

**165**

**THE COMPARATIVE STUDY OF NEW  
AGRICULTURAL TECHNOLOGY IN WET AND  
UPLAND VILLAGES IN WEST GODAVARI  
DISTRICT - ANDHRA PRADESH**

A THESIS  
SUBMITTED TO THE  
**UNIVERSITY OF POONA**  
FOR THE DEGREE OF  
**DOCTOR OF PHILOSOPHY**  
( IN ECONOMICS )

BY  
**K. P. R. SESHAGIRI RAO**

GOKHALE INSTITUTE OF POLITICS AND ECONOMICS

PUNE 411 004

JANUARY 1986

**THE COMPARATIVE STUDY OF NEW  
AGRICULTURAL TECHNOLOGY IN WET AND  
UPLAND VILLAGES IN WEST GODAVARI  
DISTRICT - ANDHRA PRADESH**

A THESIS  
SUBMITTED TO THE  
**UNIVERSITY OF POONA**  
FOR THE DEGREE OF  
**DOCTOR OF PHILOSOPHY**  
( IN ECONOMICS )

BY  
**K. P. R. SESHAGIRI RAO**

GOKHALE INSTITUTE OF POLITICS AND ECONOMICS

PUNE 411 004

JANUARY 1986

(ii)

Form 'A'

Certified that the work done in the thesis "The  
Comparitive Study of New Agricultural Technology in Wet  
and Upland Villages in West Godavari District, Andhra  
Pradesh" submitted by Shri K.P.R. Seshagiri Rao was  
carried out by the candidate under my supervision.  
Such material as has been obtained from other sources  
has been duly acknowledged in the thesis.

  
**Supervisor**  
G. R. M. N. S.

ACKNOWLEDGEMENT

The study was undertaken under the guidance of Dr. G.R. Mulla, Gokhale Institute of Politics and Economics, Pune 4. I am highly grateful to him for his suggestions, encouragement, interest and patience, which enabled me to complete the work. I am particularly grateful to Dr. M.B. Padki, for having gone through the whole draft of the thesis. I benefited immensely from the comments he made in relation to the drafts from time to time. Mere words would not be sufficient to record my deep sense of gratitude to him.

My thanks are also to Prof. B.S.R. Rao and Shri M.P. Khare, who have helped me in various ways. I have had the benefit of valuable suggestions from the members of the staff of this Institute and I acknowledge them with thanks.

I am also grateful to my uncle and aunti, for their affectionate encouragement which sustained my enthusiasm through all the hazards of my academic career. Last but not least, I thank my wife, Ranganayaki, who has cheerfully borne the unwanted externalities of my research and many days of silence.

I thank the Principal, Government Degree College, Sullur Peta, Andhra Pradesh for granting me leaves, whenever I required.

(iv)

**Lastly I thank Shri K.P. Limbore for typing the thesis neatly.**

**K.P.R. Seshagiri Rao**

CONTENTS

<u>Chapter</u>	<u>Title</u>	<u>Page Nos.</u>
1	Introduction ... ..	1 - 31
2	Salient Features of the Area and Economic Profits of the Selected Cultivators ... ..	32 - 67
3	Extent of Adoption of Improved Agricultural Practices Among the Farmers ... ..	68 - 107
4	Socio-Economic Factors and Adoption	108 - 159
5	Package of Practices - A Detailed Study ... ..	160 - 290
6	Summary and Conclusions ... ..	291 - 325
	Bibliography ... ..	326 - 335

(vi)

LIST OF TABLES

<u>Table No.</u>	<u>Title</u>	<u>Page No.</u>
1.1	Population growth in India 1901 to 1981 ..	3
1.2	Growth rate of food production in India ..	3
1.3	Production and imports of food grains 1951-1960	4
1.4	Growth rate of cropped area : Output and productivity per cropped hectare ..	9
1.5(a)	Area of HYV paddy from 1969-70 to 1978-79 in West Godavari District - Blockwise (in acres) ..	20
1.5(b)	Area of local paddy from 1969-70 to 1978-79 in West Godavari District - Blockwise (in acres) ..	21
1.6	Compound growth rate of expansion of area under HYV to the total cultivated area .. for all the blocks from 1968-69 to 1977-78	24
2.1	Area, productivity and production of major crops in West Godavari District with compared to the state ..	35
2.2	Distribution of land holdings in West Godavari District (in hectares) ..	37
2.3	Area under principal crops in West Godavari District 1978-79 (in hectares) ..	40
2.4	Land utilisation in the West Godavari District (1978-79) ..	41
2.5	Basic Characteristics of the selected blocks	45

