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The Effect of Intercropping in the Fish Culture on Productive Capacity (Applied study)

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ABSTRACT

This research was aimed to increase the productive power of fish culture per unit in ponds, it was optimized to change the production method used through the cultural intervention of fingerlings and small- sized fishes by beneficial effect of feeding. It was noticed that the feed in water Crustacia. Meanwhile, the fish were fed on about 300 gm of feed. A total of (4) ponds were cultured by fingerlings by various density the results indicated that the best economical density was 20,000 fingerlings per acres. The results have also indicated that per acre has an income of (6.686 million), despite of the high mortality rate which was 55%; in comparison with the density of 10,000 fingerlings in the (4th) pond which was due to the 40% mortality rate; so the total income was 4.8 million Dinars. The results of culture intervention led to increase of the influx currency from 2 million Dinars to be more than 94 million Dinars, and each single Dinar income was increased from 1.083 to 3.74. The net value was increased from 5.641 to 97.641 as well as the productive capacity from (1.4) to (24.4).

Keywords: **Fish Culture, Agriculture, Production, Intercropping.**

1. Introduction

The Fisheries income is considered to be the cornerstone of livestock productive base and an important source of animal protein, which developing and maintaining them is food security strategies on growing demand (Jabber and others, 2008). Due to what these meats contain of fat unsaturated fatty acids, amino acids and vitamins, making it as one of the important components in achieving and improving the food balance and health (Falluji, 2011). Despite of the availability of environmental and water potentiality which are suitable for breeding and expansion of this important product, but these potentiality and resources remained unexploited efficiently; whereas indications show that the production and consumption of fish in Iraq is in decline, as estimated the consumption of each Iraqi citizen per capita in 2000 at a rate not exceeding 1.4 kg / capita/ year which is very little in

comparison with the Arab per capita 7 kg / year per capita and globally up to 25.9 kg / year per capita (Balasim, 1999). This is a proof that the local production of fish meat is not enough to meet the domestic consumption which is a clear flaw in the structure of economic policy and productivity. The Intercropping fish is one of the applied modern agriculture concepts for the purpose of diversification and increase to the agricultural production, which was originally the means innately practiced by the ancient man through intensive agriculture in order to increase the production (Hassan, 2009). The intercropping fish has the ability to achieve a positive coexistence among crops need for high quantities of nitrogen fertilizers with crops working on fixing the atmospheric nitrogen more than of their actual need like legumes, and eventually the main crop will avail from the accompanying crop. It was therefore the methods of production changed by the intercropping fish of hands which they weigh more than 300 gm for each and the fingerlings weigh 2 gm, in order to take advantage of different feeding between fingerlings and hands fish by advanced weighs; as the fingerlings feed on Zooplankton while fish feed on 300 gm of fodders as well as bottom livings. The importance of this research is to increase the fish productions per cubic meter of the aquatic ponds and take the remedial measures to eliminate the low-density fish in sand ponds in order to increase the investment of the Iraqi Dinar. The research aim is to increase the capacity production of fish culture per unit as well as to figure out the best densities of fingerlings that can be cultured inside the ponds

2. Methodology

Research Snag: The fish production in Iraq is now facing several problems and obstructions that stand as an obstacle of taking advantage from the available potentialities, which led in decline to the fish production level and cannot meet the needs of local market demands despite of establishing numerous fish culture projects in Iraq.

Research Hypothesis: It is possible to increase the production capacity of fish culture in ponds through intercropping fish to meet the market demands as well as achieve greater economic incomes.

Research Methodology: The research has adopted the method of descriptive analysis through applied field study to four fish ponds as well as makes a feasibility study of costs and return incomes for the interest of investors by using a statistical analysis program of data named (SAS 2004).

