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Increasing incomes of resource-poor farm families through an integrated farming system

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Abstract
This study was undertaken in Moradabad district of Uttar Pradesh North Eastern plain agro-climatic zone. The total Area of Moradabad is 37174 Sq. Km.,it is 28th largest district of Uttar Pradesh and 329 largest in India in term of area. Where more than 80% of total geographical area is under agriculture. Three villages were randomly Selected from the three community development blocks of the district with a sample size of 150 small and marginal Farmers, 50 from each village. It was found that out of the 13 farming systems followed by the resource-poor community of Moradabad district, rice-pulse and pulse-wheat with 1 tractor was the most prevalent farming system adopted by 20.5% of total farm households followed by rice-pulse and pulse-wheat with live stock, rice-oilseeds-vegetable crop combination was adopted by only 35.7% of respondents. On the basis of survey to assess a suitable integrated farming system (IFS) in one hectare of land for resource-poor farmers of this complex-diversified and risk prone (CDR) NE Zone eco-system comprising both crops (rice-lentil-cucurbits) and (black gram-wheat with intercrop of mentha) and non crop components (poultry, mushroom, vermicompost,bee-keeping etc) was tested by Krishi Vigyan Kendra Moradabad during 2015-16. It was found that the gap of the net income between the farming system was Rs.85,670.00. BC Ratio calculated was 1.96 and 1.75 of the recommended and the traditional systems respectively. The IFS was found valid for resource-poor farmer families in North-Eastern Plain Zone eco-system with increasing land use efficiency, sustaining livelihood. By strengthening the economic status and generating employment using the land and time judiciously.

Keywords: Crop root zone, evapotranspiration, irrigation, moisture extraction, soil–water

Introduction
An integrated farming system (IFS) is one which focuses on judicious combination of any one or more of such enterprises and effective recycling of residue waste for better management of available resources with small and marginal farmers to generate more income and employment for family labourers during off seasons (Behera *et al.*, 2001) [1]. Integrated farming system includes livestock, poultry, duckery mushroom production and apiculture along with crop component through which total biomass production per unit area can be increased by efficient utilization of natural resources. The primary objective of a farming system is to improve the well- being of individual farm families by increasing the productivity of their farming systems given the constraints imposed by resources and environment (Norman and Collinson, 1985) [2]. Thus IFS activity is focused on a few selected interdependent, interrelated and interlinking, enterprises of crops, animals and other related subsidiary professions. In integrated farming system (IFS) bee keeping, fisheries, sericulture, mushroom cultivation and space-conservative subsidiary professions give additional high energy food without affecting production of food grains(Gill *et al.* 2009). Backyard poultry and vermin composting cane beaded to increase from income and strengthen livelihoods.
Moradabad district located between the longitude $28^0$37'-59.0 N and longitude $78^0$47'-59 .0 E with185 m from sea level. It has only 183169 ha. total cultivated area. Most farm families belong to the resource- poor small and marginal category. This paper highlights the different farming systems adopted by small and marginal farmers and assesses an alternative farming system comprising both crop and non crop components, suitable to this complex, diversified and risk-prone eco system.

Methodology
In order to get an idea of different farming systems present in the complex and risk- prone eco-system, all four community development blocks of Moradabad district were taken in the study. One village of each block was selected randomly from the villages where more than 70% of farmers belong to the small and marginal category.

Fifty farm families belonging to this category were selected randomly from each village. Data were collected through a pre structured interview schedule incorporating all the information required for the study. . All the 150 respodents were interviewed personally. The economics of the farminf system were calculated.

Results and Discussion

The geographical location and the lack of infrastructure have led to poor performance of Moradabad district. About 75% of its rural families depend upon agriculture. The economy of the district is agriculture –oriented. Only 99.5%of the cultivated area is irrigated. The land distribution among farm families, there were 52.5% marginal farmers. Out of the five types of farming category i.e. marginal, small, semi medium, medium and large farmers were the lowest in number with only 0%. Small category farmers with average land holding size of 1.4 ha was 29.7%.Thus resource- poor farmers constitute about 81.9% of total farm families in the district. The cropping intensity of the district is 172% .The diversity in cultivation of the district (anonymous, 2008-09) is mentioned in table-1

Table 1: Crop Demography of Moradabad District.