<u>Table No.</u>	<u>Title</u>	<u>Page No.</u>
2.6	Land utilization in the selected blocks	
	1978-79 ..	46
2.7	The cropping pattern of the selected blocks (1978-79) ..	48
2.8	Basic amenities of the selected villages	50
2.9	Land utilization in the selected villages	55
2.10	Cropping pattern of the selected villages (1978-79) ..	56
2.11	Distribution of farmers according to the rise of operated holdings ..	59
2.12	Distribution of net and gross irrigated areas of the sample farmers according to the size of operational holdings in the selected villages ..	61
2.13	Distribution of selected farmers by tenancy in the selected villages ..	63
2.14	Distribution of the selected farmers according to caste in the selected villages	65
2.15	Level of literacy among the sample farmers in the selected villages ..	66
3.1	Average extent of adoption of the selected villages ..	97
3.2	Extent of adoption in wet and upland villages	99
3.3	Distribution of practices adopted by the farmers in the selected villages ..	101



<u>Table No.</u>	<u>Title</u>	<u>Page No.</u>
3.4	Distribution of adoption by practices (villagewise) ..	103
3.5	Number of practices adopted by the farmers (villagewise) ..	105
3.6	Number of practices adopted by the farmers Regionwise) ..	107
4.1	Effect of size of holding on adoption of improved agricultural practices (regionwise)	114
4.2	Number and proportion of farmers whose credit needs were not fully met ..	115
4.3	Rate of adoption and tenurial status in wet and upland villages ..	119
4.4	Irrigation and rate of adoption of improved agricultural practices (regionwise) ..	122(a)
4.5	Availability of credit and rate of adoption of improved agricultural practices (regionwise)	127
4.6	Distribution of selected farmers who got credit according to sourcewise ..	129
4.7	The influence of caste on the adoption level (regionwise) ..	133
4.8	Level of education and the rate of adoption of improved agricultural practices (villagewise)	135
4.9	Farmers age and the rate of adoption of improved practices (regionwise) ..	137
4.10	Voluntary contacts with the V.D.O. by the farmers and their rate of adoption (villagewise)	143

(17)

<u>Table No.</u>	<u>Title</u>	<u>Page No.</u>
4.11	Involuntary contacts with the V.D.O. and the rate of adoption of improved practices (villagewise) ..	145
4.12	Demonstration plots observed by the farmers and the result ..	148
5.1.1	Rate of adoption of HYV versus local paddy varieties in the selected villages ..	163
5.1.2	Reasons for non-adoption of improved seed.	166
5.1.3	Per acre cost of production of HYV and local varieties of paddy ..	171
5.1.4	Cost of cultivation per acre of the selected farmers ..	172
5.1.5	Distribution of farmers according to the cost of cultivation (sizewise and varietywise)	176
5.1.6	Distribution of farmer's cost of cultivation per acre according to their size of holding	178
5.1.7	Cost of cultivation and yield (sizewise and regionwise) ..	182
5.1.8	Production function of HYV paddy and local paddy farmers in the selected farmers ..	190
5.1.9	Production function of local paddy between wet and upland villages ..	195
5.1.10	Production function of HYV paddy between wet and upland villages ..	198
5.2.1	Pattern of fertilizer use <sup>of</sup> on sample farmers (overall picture) ..	204

(X)

<u>Table No.</u>	<u>Title</u>	<u>Page No.</u>
5.2.2	Average rate of fertilizer application (N,P <sub>2</sub> O <sub>5</sub> ,K <sub>2</sub> O) per acre of cropped area under paddy (in kgs.) ..	207
5.2.3	Mode of fertilizer use per acre by the farmers in the selected villages ..	212
5.2.4	Fertilizer use on irrigated and unirrigated area (villagewise) ..	216
5.2.5(a)	The frequency distribution of different categories of farmers according to the level of 'N' use per acre in the selected villages (HYV paddy) ..	218
5.2.5(b)	The frequency distribution of different categories of farmers according to the level of 'N' use per acre in the selected villages (local paddy) ..	219
5.2.6	Frequency distribution of farmers according to the levels of 'N' use and the yield of paddy ..	221
5.3.1	Insects and pests associated with rice and the recommended control measures ..	235
5.3.2	Distribution of farmers according to the adoption of seed treatment and source of information ..	239
5.3.3	Distribution of farmers according to the reasons for not adopting the chemicals for seed treatment ..	241

