



Full Length Article

Mixculture, fusion approach to develop the rural economy (Case study: Farim region, Mazandaran Province, IR-Iran)

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ABSTRACT

Agriculture as the most important source of human food, has changed normal operation of the building drastically. Human exploitation of natural resources is unilaterally and without observance of protectoral procedures but it is only based on short-term taking advantage of these resources. Growing population and food deficiency crisis caused extra exploitation of natural resources and the disorder the biological balance. Thus to stability and continuity of natural history natural resources, it is necessary to step for food security, employment and increase for low-income segments along to natural resource protection as synchronize. Synthetical culture science is one of the things that found special place in resolve natural resource problems. The main objective of this study was to compare the economic, production and income in synthetical culture and integrated agriculture. The data was preparation by survey, questionnaire and interview with 30 users of study through survey, questionnaire and interview preparation and compilation of agricultural cultivation with 30 users was conducted with a random sample of synthetically culture and integrated agriculture as random sampling. The results showed that the income of synthetical cultivation system is more than integrated farming system; because of higher income. So synthetical culture had preferment the public welfare and uplift in living standards of rural and prevent rural migration to urban directly. Therefore synthetical culture is not only the natural history of stability and continuity of natural resources, but will also lead to rural economic development.

Keywords: mix culture, economic, rural development, Farim

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INTRODUCTION

Synthetical culture in agriculture is agricultural crops accompanying timber trees. This method has great compatibility with most areas of the world and it has perfectly matched in natural forest area. Synthetical culture shows adaptation with production of perennial grass and annual plants. Livestock is also reconcilable [9]. Soil erosion is in the least and ventilation ecosystem is highly and desirable agronomic efficiency light, air, water and soil nutrients are maximized in this system [3]. Synthetical culture is comprehensive insight, which its various aspects of economic, social and even philosophical are combined and cultural dimensions is not less technical aspects. In order to reduce the use of pesticides, herbicides and fertilizers in this method, synthetical culture, crop rotation, racial and substitute crops, biological control and use of green manure and fertilizers instead of animal fertilizer is done and resulting in damage and adverse effects of chemicals on human health, natural resources, environment and rural communities is less [1]. Based on the research of [6] which was working on the agroforestry systems and soil surface management at the tropical alfisol explained the soil moisture and crop yield suppressed the cowpea grain yield and maize, drastically. The average cowpea yield in agroforestry systems was 30 to 50% of the control. Regardless of the management system, grain yields declined over time at the rate of 340 and 96 kg ha⁻¹yr⁻¹ for maize and cowpea, respectively. Hedgerows of *Leucaena* and *Gliricidia* acted as windbreaks. Consequently, soil moisture content in the top 0–5 cm layer in agroforestry systems was generally higher than that in the control during both wet and dry seasons. [13] reported that the system of