Theoretical Framework: The production capacity is known as the available production in the project through a used or an excluded list within a time-frame and with specific method of works. It is also known as the production unit capability to produce additional units or perform services which are connected to assets. The productive energy is achieved through technical and economical efficiencies for the same (Aldhahri 1991). The technical efficiency means to achieve the utmost productions by using the same available production resources with reasonable costs. The economical efficiency means the costs per production unit should be as little as possible (Hassan 1994), hence the production energy is as follows (Baker et al, 1980)(The amount of available production incomes, method of production works and the efficient use of basic requirements).It was therefore focus to change the used method of works by another method like intercropping fish culture among hands fish weigh more than

300gm and fingerlings weigh about 2gm to take advantage of the different feedings between the fingerlings and the hands fish by advanced weights. The fingerlings feed on plankton water while fish feed on over 300gm of fodder (Saleh, 2010). The four ponds were cultured by different densities in order to know which one of them is economically the best.

Experimental studies: It was selected a farm of 20 acres which contain of four ponds and each pond sized of 4 acres make them in total of 16 acres. It was then cultured by eight thousand hands fish which weights between 70gm to 200gm. The culture was started on 15 April and ended up on 15 June of 2011. The ponds were prepared and cleaned from sediments as well as fertilized, seven days before the recommended time limit, by 750 kg of poultry waste for per acre (Haider, 2008). The fish were fed by a special ration and hands fish and were categorized by their own weights; as follows:

First Pond: Contain of 1800 hands fish at the density 450 hands fish per acre, by the preliminary weight of (150-200gm).

Second Pond: Contain of 1900 hands fish at the density 475 hands fish per acre, by the preliminary weight of (125-150gm).

Third Pond: Contain of 1950 hands fish at the density 487.5 hands fish per acre, by the preliminary weight of (125-100gm).

Fourth Pond: Contain of 2350 hands fish at the density 587.5 hands fish per acre, by the preliminary weight of (less than 100gm).

The gross total is 8000 hands fish at an average culture of 500 hands fish per acre.

After 30 days of the beginning of fish culture, the average weight of fish in the four ponds reach up to 300gm per acre cultured by 25,000 fingerlings per acre for a total of 100,000 fingerlings weighing 2gm of fingerlings. The second pond was cultured by 80,000 fingerlings at the density of 20,000 fingerlings per acre. Third pond was cultured by 60,000 fingerlings at the density of 15,000 fingerlings per acre. While the fourth pond was cultured by 40,000 fingerlings at the density of 10,000 fingerlings per acre.

3. Results & Discussion

Table (1) shows the fixed and variable total costs, as the highest cost is the fodder which is amounted 33, 84 % and the fixed cost is amounted 14, 45 %.

Table (1), the total costs of hands fish culture inside the ponds:

Sr. No.	Details	Total Costs	Percentage %
-	Fixed Costs		
1	Extinction of Buildings		
2	Extinction of Tools	0,250	0,96
3	Rent of Land	2,000	7,71
4	Salary of Investor	1,500	5,78
-	Total of Fixed Costs	3,750	14,45
	Variable Costs (Operative)		
1	Hands fish	8,000	30,84
2	Fodder	8,759	33,76

3	Protection	----	--
4	Animal Fertilizer	1,0	3,86
5	Maintenance of Ponds	0,800	3,08
6	Labours Wages	1,650	6,36
7	Maintenance of Tools	0,100	0,39
8	Fuel	1,650	6,36
9	Lubricants	0,105	0,40
10	Transportation	0,125	0,48
-	The total of variable costs	22,189	85,55
-	The Gross total of Costs	25,939	%100

(*Gathered by the Researcher based on the Culture Records)

Table (2) shows the fish product status in four ponds as they were sold out at the price of 4.25 dinars per kilogram, due to the variable of weights in the four ponds ranged between 1.1 to 0.650 kg \ fish, if there are significant discrepancies at the average weight of hands fish and the total value of each pond as well as the mortality percentage in the ponds.

