schemes such as training & demonstration, crop diversification scheme, special pruning scheme, tea factory Upgradation scheme, Quality Upgradation Programme in small tea sector in Nilgiris, special purpose tea fund, 50% machinery subsidy scheme, SC sub plan scheme etc., for the benefit of the small farmers in the district.

UPASI-KVK in collaboration with Tea Board of India in the year 2000 launched Quality Upgradation Programme (QUP). The objective of this programme was to improve the quality of tea from small sector. The refined and improved technologies in tea are transferred to the small sector through Quality Upgradation Programme. One of the most recently transferred technologies is the introduction of mechanisation in tea among small farmers.

I must appreciate the initiative taken by UPASI-KVK under the leadership of Dr. G. Ramamoorthy along with QUP team to create awareness on mechanisation in tea and motivate small farmers to utilize the opportunities in the form of subsidy provided to them. The 50% machinery subsidy scheme was specially launched for the benefit of unemployed youth in the district and society members. I am glad to know that most of the farmers who are registered members in the Small Tea Growers' Society (STGS) have utilized this scheme to purchase green leaf harvesting machines.

This book clearly indicates that there is scope to adopt mechanisation on a larger scale among small sector and trust it will be a guide line for small farmers. I am of the opinion that UPASI-KVK with the support of ICAR and Tea Board will continue its service to the farming community and ensure their development at all levels.

R. AMBALAVANAN



Ullas Menon

Secretary General & Chairman



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The Nilgiris

Preface

Tea is the most commonly grown crop among the hill crops in Nilgiris. Tea is also the livelihood for most of the farming community in Nilgiris. Small sector contributes to over 40% to the south Indian tea industry. Hence, there is a need for agricultural institution to work on a larger scale in Tea to support tea farmers.

The constant migration of labour to cities started as early as in the year 2009. Most recently it is noted that tea industry in Nilgiris is running short of labour in the plantations on an average of 30%. Nilgiris alone faces a labour shortage to the tune of 28% which is alarming.

This labour shortage will bring adverse effect on quality of tea produced by the sector. Though tea estates have adopted mechanisation on a large scale to tackle the problem, small sector was apprehensive to move into mechanisation for want of technical knowledge and financial constraints.

The facility to carry out Front Line Demonstration (FLD) in small farmer's field through ICAR scheme has facilitated in creating awareness on mechanisation. Motivation of Dr S Prabhu Kumar, Zonal Project Director, ICAR has kept UPASI-KVK to continuously carry out trials in tea to identify the scope to support and improve small farmers in better tea production. It is important to appreciate Tea Board of India at this juncture which came forward to support small farmers financially through different subsidy schemes for small tea growers in the district.

This book briefs about the impact of mechanisation in tea cultural practices among small and progressive tea farmers in Nilgiris. I am sure this book will motivate farmers to move into mechanisation with a positive approach. I congratulate Dr G Ramamoorthy and Quality Upgradation Programme team for their untiring efforts to make sure the refined technologies reaches small tea farmers.

I am of the view that if farmers continue to adopt mechanisation they will be able to handle labour shortage to manage cultural operations in tea efficiently and also achieve quality. This will also bring about consistency in quality of tea produced which will further improve the image of small sector tea industry in the global market.