MSRBS¹ offers farmers a way to intercept eroding soil, trap and transform NPS² pollution, stabilize streambanks, provide wildlife habitat, produce biomass for on-farm use, produce high-quality hardwood in the future, and enhance the aesthetics of the agroecosystem. As a streamside best management practice (BMP)³, the MSRBS system complements upland BMPs and provides many valuable private and public market and non-market benefits. Nitrate-nitrogen concentrations in the MSRBS never exceed 2 mg l⁻¹ whereas the levels in the adjacent agricultural fields exceed 12 mg l⁻¹. Several studies have done about effects and benefits of different synthetic farming systems. According to study natural resources research scientist such as Tonts [15], using of combination cultivation is one solution to prevent the forest destruction and the sharp decline in tree and animal communities associated with them and reducing greenhouse gas emissions, that is achieved by understanding of farmers' needs and matching those needs with economic factors - social and biological imperative. To this end, social, economic factors, market indigenous knowledge and effective biological strategies to improve productivity and environmental conservation are adjustment methods for combination of cultivation systems. To promote this culture, ecological characteristics and cultivation combined with economic factors [9]. Nair et al [11] assess carbon sequestration in mixed culture in tropical region and concluded that cultivation combined savings of 5 to 10 kg of C ha⁻¹ in arid and 100 to 250 kg C ha⁻¹ in semi-arid too. [16] compared the combination of planting citrus trees with peanuts and peanut monoculture systems and concluded that the water-holding capacity in soil of planting mix because of the deep roots of the trees is more than monoculture and it decrease subsurface flow upto 2.9 percent. Souza et al., (2012) examine the impact of a variety of trees and soil properties in Coffee forest mix cultivation in Atlantic which 78% of the trees planted were native. Maximum average monthly temperature in the culture of coffee around 6 °C higher than that of brown full exposed to the sun. There is no significant difference between chemical and biological properties of soil cultivated with mix cultivate coffee and coffee where sun exposure perfectly, but soil organic carbon and nitrogen mineralization in cultivated with coffee rather than coffee is exposed to full sun. Namin Engineering (2009) examined the combination of culture and its role in socio-economic development in Isfahan city. The results show that mix cultivation of agriculture increase employment rates more than monoculture dramatically. As well as migration to cities is lower among users of combined cultures. AtaiGiglu (2010) examined the combined cultivating as new methods to develop the rural economy (case study: Parsabad, Moghan, IR-Iran). The results showed that the income of agricultural crops in integrated crop system is more than mixed culture, but respect to the system (e.g., fruits, wood), total mixed culture income is higher than that of integrated system. Therefore mixed culture high welfare and raised the standard of living of rural and prevents urban migration indirectly. In addition to socio-economic impact of mixed culture, it has combination of environmental effects. [2] study the rural forester forest socio-economic situation and its impact on forest (Behshahr, rural area, Yakhkesh, Mazandaran Province, IR-Iran). The results showed that in mixed cultures erosion is minimal, air ventilation in agriculture eco-system is quite desirable and agronomic use efficiency, light, water and soil nutrients is maximized. [8] in his master's thesis under the title of management role in improving the socio-economic status of rural forest area (study area Yakhkesh) examined the factors contributing to increase production and income per hectare from livestock and hence the entire income of farmers and rural projects concerned with environmental protection in Yakhkesh; results showed positive effect on the conservation and development of forest surface area that it have created addition of 34 new permanent jobs and 180 temporary jobs in the region. He believes mixed culture programs and poplar cultivation on steep terrain and low efficiency is one of the most important factors in this field. Combine culture knowledge passed from generation to generation according to different circumstances and different needs. The purpose of this study was to evaluate the use of mixed culture respect to economic feature in Farim region.

Materials and methods

Site description

Kellijkola forestry projects is location on Shirinrood basin and watershed number of 65 in the northern forests of IR-Iran and located between the 36° 6'26" to 36° 10'10" north latitude and 53° 17' 12" to 53° 9' 13" east longitude. This project is limited of north by Farim plains and east by Jorjade forestry project and west by Rasket and Valikben project and south by Sangedeh forestry projection at Mazandaran Province. This project is located on about 68 km from Sari city in Sari- Kiyasar jurisdiction (Fig1). The plan is accessible by two axes Sari and Savadkooh. Natural forests in the area are destruction for 20 years ago and it is

¹ Multi- Species Riparian Buffer Strip

² None- Point Source

³ Best Management Practice

cultivated by various species such as nectarines, walnuts, wheat, rice, poplar and so. The total project area is approximately 4197 ha.



Fig1: topographic and road maps for Kelijola forestry projects

Method

Purpose population is members of the farms where there is a mixed culture. After identifying the appropriate fields, to conduct research, questionnaires and interviews were conducted to collect data related to the fields of economics. The next step for study purposes, of the total population based on the cultivation of crops that are consolidated are governed about 23 samples and 7 samples were selected as control fields (Fig2). After collect the questionnaire data of users for combination and integrated agriculture, information was provided that showed comprehensive overview of economic situation of users in terms of income and product per unit area. In this section the results of the questionnaire were analyzed on Excel and SAS with parametric test. T-test method was used for data analysis and SNK was used for group mean comparison between different combinations of mixed cropping and integrated farming methods as statistically independent. Integrated farming systems that produce only crops was calculated annually for eachacre but for another system addition to producing crops and other products that suit the type of tree (wood, fruit), fruit production per hectare was calculated on an annual basis and the tree product that they wood shavings perception in terms of tons produced per hectare obtained, wood production rates were calculated on an annual basis (Table 1).