S. No.	Crop Name	Area (ha)	Yield (q/ha)
1	Paddy	94261	23.41
2	Wheat	121754	30.84
3	Sugarcane	98287	645.36
4	Lentil	1150	07.43
5	Black gram	5574	09.45
6	Mustard	2534	11.68
7	Mongo	2875	162.27
8	Guava	1185	298.59
9	Papaya	20	400.00
10	Banana	41	478.54
11	Brinjal	445	342.72
12	Sweet potato	442	131.79
13	Carrot	125	248.56
14	Bottle Guard	172	288.89
15	Potato	1465	273.41
16	Spong guard	207	240.43

Wheat being the principal crop of the district, all farming system was based on spring/autumn sugarcane. Though number of crops including fruits is cultivated in the district, the productivity was poor (table -1).Therefore it can be concluded that all the responding farm families had a crop and animal component. Livestock, goats, sheep, poultry bird, buffaloes and desi/cross breed cows are also present with most of the farm families. The data on different types of farming systems in the district were collected and summarized in table-2.

Table 2: Distribution of Farming System N = 150

S. No.	Farming systems	Frequency	Percentage
1	Rice – Wheat- Livestock	9	6.0
2	Black Gram-Mustard-Mentha-Vegetable	11	7.3
3	Rice –Mustard –Sugar cane-Livestock	30	20.0
4	Rica-Pulses-Sugarcane +Horticulture-Livestock	15	10.0
5	Vegetable-Sugarcane-Lentil-Livestock	19	12.7
6	Black gram-Wheat+ Mentha-Livestock	17	11.3
7	Black gram-Potato-Sugar cane- Vegetable	14	9.3
8	Fodder(chari)-Lentil- Sugar cane -Livestock	12	8.0
9	Rice –Vegetable- Sugar cane-Livestock	13	8.7
10	Rice-Wheat +Sugarcane-Livestock	12	8.0

Table- 2 shows that there were eleven rice sugar cane based farming system in the district. Rice-Mustard-Sugar cane was most prevalent one adopted by 20% of respondents. Vegetable–Sugarcane-Lentil-Livestock was the second (12.7%) most popular farming system. Blackgram-Wheat+Mentha-Livstock have 11.3% a presence in the district. Rice–Pulses–Sugar cane Horticulturecrop - Livestock farming systam are adopted by 10% farmers. Rice Wheat – Livestock systems were the least adopted farming system (6.0% of responding) and they were half of the only rice farmers among the responding small and marginal farmags.

Table 3: Component wise Configuration of Farming System N=150

S. No	Components	Freqency	Percent
1	Whaet	135	90.0
2	Sugercane	110	73.3
3	Rice	102	68.0
4	Lentil	75	50.7
5	Livestock	85	56.7
6	Horticulture crops	57	38.0
7	Oilseed crop	65	43.3

It is evident from table-3 that sugercane was the second most preferred component behind wheat in the existing ten farming systems. From discussion with respondents, it was found that after whaet- rice was the second perferred food of the in habitants of the eco –system. Hence, rice was the components of the maximum number of farming systems. Livestock are the companions of the resouse-poor farmers. Traditional goatery poultry and dairy were practised by good numbers of farmers as table-2 shows about 56.71.had these livestock. Horticulture crops were the lesast preferred components (28% of respondings) behind oilseeds. Among the wheat, Sugar cane werw cultivated in the highest areas i.e. 2,20041 ha during the year 2015-16 Rice –Mustard –Sugar cane was the most prevalent farming system in this eco-system The Krishi Vigyan Kendra, Moradabad assessed an integrated farming system model substituted for the most prevalent Rice – Mustard –Sugar cane farming system in district through its on survey programme during 2015-16 & 2016-17. The survey programme was taken in one ha area of irrigated condition in Khanpur village. The Survey programme was designed with two type farming systems, i.e. two farming systems in five farmer's fields as replications. The most prevalent existing farming system was taken as a Rice –Mustard –Sugar cane combination and the recommended practice was the diversification to IFS, integrating the crop and non-crop components (Table-4).

S. No.	Season	Crop	Area (ha.)	Variety	Character of the variety	Intervetions
1.	Kharif	Rice	1.0	Pusa-1509	High yielding,short duration & suitsble for upland	Fertilization application @120:60:45kg NPK/ha
2.	Rabi	Mustard	1.0	Pusa Shatabdi	HYV,more oil % & suitable for spring S.cane	Fertilization application @120:60:45kg NPK +30 kg Sulphur /ha
3.	Spring (Zaid	Sugar cane)	1.0	Co-0238	Early mature, high sugar % & good ratoon	Fertilization application@ 150:80:60Kg NPK +25 kg Zinc sulphate /ha
4.	Spring (Zaid	Onion Intercrop with S.cane	0.5	Pusa Red	High production, disease registant	Additional dose of NPK fertilizer/ha
5.	Spring (Zaid	Tomato Intercrop with S.cane	0.5	Kashi Amrat	High production, disease registant	Additional dose of NPK fertilizer/ha
6.	Post crop period	Dairy	02 baffaloes +02 Cows	Murra & Sahiwal	Both are high milk production	Vaccination and mineral mixture
7.	Post crop period	Mushroom (wheat straw)	100 Box	V.volvacea	Indoor business	Off season feeding
8.	Through out the year	Vermi compost	02 pit	E.fatida	High feeding habit & survive in airobic condition	Earthworms