ULLAS MENON

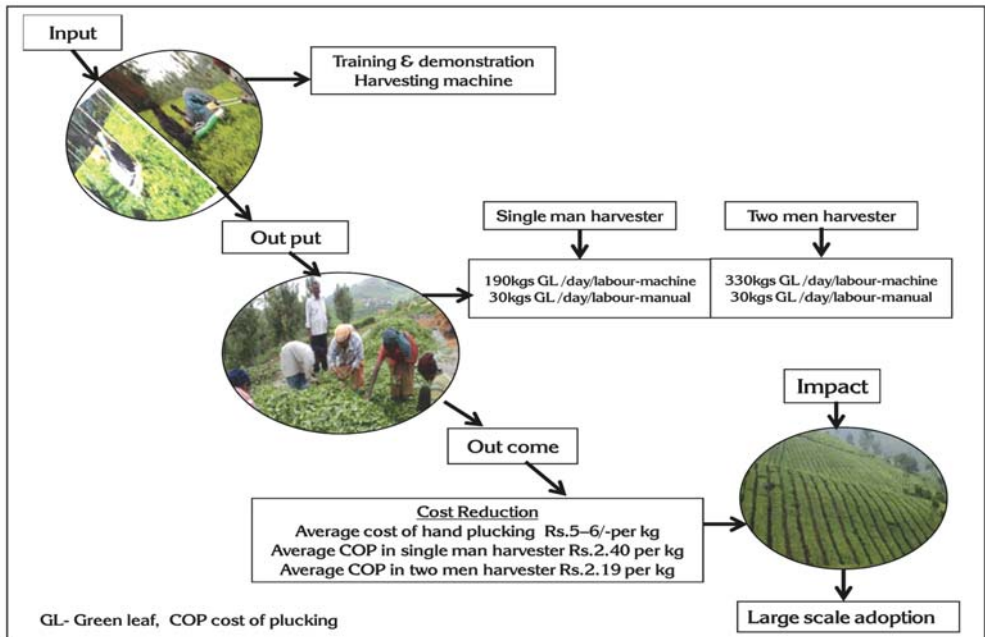
Intervention and Impact of Machine Harvesting in Tea among Small Farmers of Nilgiris district

Introduction:

Mechanisation in tea has become necessary to handle labour shortage in recent times and also reduce the cost of production in tea. Two main cultural operations in tea are plucking or harvesting of green leaf at 10 to 12 days interval and pruning which is done once in four years. Plucking and Pruning operations involve more labour. With the growing demand for labour, farmers were keen to know other options to carry out harvesting and pruning operations in tea. UPASI-TRF recommended use of harvesting machines in tea fields on gentle slopes. Many small farmers have started using these machines in tea field on a large scale after the intervention of KVK on machine harvesting.

There are two seasons in tea namely high cropping and lean cropping season. Sixty five percent of leaf is harvested during high cropping season and thirty five percent in lean cropping season. Seventy percent of the workers are utilized for plucking alone. Hence UPASI-KVK with the support of ICAR & Tea Board of India decided to promote machine harvesting on a larger scale.

In order to motivate farmers move into mechanisation to handle labour shortage during rush crop season and also improve productivity, UPASI-KVK has worked out the economics of mechanisation clearly and projected the cost reduction by adopting mechanisation. The chart below clearly indicates the cost reduction achieved through mechanisation in tea for harvesting green leaf. Therefore farmers in different parts of the district have been adopting mechanisation since the intervention of UPASI-KVK.



UPASI KVK has started Front Line Demonstrations (FLD) on machine harvesting in different places in Nilgiris. Based on the results obtained in the FLD plot Tea Board supported small farmers by way of subsidy to purchase harvesting machine with 50% subsidy scheme. In order to know the impact on FLD on machine harvesting a study was conducted mainly in Ooty and Kundah taluk where maximum demonstrations on machine harvesting were carried out.

Methodology:

Nilgiris district has six taluks viz., Coonoor, Kotagiri, Kundah, Ooty, Gudalur and Pandalur. Out of the six taluks Ooty and some parts of Kundah taluk are planted with high yielding clonal tea. As these two taluks have newly planted and replanted tea under schemes Crop Diversification and Kundah Replanting Scheme sponsored by Tea Board of India the crop is comparatively high during rush crop and they face labour shortage during this season. Hence these two regions moved into mechanisation to manage rush crop.

With the financial support of Tea Board schemes farmers started purchasing harvesting machines. Though farmers from all the taluks have moved into mechanisation Ooty and Kundah taluk farmers have adopted mechanisation in clusters. Hence Ooty and Kundah taluks were selected for study.