Table (2) Total Income of Fish in the Sand Ponds:

Sr. No.	Ponds Records	The Weight of Single Hands fish during Culture	Total No.	Breeding Period (Day)	The Average weight of Hand (Kg)	The Average Price per Kg	Total Value for Each Pond (Million Dinar)	Mortalities
	First	150-200gm	1800	90	1.10a	4.25	8.335	17a
	Second	125-150gm	1900	90	0.9ab	4.25	7.198	18a
	Third	100-125gm	1950	90	0.8ab	4.25	6.392	70b
	Fourth	Less than 100gm	2350	90	0.650b	4.25	6.155	121c
	Intestinal Level	-	-	-	-	-	-	-

(*Gathered by the Researcher based on the Culture Records)

(*All fish in the four ponds were sold out in one time at the price of 4,250 Dinar)

Table (3) shows the number of fingerlings cultured in each pond, as it varies between 10,000-25,000 per acre, to figure out the best economic culture ratio.

Table (3) the fingerlings culture in each pond with associated costs.

Ponds	Fingerlings Culture Density per Acre	Total Nos. of Fingerlings	The Value of One Fingerling per Dinar	The Total Costs in Dinar
First Pond	25000	100000	30	3000000
Second	20000	80000	30	2400000

Pond				
Third Pond	15000	60000	30	1800000
Fourth Pond	10000	40000	30	1200000
Total		240000		8400000
Total		240000		8400000

(*Gathered by the Researcher based on the Culture Records)

Table (4) shows the number of mortalities in the four ponds as well as the average weight of hands fish.

Ponds	No. of Mortalities	The Remaining No. of Hands fish	The Percentage of Mortalities	The Average Weight of each Hand by gm
First Pond	65000	35000	65	75
Second Pond	45000	35000	55	62
Third Pond	26000	34000	43	65
Fourth Pond	16000	24000	40	67

Table (5) highlight the selling price, as the average price was 850 Dinar /kg, whereas the Second Pond overpasses economically all the other ponds and the net profit was 27, 35 Million Dinars; whilst the fourth pond was the less profit despite of the low mortalities percentage.

Table (5) shows the incomes, total costs and the net profit of fingerlings:

Ponds	No. of Hands fish	Selling Price/Dinar	Total Amount/Dinar	Total Costs/Dinar	Net Profit/Dinar
First Pond	35000	850	29750000	3000000	26750000
Second Pond	35000	850	29750000	2400000	27350000
Third Pond	34000	850	28900000	1800000	27100000
Fourth Pond	24000	850	20400000	1200000	19200000

(*Gathered by the Researcher based on the Culture Records)

Table (6) shows some of the economic criteria for culture inside ponds without fingerlings intercropping and also shows the huge superiority at all used criteria of the intervention between fish and fingerlings in the same ponds, whereas the additional value has

rose from 5,891 to 97,891 Million Dinar, whilst the work production has rose from 1.4 to 24.41 as well as the average income of single Dinar has rose from 1.083 to 3.74.

Table (6) shows the total costs and incomes in (million Dinar)* as well as the economical assessment criteria for the breeding in the cages and ponds:

Sr. No.	The Total Costs, Incomes & the Economic Assessment Criteria	Breeding in Ponds	Breeding with the intervention of Culture Fingerlings	Intestinal Level
1.	The total fixed costs	3,750	3,750	**
2.	The total variable costs	22,189	30,589	**
3.	Total costs	25,939	34,339	**
4.	Total incomes (production value)	28,080	128,48	**
5.	Currency influx (finance profit)	2,141	94,141	**
6.	The average income of single Dinar	1,083	3,74	*
7.	Total additional value	5,891	97,891	**
8.	Total additional value	5,641	97,641	**
9.	Work production***	1,41	24,41	**

(*Gathered by the Researcher based on the Culture Records)

*($p < 0.05$) ** ($p < 0.01$)

*The numbers of labours are (4) only.

4. Conclusion

It is possible to increase the fish production capacity per unit in the ponds by using the method of culture intercropping between fingerlings and fish. However, the typical density to achieve the best economic incomes is to put 20,000 fingerlings per acre and the best weight to culture hands fish in the sand ponds is 150-200 gm, which provides the highest weights than any other pond with less weight. According to the results obtained it is recommended to apply the experiment in the water cages and encourage all concerned breeders in order to overcome the significant shortage of hands fish due to the wide use of water cages recently.

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