Table 1 - Characteristics of crop an cultivate farms

System	Product	The total area of operation (acres)	Average number of trees per hectare (trees)	Repeat for each system
Cultivate Crop	Grain- Nectarine	4.5	300	6
	Grain- walnut	12	200	6
Corridor	Grain-Rose	4	100	3
	Poplar and Rice	10.5	240	8
Agriculture integrated	Rice	8	-	2
	Grain	4.5	-	5

RESULTS

The analysis of social factors

According to the user age, user education, user jobs, children education and jobs, participation in promotional and educational classes were studied as shown in table 2.

1 – According to results of comparative tests,there is significant effect between user age in select of agroforestrysystem and integratedagriculture (Fig 2).

2 –There is significant relationship between user education and select the system (integrated agriculture or agroforestry) (Fig 3).

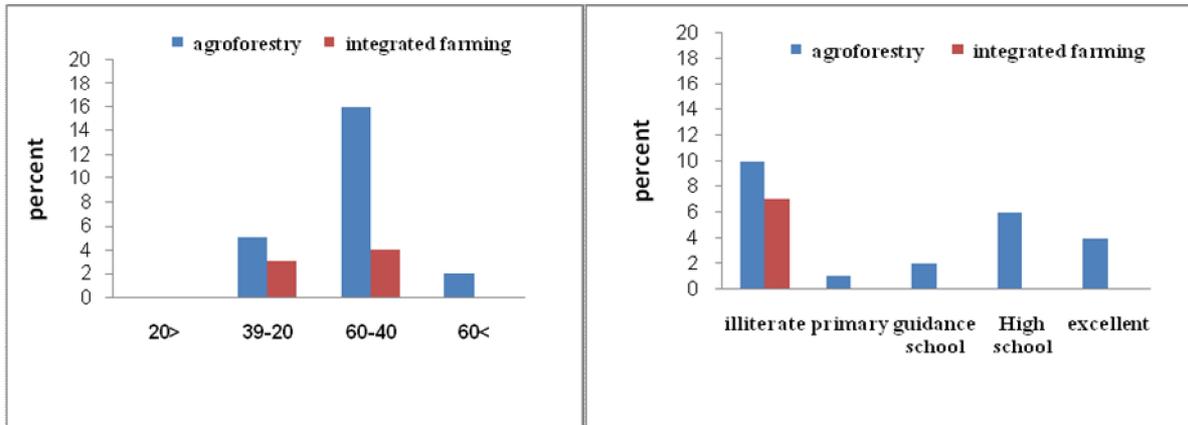


Fig2: agroforestry and integrated farming systems at users age classification

Fig3: agroforestry and integrated farming members education status

1. Comparative tests showed no significant difference in select secondary job agroforestry and controls systems users (Fig 4)
2. Significant relationship in comparison between agricultural user status and system selection (agroforestry or integrated agriculture).

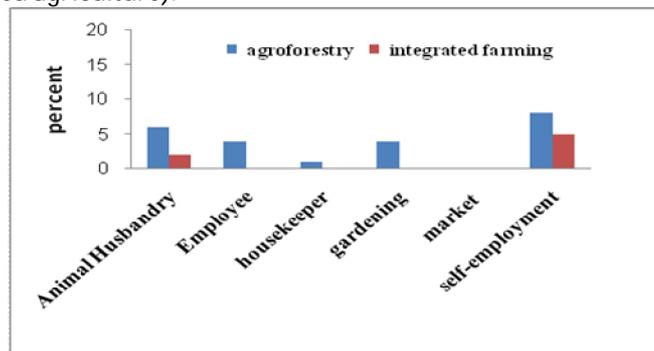


Fig4: Agroforestry and integrated farming employment status

5 – There is significant difference between the number of household members and agroforestry systems and controls (Fig 5).

6 - Results obtained of the table show that there is significant difference between the children education in control system and agroforestry (Fig 6).