<u>Table No.</u>	<u>Title</u>	<u>Page No.</u>
5.3.4	Distribution of farmers according to the adoption of curative plant protection measures (villagewise) ..	243
5.3.5	Distribution of farmers according to the adoption of curative plant protection measures and the source of information ..	244
5.3.6	Distribution of farmers according to the reasons for not adopting the curative plant protection measures ..	246
5.4.1	Distribution of farmers who has under-taken land levelling work ..	251
5.4.2	Distribution of farmers who did not take up land levelling work according to the reasons ..	252
5.4.3	Distribution of different crops regarding their water requirements ..	255
5.4.4	Distribution of farmers according to the number of waterings given to paddy ..	256
5.4.5	Distribution of farmers according to the reasons for not giving recommended watering to paddy crop ..	258
5.4.6	Distribution of farmers obtained yield according to the number of watering given to paddy crop ..	260
5.5.1	Percentage reduction in yield due to weeds	263
5.5.2	Cost Benefit ratio of weed control in rice through the chemical fertilizers ..	264

(xii)

<u>Table No.</u>	<u>Title</u>	<u>Page No.</u>
5.5.3	Awareness of pesticides among the farmers (villagewise) ..	272
5.5.4	Number of farmers used pesticides (villagewise) ..	273
5.5.5	Frequency of reasons for non-adoption of pesticides ..	275
5.6.1	Awareness of different types of improved implements selected for the study among the farmers ..	282
5.6.2	Distribution of farmers according to the use of improved implements in the selected villages ...	284
5.6.3	Distribution of farmers according to the reasons for non-usage of improved agricultural implements ..	286

BIBLIOGRAPHYBooks:

1. Ahlgreen, G.H., Klingman, G.C., and Wolf, Dale E.,  
"Principals of Weed Control", John Willy Inc.,  
New York, 1962.
2. Alexander, Robert, H., "Comparison of Results From Farm  
Records and Production Function Analysis" (Ed),  
Heady, Ezra O, Resource Productivity Returns to  
Scale and Farm Size, 1956.
3. Berker, R. and Herdt, R.W., Equity Implications of Tech-  
nology Change", Interpretive Analysis of Selected  
Papers from Changes in Rice Farming, Selected Areas  
of Asia, I.R.R.I. Losbanos, 1978.
4. Besu, Asek, "Technological Possibilities of Indian Agri-  
culture", Calcutta, 1978.
5. Bhattacharji and Prasad, Jyoti, "Mechanisation of Agri-  
culture in India; It's Economics, Modern India  
Press, Calcutta, 1949.
6. Bose, S.P., "The Diffusion of Farm Practices in Indian  
Villages" (Ed), Tara Shukla, Economics of Under-  
developed Agriculture", Vora Publications, 1969.
7. Desgupte, Sipsra, "Agriculture: Producer's Rationality  
and Technological Change", Asia Publishing House,  
New Delhi, 1971.
8. Desgupte, Bibleb, "The New Agrarian Technology in India",  
Macmillan, New Delhi, 1977.
9. Durost, D.P., and Barton, G.T., "Changing Sources of  
Farm Output", U.S. Department of Agricultural

## Production, 1960.

10. Fliegell, F.C., and Sen, L.K., "Agricultural Innovation in Indian Villages", M.I.C.D., Hyderabad, 1968.
11. Frenkel, F.R., "India's Green Revolution Economic Gains and Political Costs", 1968.
12. Freeman, Charles, "Economic Status and Adoption of New Agricultural and Home Practices : A Study of Three Villages" (Ed) by Saxena, R.N., "Sociology, Social Research, and Social Problems in India", Asia Publishing House, Bombay, 1961.
13. Food and Agricultural Organisation, Production Year Book, Rome, 1968.
14. Hanumante Rao, C.H., "Technological Change and Distribution of Gains in Indian Agriculture", New Delhi, 1980.
15. Harpal Singh and Hodgson, "Adoption of Agricultural Practices", NICD, Hyderabad.
16. Jaiswal, K.K., and Ram, D.N., "Recent Developments in Rice Production", Technology Diffusion Among Asian Rice Farmers, 1978.
17. Joshi, A.B., "Fertilizer Application in India", New Delhi, 1974.
18. Kuznets, Simon, "Six Lectures on Economic Growth", Free Press, New York, 1960.
19. Majumdar, D.N., "Caste and Communication in an Indian Village", Asia Publishing House, Bombay, 1962.

