

# **Employment and Income Effects of Orange Incorporation into Traditional Farming Systems in the Hill Region of Nepal**

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Boundary representation is not necessarily authoritative.

Zones	
1 Mahākālī	8 Gandakī
2 Setī	9 Nārāyaṇī
3 Karnālī	10 Bāgmatī
4 Bherī	11 Janakpur
5 Rāptī	12 Sagarmāthā
6 Dhawālagīrī	13 Kōstī
7 Lumbīnī	14 Mechī

**Nepal**

- International boundary
- - - Zone boundary
- ★ National capital
- ⊙ Zone capital
- +— Railroad
- Road
- - - Track or trail

0 75 Kilometers  
0 75 Miles

# Introduction

- The hill region of Nepal has been facing environmental degradation due to population pressure and expanding cultivation, over-grazing.
- Incorporation of high value fruit trees into the farming systems could be an alternative to improve the farmers' welfare without impairing the resource base.
- As the access to urban market improved, commercial production of mandarin orange has increased in some hill regions since the mid-1970s.
- This paper aims to clarify the impact of the incorporation of commercial orange production into the existing farming systems, focusing on employment and income.



# Data and Methods

- Location: Kavre district, 50 km east of Kathmandu
- Year: 1993, 1994
- Data: Randomly sampled 51 farms
- Survey method:
  - Structured Interview
  - Group discussions
- Analytical methods:
  - Comparing labor use, new vs. trad. cropping systems
  - Gini decomposition analysis to gauge income distribution

# Agrarian Conditions (1)

Land use in the study village, 1994

Lowland ( <i>Khet</i> )	26 %
Upland ( <i>Bari</i> )	
Annual crops	16 %
Orchard (orange)	24 %
Private forests/bushes	4 %
Community forests and grazing	30 %
TOTAL	100 %

# Agrarian Conditions (2)

Size distribution of farmland holdings, 1993

Area (ha)	Number of farms	Share (%)	
		in number	in area
- 0.50	8	16	4
0.51-0.75	10	20	11
0.76-1.00	10	20	14
1.01-2.00	17	33	37
2.01-	6	12	34
TOTAL	51	100	100

(Average farm size: 1.20 ha)

# Cropping Systems

	J	F	M	A	M	J	J	A	S	O	N	D	
<b>Rainfall (mm)</b>	20	20	40	80	160	220	320	310	280	140	10	10	
<b>Lowland</b>	++ Wheat xxx				--- /// ++ Rice xxx ///								
<b>Upland</b>	++ Wheat xxx			///	+ ++ Maize xxx			///					
	-ard xxx		///		+++		Maize xxx		///	++Must-			
	xxx				Orange				+++++++				xxx

--- Land preparation, /// (Trans)planting, +++ Weeding, XXX Harvest



# Employment Effect (1)

Labor input by cropping system, 1993

	Lowland	Upland	
	Rice-Wheat	Maize- Wheat/Mustard	Orange
	----- man-days/ha (%) -----		
Family labor	<u>173 (53)</u>	<u>141 (58)</u>	<u>76 (47)</u>
Male	90 (28)	63 (26)	51 (32)
Female	83 (25)	78 (32)	25 (16)
Hired labor	<u>153 (47)</u>	<u>103 (42)</u>	<u>85 (53)</u>
Male	68 (21)	44 (18)	62 (39)
Female	85 (26)	59 (24)	23 (14)
Total	<u>326 (100)</u>	<u>244 (100)</u>	<u>161 (100)</u>

# Employment Effect (2)

Comparison of labor use (new vs. trad system)

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	New system w/ orange	Trad system w/out orange	With/ without orange
	----- man-days/56.2ha-----		
Family labor	<u>7,494</u>	<u>8,625</u>	0.9
Male	3,923	4,132	1.0
Female	3,571	4,493	0.8
Hired labor	<u>6,570</u>	<u>6,884</u>	1.0
Male	3,312	2,998	1.1
Female	3,259	3,885	0.8
Total	14,064	15,509	0.9

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# Income Distribution Effect: Model

$$G(y) = \sum S_i R(y, x_i) G(x_i)$$

$y$  : Total household income

$G(y)$  : Gini ratio of total income

$x_i$  : Income from  $i$ th source

$S_i$  : Average income share of  $i$ th source

$R(y, x_i)$  : Rank correlation ratio

$G(x_i)$  : Gini ratio of  $i$ th income

# Income Distribution Effect: Results

## Decomposition of income Gini

	Income share	Rank correlation Ratio	Component Gini ratio	Component Gini contribution
Rice	0.24	0.76	0.41	0.08
Upland crops	0.06	0.50	0.35	0.01
<b>Orange</b>	<b>0.44</b>	<b>0.90</b>	<b>0.61</b>	<b>0.24</b>
Farm wage	0.02	-0.16	0.89	-0.00
Non-farm wage	0.06	0.25	0.86	0.01
Small business	0.12	0.67	0.85	0.07
Formal job	0.06	0.66	0.88	0.03
TOTAL	1.00	NA	NA	0.43

# Conclusions (1)

1. Introduction of profitable commercial orange production reduced employment opportunities in farming in the by 10% as a whole.
2. The effect was most conspicuous for female labor which decreased by 20%, while the use of hired male labor increased by 10%.
3. Income from orange farming accounted for 44% of the total household income and for 56% of the total income inequality.

## Conclusions (2)

4. Replacement of traditional upland crops by commercial orange may have worsened the income distribution, though absolute income increase might be significant.
5. No villagers participated in marketing activities of orange, which has a large potential of employment and income generation.
6. To further promote rural development focusing on the poor, use of labor for postharvest activities such as marketing and processing is recommended.



**Thank you for your attention.**