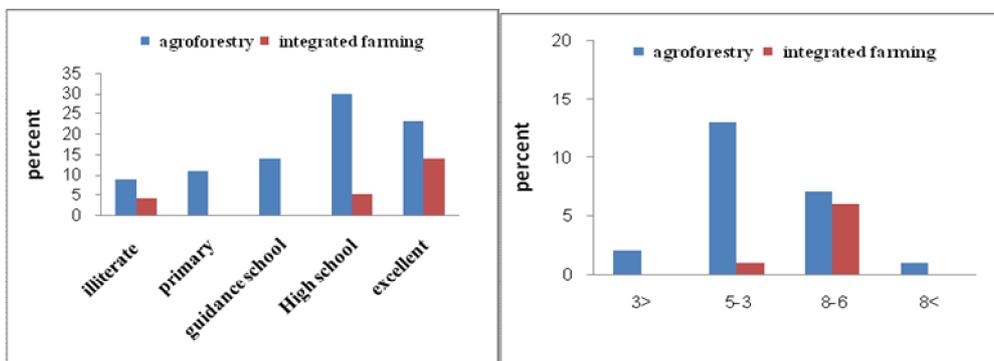


Fig5: agroforestry and integrated household members classification

Fig6: child education status in agroforestry and integrated systems users

7 - Results obtained of the table show that there is significant difference between the children employment in control system and agroforestry (Fig 7).

8 - Comparison between participation in training and extension and agroforestry systems and controls in this study indicate that there are significant differences between the two (Fig 8).

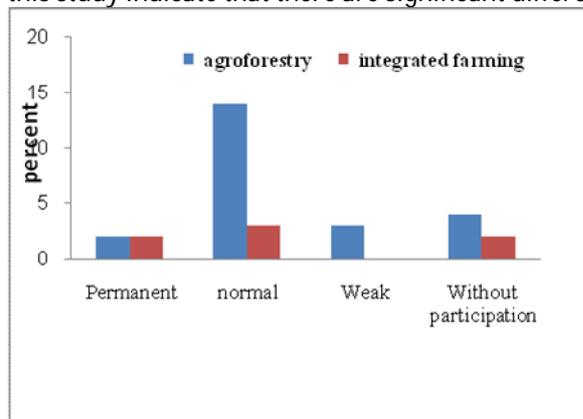


Fig7: employment status of user children in agroforestry and integrated systems

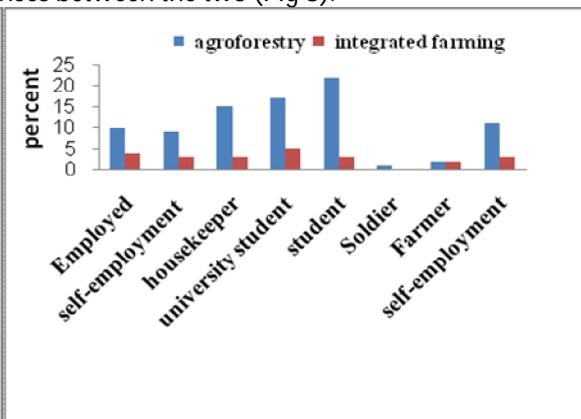


Fig8: comparison of agroforestry and agricultural systems integrated user engagement in classroom learning and promote

Table 2 – Investigate the relationship between user social characteristics in selection of agroforestry and agricultural integration

Source of Variations	Df	Chi-square Data value	P>F Significant level
Members age	3	14.35	0.000
User education	4	18.2	0.000
Employment status	5	4.6	0.120
Agriculture status	3	11.5	0.000
Number of household	3	22.25	0.000
Children education	4	38.65	0.000
Children employment	7	44.15	0.000
Participation rate	3	16.7	0.000

Analysis of economic variables

Production and income in agroforestry and integrated agriculture systems: Table 3 shows comparison production and income in agroforestry and integrated agriculture systems using ANOVA, as seen in the table, there is significant difference in level of 1%.

Table 3: ANOVA, production and income in agroforestry and integrated agricultural system

Source of Variation	df	MS	F _{value}	P>F	R ²	CV
Crop production	5	2264676171	8.09	0.0001	0.627	40.6
Crop income	5	2.823	5.75	0.0013	0.547	30.32
The total production of goods	5	2575701714	10.58	0.0001	0.687	35
Total revenue products	5	6.654	8.67	0.0001	0.643	31.17

Crop production

According to Fig 9, poplar and rice are maximum and barley production and rice composition are minimum production of agroforestry systems.