20. Mellor, J.W., "The Economics of Agricultural Development", Vora & Co., Bombay, 1969.
21. Mellor, John W., "Towards Theory of Agricultural Development", (Ed) by Southworth and Johnston, Agricultural Development and Economic Growth, 1968.
22. National Council of Applied Economic Research Centre, "Factors Affecting Fertilizer Consumption, Problems and Policies", New Delhi, 1964.
23. Nicholes, William H., "Agriculture in Economic Development", McGraw Hill.
24. Ranga Swamy, P. "India's Changing Farmers", Kitab Mahal, Allahabad, 1972.
25. Rayachoudari, S.P., "Problems of Fertilizer use and Crop Production", Economic and Scientific Research Institute, New Delhi, 1974.
26. Rogers, E.M., "Characteristics of the Innovations", Free Press, New York, 1962.
27. Rostow, W.W., "The Stages of Economic Growth", Cambridge University Press, London, 1960.
28. Schultz, T.W., "Transforming Traditional Agriculture", Michigan Press, U.S.A.
29. Schultz, T.W., "Economic Crisis of World Agriculture", Michigan Press, U.S.A., 1964.
30. Singh, D.J., and Rao, K.N., "Weed Control by Chemicals", Sri Lakshmi Press, Bapatla.
31. Singh, J.B., Govinda Raj and Raghava Rao, "New Seeds,



Adoption and Yield", Institute for Social and  
Economic Change, Bangalore.

32. <sup>Srinath</sup> ~~Srinath~~, Srinath, "Modernisation of Agriculture - A  
Case Study in Eastern Uttar Pradesh", Heritage  
Publishers, New Delhi, 1976.

Articles:

1. Abrol, I.P., Gerel, B.L., and Acharya, C.L., "Efficient Water-use Management", Indian Farming, Vol.25, July, 1975.
2. Bose, Santi Priya, "Characteristics of Farmers who Adopt Agricultural Practices in Indian Villages", Rural Sociology, Vol.26, 1961.
3. Chaudhuri, D.P., and Saini, G.R., "Use of Improved Farm Implements - A Study of the Old Ped Thresher", Economic and Political Weekly, Vol.23, 1968.
4. Chattopadhyay, S.N., and Udel Parek, "Adoption Quotient: A Measure of Multi Practice Adoption Behaviour", Journal of Applied Behavioural Science, Vol.2, 1966.
5. Chowdary, Kalyan, and Maharaja, Madhukar, "Acceptance of Improved Practices and their Diffusion among Wheat Growers in the Pelli District of Rajasthan", Indian Journal of Agricultural Economics, Vol.21, 1966.
6. Chowdery, B.K., "Disparity in Income in the Context of HYV", Economic and Political Weekly, Vol.5, 1970.
7. Dantwala, M.L., "Incentives and Disincentives in Indian Agriculture", Indian Journal of Agricultural Economics, Vol.22, 1967.
8. Dastane, N.G., "New Concepts in Irrigation", Economic and Political Weekly, Vol.13, 1969.
9. Dasgupta, Setedal, "Innovation and Innovators in Indian Villages", Man in India, Vol.43, 1963.

10. Des, H.K., and Sarker, B.R., "Attitude of Farmers Towards TN-1-A HYV of Rice", Indian Journal of Agricultural Science, Vol.40, 1970.
11. Eliegal, F.C., "A Multiple Correlation Analysis of Factors Associated with Adoption of Farm Practices", Rural Sociology, Vol.21, 1956.
12. Herdt, Robert W., "Profitability of High Yielding Wheat and Rice", Economic and Political Weekly, Vol.4, 1969.
13. Hopper, Charles R., and Dale, Stangeland, "Farmers Attitude and Values in Relation to Adoption of Approved Practices in Corn Growing Fields", Rural Sociology, Vol.23, 1958.
14. Jaiswal, N.K., "Effects of Size of Holding and Irrigated Facilities of Adoption of HYV", Indian Journal of Extension Education, Vol.6, 1970.
15. Jakhade, V.M., "Small Farmers and Co-operative Credit - The Problems", Indian Journal of Agricultural Economics, Vol.23, 1968.
16. Junghere, Y.N., "Factors Influencing the Adoption of Farm Practices", Indian Journal of Social Work, Vol.23, 1962.
17. Limberger, H.F., "The Diffusion of Farm and Home Information in an Area of Biological Research", Rural Sociology, Vol.17, 1952.
18. Marsh, Paul C., and Coleman, Lee A. "Farmers Adoption