IN the recommended IFS practice, out of one ha of land, a short duration rice variety like pusa-1509 was cultivated in 1.0 ha with application of presmud @ of 150q/ha and recommended doses of fertilizer. After the rice was harvested, the mustard high yielding variety (shtabdi) was sown, the mustard harvested in the end of feb., than spring sugar cane was planted in same land with all recommended dose of fertilizer. The rearing of two baffaloes and two cow for milk purpose 6-8 monthmilk period and mushroom farming of 75 beds were recommended for the post period. All the crop and non crop residues were recycled through productivity and reducing the cost of cultivation. The early tomatoes harvested and marketed at the rate of Rs. 06/- per kilogram, whereas the onion sold at Rs.12/- per kilogram. The mushroom was sold at Rs.65/- and milk sold Rs. 35/- per liter for 7 month milking period and average milk production 18.0 liter per day.

S. No	Crop	Area (ha)	Production (q.)	Grass cost (Rs.)	Grass Return(Rs.)	Net Profit (Rs.)	BC Ratio
1.	Rice	1.0	56.50	43650.0	96500.0	52850.0	1:2.21
2.	Mustard	1.0	16.45	21272.0	62510.0	41238.0	1:2.93
3.	S. cane	1.0	825.00	98750.0	259875.0	161125.0	1:2.63
4.	Onion	0.5	148.5	87850.0	178200.0	90350.0	1:2.03
5.	Tomato	0.5	176.5	65750.0	141200.0	75450.0	1:2015
6.	Dairy	02 baffaloes +02 Cows	3780Lit.	73000.0	132300.0	59300.0	1:1.81
7.	Mushroom (wheat straw)	100 beds	1.55	3500.0	10750	7225.0	1:3.07
8.	Vermi compost	02 pit	5.00	965.0	2500.0	1535.0	1:2.59
Total				394737.0	883835.0	489098.0	1:2.24
Conventional Method of Farming							
1.	Rice	1.0	52.50	47650.0	78750.0	31100.0	1:1.65
2.	Mustard	1.0	14.65	21272.0	55670.0	34398.0	1:1.61
3.	S. cane	1.0	765.00	98750.0	240975.0	142225.0	1:2.44
Total				163672.0	418885.0	255213.0	1:1.90

It is clear from Table-5 that the recommended integrated farminf system gave Rs. 2,33,885/-more then the tradition method of Rice –Mustard –Sugar cane cropping system in the same one ha. Of land. The cost benefit ratio was increased

from 1:1.90 to 1:2.24 in the recommended integraded farming system. From Table-5, it is evident that the grass income from the crop component was 738285/- rupees, whereas non –crop components like dairy, mushroom and vermicompost contributed 145550/- rupees. The net income from crop and non-crop components was 421013/- and 68060/- rupees respectively. Farm families were able to get more employment opportunities in comparision to the traditional rice- mustard- S.cane farming system. In off season the family got employment from mushroom cultivation and vermicomposting during the post-crop period when they would normally remain idle at his home without employment or migrate outside in search of job.

This proposed integrated farming system for the ecosystem was found profitable and viable by efficient and judicious use of every bit of land without herpering the environment.

Conclusion

An integrated farming system involving both crop and non-crop components is economically more viable than the traditional cropping system. It not only enhances the net income minimising risk factors but also provides employment opportunities during the leisure period. In such a agro-eco system integrating both crop and non -crop components is thus a suitable and better alternative to the traditional cropping system for small and marginal farmers.

References

1. Behera UK, Jha KP, Mahapatra IC. Generation of income and employment, a success story. Intensive agriculture. 2001; 39(7-8):9-13.
2. Norman DW, Collinson M. Farming system, research in Theory and practice. Proc of International workshop held at Hawkesbury Agricultural college, Richmond, NSW, Australia, 1985, 16-30.
3. Gill MS, Singh JP, Gangwar KS. Integrated farming system and agriculture sustainability. Indian Journal of Agronomy. 2009; 54(2):128-139.