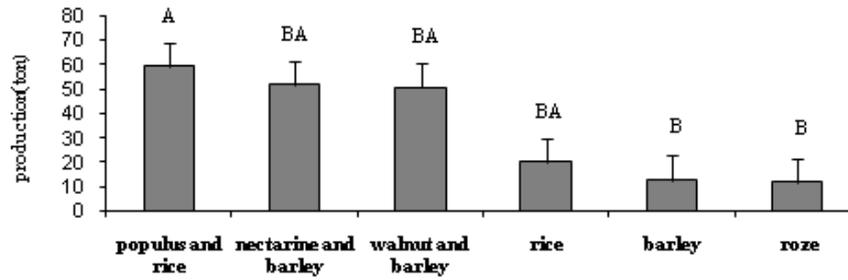


Figure 9 - Production (tons) of annual crops in agroforestry and integrated agriculture systems per unit area (ha)

Crop income

As shown in Figure 10, crop income in various agroforestry system is higher than integrated farming systems. In this system Poplar, and Rice is first and the last rank is a combination of Rose and Barley.

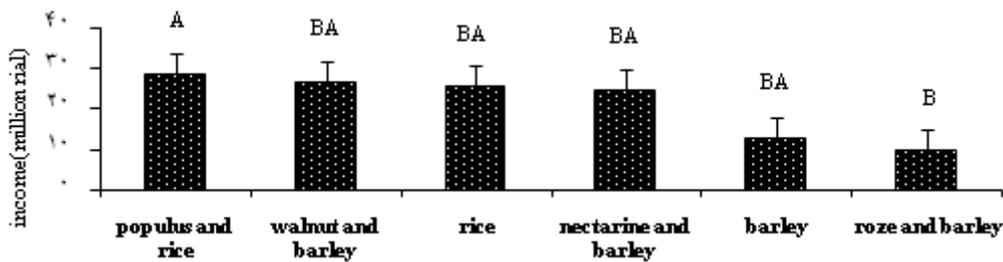


Figure 10 – Annual crop income (Rial) of different crops in agroforestry and integrated agricultural systems per unit area (ha)

The total production of goods

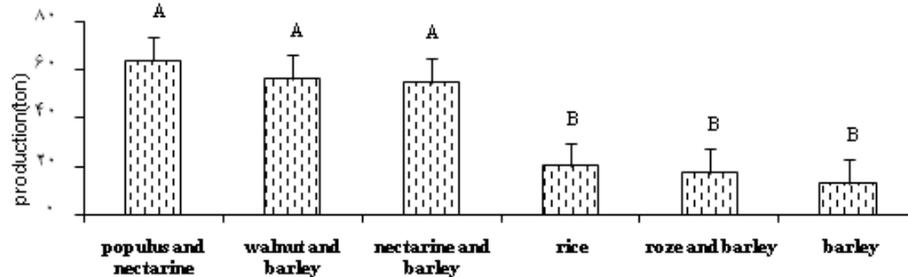


Figure 11 shows the production of all products in the studied systems. According to it, total crops and trees for agroforestry and crop for integrated agriculture are total productions. Popular and Rice are maximum and Barley is lowest.

Figure 11 – Total production of goods in different systems agroforestry and integrated agricultural systems per unit area (ha)