Totally 18 villages are using single man and two men harvesters. Out of 18 villages 9 villages were selected for study. Out of the 9 villages 6 villages are using single man harvester and 3 villages are using two men harvesters in Ooty and Kundah taluk.

Random sampling was the methodology adopted for studying intervention and impact of mechanisation among small farmers. Out of 136 farmers in Ooty and Kundah taluk, 68 farmers covering tea area of 237.25 acres were selected from 9 villages for the study.

Table - 1 : Details of village wise data :

Sl. No.	Name of the village	No. of farmers using mechanical harvester in the village	Area of tea in acres in the village	No. of farmers surveyed	Area of surveyed farmers in acres
1.	Attuboil	20	79.00	10	39.50
2.	Yedakad	26	100.00	13	50.00
3.	Sathyamoorthynagar	12	13.50	6	6.75
4.	Sundatty	22	106.00	11	53.00
5.	Thakkarbabanagar	42	89.00	21	44.50
6.	Thalaihatty	6	22.00	3	11.00
7.	Mynalai	4	40.00	2	20.00
8.	Sogathurai	2	20.00	1	10.00
9.	Naduhatty	2	5.00	1	2.50
	Total	136	474.50	68	237.25

Parameters taken for study are;

- 1) Area owned by the farmer
- 2) Type of harvester used
- 3) Green leaf harvested per day per machine
- 4) No. of Labour used per day per machine
- 5) Plucking average per labour per day
- 6) Cost of Plucking per kg

Tools for data collection :

Interview cum observation method was used to collect information from 68 farmers and data was compiled.

Results:

Small farmers purchased both single man and two men operating machines based on the area of tea owned by them. Single man harvesting machine required two to three labourers whereas two men harvesting machine required five to six labourers. Though harvesting capacity was more for two men harvesting machine the cost of the machine played a vital role besides the availability of labour to handle the machine. Approximate cost of two men harvesting machine is Rs.1,28,000/- whereas for single man harvesting machine it is only Rs.24,000/-.

Hence most of the small farmers prefer single man harvesting machine when compared to two men harvesting machine as cost of the machine is low. Single man harvesting machine require only two labourers and farmers themselves could operate the machine saving on labour cost. The small farmers were able to purchase harvesting machine with the support of 50% machinery subsidy scheme of Tea Board.

Results of some small and progressive farmers are given hereunder to understand the impact of mechanisation on labour and cost reduction.

Mr. Sreedhar using single man harvesting machine in his tea field in Naduhatty village, Kundah region



Total area owned	:	4 acres
Green leaf harvested/day/machine	:	550 kgs average
Type of harvester used	:	Single man harvesting machine
No. of labour used per day	:	Two
Harvesting average per labour	:	275 kgs
Cost of harvesting per kg green leaf	:	Rs 1.87 (L - 1.09 + D - 0.15 + F - 0.64)

Workings for Single man harvester

Labour wages (L) : Per day labour wages / total quantity of green leaf harvested per day per machine
 (2 labour x Rs.300= Rs.600 per day)
 Rs.600 / 550 kgs = Rs.1.09 per kg of green leaf
L = Rs.1.09 per kg of green leaf

Depreciation (D) : Cost of Machine /no. of working days in a year
 (Rs. 24,000/300=Rs.80 per day depreciation)
 Depreciation/green leaf harvested per day per machine
 (Rs.80/550=Rs.0.15)
D = Rs.0.15 per kg of green leaf

Fuel cost (F) : Petrol * Rs.100/- liter x 3 liters for
 6 running hours = Rs.300
 Oil 40ml per liter of petrol. For 3 liters x 40 ml = 120ml
 Oil Rs.18 for 40ml x 120 ml = Rs.54
 Cost Petrol +Oil (Rs.300 + Rs.54= Rs.354)
Therefore fuel cost per kg :
 Total Fuel cost / green leaf harvested
 per day per machine
 (Rs.354/ 550 = Rs.0.64 per kg)
F = Rs.0.64 per kg of green leaf