- Rates in Relation to Adoption Rates of Leaders", Rural Sociology, Vol.19, 1954.
19. Marsh, Paul C., and Coleman, Lee A., "The Relation of Farmers Characteristics to the Adoption of Recommended Farm Practices", Rural Sociology, Vol.20, 1955.
  20. Mellor, J.W. and Mshuler, "New Seed Variation and the Small Farm", Economic and Political Weekly, Vol.7, 1970.
  21. Mukherji, D.K., "The HYV Programme - Variables that Matter", Economic and Political Weekly, Vol.5, 1970.
  22. Muttiah, C. "The Green Revolution - Participation by Small versus Large Farmers", Indian Journal of Agricultural Economics, Vol.1, 1971.
  23. Pale, B.B., "Fertilizer Consumption in Developing Countries - Relevance of the Price <sup>Factor</sup> Factor", Economic and Political Weekly, Vol.3, 1968.
  24. Prasad, V. and Chandwani, G.M., "Impact of Modern Technology on Pattern of Capital Formation in Agriculture", Indian Journal of Agricultural Economics, Abstract, Oct-Nov., 1969.
  25. Presser, H.A., "Measuring Innovativeness Rather Than Adoption", Rural Sociology, Vol.34, 1969.
  26. Robertson, C.A. and Sarma, R.K., "Lessons from the Package Programme with Implication of New Agricultural Technology", Indian Journal of Agricultural Economics, Vol.21, 1966.

27. Ryan, Brya, Neal Gross and Belohur, John C., "Acceptance of Innovation in Farming", Rural Sociology, Vol.23, 1958.
28. Shetty, N.S., "Agricultural Innovations: Leaders and Laggards", Economic and Political Weekly, Vol.3, 1968.
29. Sivaraman, B. "Scientific Agriculture is Neutral to Scale : The Policy and Remedy", Journal of Indian Society of Agricultural Statistics, Vol.25, 1973.
30. Singh, S.N., and Reddi, S.K., "Adoption of Improved Agricultural Practices", Indian Journal of Social Work, Vol.26, 1965.
31. Solow, R.M., "Technological Change and the Aggregate Production Function", The Review of Economic Statistics, Vol.39, 1956.
32. Vyas, V.J., and Bandopadhyay, S.C., "National Food Policy in the Frame Work of a National Food Budget", Economic and Political Weekly, Vol.10, 1975.
33. Wilkining, E.A., "An Introduction Note on the Social Aspects of Practice of Adoption", Rural Sociology, Vol.23, 1958.

Reports, Mimeographs, Technical Bulletins and others:

1. Government of India, Planning Commission, First Five Year Plan, A draft outline, New Delhi.
2. Government of India, Report of the Food Grains Policy Committee, New Delhi, 1966.
3. Government of India, Planning Commission, Fourth Five Year Plan - A Draft Outline, New Delhi.
4. Government of India, Report on Agricultural Development Problems and Prospectives, Department of Agriculture, 1965.
5. Government of India, Ministry of Agriculture and Irrigation, Report of the Committee on Panchayat Raj Institutions, August 1978.
6. Government of India, Ministry of Agriculture and Irrigation, Report on the National Commission on Agriculture - Part II.
7. Government of India, Planning Commission, Fifth Five Year Plan - A Draft Outline 1974-79, New Delhi.
8. Government of India, Planning Commission, Study on the Use of Fertilizer and Agricultural Production, New Delhi, 1967.
9. Economic Survey of Asia and Far East, Food and Agricultural Organisation, Rome, 1964.
10. Report on Guide lines on Planning Extension Programme - IAPP, Eluru, 1964.
11. Report on the Performance of Integrated Pest Control

Programme - IADP, Eluru.

12. Report on Evaluation of Agricultural Implements Programme in Pilot Development Project, Planning Department, Government of Uttar Pradesh, 1968.
13. All India Report of Agricultural Census, Government of India, Ministry of Agriculture and Irrigation, 1970-71.
14. Report on Improved Agricultural Implements in Himachal Pradesh - Committee on Plan Projects, Planning Commission, New Delhi, 1966.
15. "Technological Changes in Paddy Cultivation in Cuttack" by Des Gupts, H.K., and Des, P.K., Mimeograph, Indian Journal of Agricultural Economics, Bombay, 1966.
16. Kalode, N.B., "Suggested Programme of Work for the A.P.A.U. Specialists", Mimeograph, 1968.
17. Chandwani M.S., and Singh, R.S., Paper Presented on "Irrigation Requirements of Rice Crop - A Review", Central Board of Irrigation and Power, New Delhi, 1969.
18. Pillai, S. Central Rice Research Institute, Paper Presented on "Cultural Practices in Rice Production" - IADP, Eluru, 1972.
19. Hand Book of Statistics - West Godavari District - Eluru.
20. Technical Bulletins, Agricultural Information Unit, IADP, Eluru.