Net revenue from products

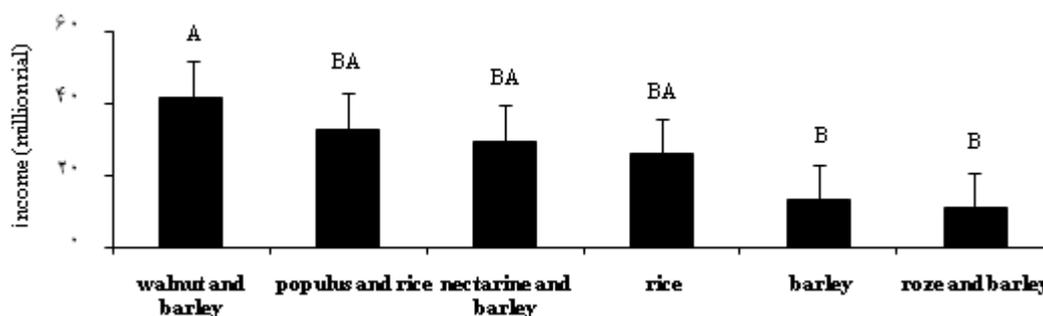


Figure 12 shows the total revenue derived from the studied systems in this study. It shown that according to the hypothesis, agroforestry system total revenue is higher than integrated agriculture that ranking

accordance to terms of composition and product. The combination of walnuts and Barley (agroforestry) is in first place and Rose – Barley composition is the last rank. That seems be more careful to choice of species and composition type.

Figure 12 -Annual income (Rial) of products, agroforestry and integrated agriculture systems per unit area (ha).

DISCUSSION

Production potential can be increased by combine cultures systems, thus created eco- system potencial is increase in taking advantage of environmental conditions. In addition to the production system so driven that much more needs to be fit and have a better quality. For example, planting a tree in a field around can use the existent potential Such as food, water and fertilizer on marginal and missing food in the topsoil. Therefore various type products can be obtained such as timber, fruits and fodder production. Single product fragile will also be reduced by becoming more complex. Mix culture science has try to increase system efficiency, production and optimization by the positive effects of the components involved in the system and also harmful effects on each other [4]. Runciman (1989)believed that improve the lives of people is one of development item. He believes it can be done in two ways: Economic development and development of other amenities and facilities that lead to deprivation of life [6]. Economic comparison is done according to crop production and farm income, gross income and net income per year between the different systems cultures of mix and integrated agriculture. Annual crop yields per hectare were performed according to statistical tests. There is significant difference between mix and integrated culture systems for crop production rate at the level of 1%. It shows higher product in mix culture (Popular and Rice). Annual crop income can be said mix culture (Popular and Rice) has highest income and lowestincome accounted Rose that both cultures are mix culture. Compare the total annual production of mix cultured (sum of crop and tree) and integrated farming (crops) represents most of mixed cultures was under mix culture that popular and rice has highest and Barley has lowest production. Finally, the important comparison between the two systems is net income obtained in the two systems. To obtain the net income, total annual revenue generated from the mix cultures (income producing crops and trees) with a fraction of the cost and the net income per hectare per year and net income obtained of integrated culture (crop production income) expense deductions applied per hectare per year.Results indicating that mix culture net income is higher than integrated system which Walnut – Barley has highest and Barley has lowest income. These results are consistent with the results of some researchers, such as the Australian Agricultural Company, a management consulting. Net income from consolidated operations of the business culture in Australia compared to integrated farming over a period of 40 years is estimated at about \$ 3 billion in 1996. Further advantage of the process of absorption is estimated at around 26 billion dollars at year. The study also forecast an increase in employment of 54,000 persons over 40 years ago [12]. [5] comprise mix culture (annuals planting paulownia trees and bushes in the tea) and integrated agriculture for energy production and economic benefit. He concluded that the combination of energy and economic gain is dominant in mix cultivation [10].[17] as an integrated management plan to protect forests in the caspian with the combination of the two systems could grow hay for ranchers and plantation poplar for farmers, the funds of the United Nations and the southern city of Behshahr in the Mazandaran Province carried out, Farmers earning up to 700 percent and 1700 percent increase farmers' income, It will protect the soil against erosion and increase soil water absorbing power [8]. According to the study, a total of 5/43 acres of farmland, 31 acres owned by 23 users of mix cultivate and 12/5 acres owned 7agricultural land use in integrated cultural. It means mix culture share is 1/3 and for integrated culture is 1/7. Therefore can said mix culture users are yeoman farmers that to increase the income of small farm land to plant trees along Their crops on the land and a minimum of other direct and indirect benefits to take advantage of it and since most users most of the mix cultures, it can be concluded that they Consolidated culture can not only natural resources but also the stability and continuity of the natural history of the development of the rural economy.

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