Therefore total cost of harvesting per kg of green leaf with single man harvester is
(L+D+F) = Rs.1.09+0.14+0.64 = Rs.1.87 per kg

*Per liter petrol cost in Kundah region petrol filling station

L- Labour wages, D - Depreciation, F- Fuel cost

**Mrs & Mr. Rajan, using a single man harvesting machine
 in Yedakad village**



Total area owned : 5 acres
 Green leaf harvested/day/machine : 450 kgs average
 Type of harvester used : Single man harvesting machine
 No. of labour used per day : Three
 Harvesting average per labour : 150 kgs
 Cost of harvesting per kg green leaf : **Rs 2.96**
 (L - 2.00 + D - 0.18 + F - 0.78)

Mrs. Sagadevan using single man harvesting machine in Yedakkad village



Total area owned	:	10 acres
Green leaf harvested/day/machine	:	350 kgs average
Type of harvester used	:	Single man harvesting machine
No. of labour used per day	:	Two
Harvesting average per labour	:	175 kgs
Cost of harvesting per kg green leaf	:	Rs 2.78 (L - 1.71+ D - 0.22+ F - 0.85)

Mr. Viji using single man harvesting machine in Thakkarbabanagar



Total area owned	:	2 acres
Green leaf harvested/day/machine	:	525 kgs average
Type of harvester used	:	Single man harvesting machine
No. of labour used per day	:	Three
Harvesting average per labour	:	175 kgs
Cost of harvesting per kg green leaf	:	Rs 2.54 (L - 1.72 + D - 0.15 + F - 0.67)

Mr. Ravi operating single man harvester at Thakkarbabanagar



Total area owned	:	4 acres
Green leaf harvested/day/machine	:	640 kg average
Type of harvester used	:	Single man harvesting machine
No. of labour used per day	:	Two
Harvesting average per labour	:	320 kg
Cost of harvesting per kg	:	Rs 1.61 (L - 0.93 + D - 0.13 + F - 0.55)

Mr Vengesh - two man harvesting machine being used in his field



Total area owned	:	20 acres
Type of harvester used	:	Two men harvesting machine
Green leaf harvested/day/machine	:	1500 kgs
No. of labour used per day	:	Five
Harvesting average per labour	:	300 kgs
Cost of harvesting per kg of green leaf	:	Rs 2.08 (L - 1.50 + D - 0.28+ F - 0.30)

Workings for two men harvester

Labour wages (L) : Contract labour wages
Rs. 1.50 to Rs. 2.00 per kg of green leaf
L = Rs. 1.50 per kg of green leaf

Depreciation (D) : Cost of Machine /no. of working days in year
(Rs. 1,28,000/300 = Rs. 426 per day)
Depreciation/green leaf harvested per day per machine
(Rs. 426/1500 = Rs. 0.28)
D = Rs. 0.28 per kg of green leaf

Fuel cost (F) : Petrol Rs. 73/- liter x 5 liters for 5 running hours
= Rs. 365/-
Oil 40ml per liter of petrol. For 5 liters x 40 ml = 200ml
Oil Rs. 18 for 40 ml x 200 ml (for 5 liters) = Rs. 90
Cost Petrol + oil (Rs. 365 + Rs. 90 = Rs. 455)
Therefore fuel cost per kg
Total Fuel cost / green leaf harvested
per day per machine
(Rs. 455 / 1500 = Rs. 0.30 per kg)
F = Rs. 0.30 per kg of green leaf

Therefore total cost of harvesting per kg of green leaf with two men harvester is
(L+D+F) = Rs. 1.50+0.28+0.30 = Rs. 2.08 per kg

L-Labour wages, D- Depreciation, F-Fuel cost

**Mr L Munusamy, Sogathurai Village
Two men harvesting machine being used**



Total area owned	:	10 acres own field 100 acres on contract farming
Green leaf harvested/day/machine	:	1800 kgs
Type of harvester used	:	Two men harvesting machine
No. of labour used per day	:	Five
Harvesting average per labour	:	360 kgs
Cost of harvesting per kg of green leaf	:	Rs 2.53 (L - 2.00 + D - 0.23 + F - 0.30)

**Mr. L. Sivaraj, using two men harvesting machine in his tea field
in Perar village**



Total area owned	:	14 acres
Green leaf harvested/day/machine	:	1200 kgs average
Type of harvester used	:	Two men harvesting machine
No. of labour used per day	:	Four
Harvesting average per labour	:	300 kgs per labour
Cost of harvesting per kg of green leaf	:	Rs 2.22 (L - 1.50+D - 0.35+F - 0.37)

Summary

Table – 2 : Details of the survey;

Sl. No.	Village	No. of farmers	Area of tea in acres	Green leaf harvested per day by machine	Harvesting avg. per labour	Cost of harvesting per kg green leaf (Rs.)
Single man harvesting machine						
1.	Sundatty	11	53.00	370.45	172.27	2.79
2.	Yedakad	13	50.00	384.62	174.85	2.35
3.	Thakkarbabanagar	21	44.50	382.29	192.17	2.28
4.	Attuboil	10	39.50	500.00	188.62	2.15
5.	Thalaihatty	3	11.00	466.67	183.00	2.91
6.	Sathyamoorthy nagar	6	6.75	466.67	233.33	1.93
	Total	64	204.75	428.45	190.71	2.40
Two men harvesting machine						
7.	Mynalai	2	20.00	1500.00	300.00	2.08
8.	Sogathurai	1	10.00	1800.00	360.00	2.53
9.	Naduhatty	1	2.50	1500.00	300.00	1.96
	Total	4	32.50	1600.00	320.00	2.19

Results of the survey are given below:

1. Out of 68 farmers 64 farmers from 6 villages used single man harvesting machine and 4 farmers from 3 villages used two men harvesting machine.
2. Highest area owned by the farmers with single man harvesting machine was 53 acres and lowest owned by the farmers was 6.75 acres.
3. Highest area owned by the farmers with two men harvesting machine was 20 acres and lowest area owned by the farmers was 2.50 acres.
4. On an average, quantity of green leaf harvested per day in single man harvesting machine was 428.45 kgs and 1600 kgs in two men harvesting machine.
5. Highest quantity of green leaf harvested per day with single man harvesting machine was 500 kgs whereas the lowest recorded was 370.45 kgs
6. For two men harvesting machine the range of harvesting of green leaf per day per machine was between 1500 and 1800 kgs.
7. Harvesting average per day per labour with single man harvesting machine was 190.71kgs whereas with two men harvesting machine it was 320 kgs
8. Highest quantity harvested per day per labour with single man harvesting machine was 233.33 kgs whereas the lowest recorded was 172.27 kgs.
9. For two men harvesting machine the range of harvesting per day per labour was between 300 and 360 kgs
10. Average harvesting cost with single man harvesting machine was Rs.2.40 a kg whereas for two men harvesting machine it was Rs.2.19 a kg.
11. Lowest cost of harvesting with single man harvesting machine was Rs.1.93 a kg while the highest cost was Rs.2.91 a kg
12. For two men harvesting machine the range of harvesting cost was between Rs.1.96 and Rs.2.53 a kg.

Conclusion:

The study reveals that the adoption level of Front Line Demonstration (FLD) programme on mechanisation in tea has made good impact among the small farmers of the district. The results show that farmers especially from Ooty and Kundah taluks have realized the importance of mechanisation to overcome the acute labour shortage prevailing in the district besides reduction in cost of production in tea harvesting.