

## The effect of farmers' farming practices on wheat productivity during winter season (2019-2020) (Abu Jen, Alaric and Ras-Elfil Taftish<sup>1</sup> - Al-Jazeera scheme)

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### Abstract:

The present study was conducted to assess the farming practices of wheat farmers in the Jazeera Scheme and their effect on Wheat productivity per-feddan. To achieve that goal, two questions must be addressed. The first question is: What are farming practices followed by farmers linked to wheat productivity per-feddan? And the second: Are these farming practices related to wheat productivity per-feddan according to research recommendations?. The study focused on the Agricultural Research corporation recommended practices by the wheat research program. That related to land preparation, sowing date, wheat varieties, knowledge of sowing depth, Seeds rate per-feddan, number and duration of irrigation, fertilization schedule and type per-feddan, and add time, knowledge of the appropriate time for fertilizing application, productivity per feddan and cost of farming. A social survey method was used. 100 farmers were selected randomly (Due to the limited capacities available for the study). 25 farmers from Abu Jen Taftish, 25 farmers from Alaric Taftish, and 50 farmers from Ras-Elfil Taftish. Some of that Taftish had irrigation problems (thirst) during the season like Abu Jen and Alaric Taftish. And other hadn't irrigation problems during the season like Ras-Elfil Taftish. A questionnaire was used to collect primary data. The data were analyzed by computer through (SPSS) software to extract the frequency and percentage to describe the farming practices followed by the farmers. The Chi-square test and Pearson's correlation were used to test the hypothesis which states: the farming practices followed by the farmers did not affect the wheat productivity during the winter agricultural season 2019-2020. The most important results of the study indicated that the practices followed by the farmers regarding the sowing date, number, and duration of irrigation and fertilization had a decisive positive role on the wheat productivity per-feddan. The study recommended

several recommendations to the authorities concerned, the most important of which are: The Ministry of Water Resources and Irrigation and Aljazeera Scheme Administration must provide irrigation water for the planned cultivation areas until the end of the season. With a commitment by farmers to at least 8-9 waterings during the crop life cycle. And must establish demonstration fields to teach farmers the irrigation processes by the Agricultural Extension department in the Scheme. The necessity for Agricultural Extension Department in Aljazeera Scheme to train farmers on how to follow an agricultural cycle and not repeat planting the same crops on the same land, and add Municipal fertilizer every five years to improve soil components.

**Keywords:** wheat farming practices, farmers' farming practices, wheat

**Introduction:**

Sudan has known wheat cultivation for thousands of years. As its cultivation was confined until world war two in the northern district (north of line 17), in an area not exceeding 30 thousand feddan, whose product was then sufficient for the local consumption of the region, which depended on it for their food, most Sudanese people have depended on corn and millet in their diet for the past 30 years, because of the growth of urban societies and changing eating habits, and increasing incomes of Sudanese citizens. The demand for wheat as an alternative to maize has increased and hence the gap between production and consumption increased until importing wheat from overseas to fill this gap became a heavy burden on Sudan's foreign exchange resources and a pressing tool. The interests of the homeland, which encouraged the country to strive to develop its local production to achieve self-sufficiency (Ajeeb, 1998). Aljazeera Scheme is situated in central Sudan between the Blue Nile and the White Nile State, in the muddy plain extending from the southern state of Sennar to the state of Khartoum. Aljazeera scheme was founded in 1925, and it is one of the oldest farms in Sudan, and it is the largest irrigated scheme in the world, with an area of 2.2 million feddan (924,000 hectares), with 400 meters above Sea level. The scheme extends throe Aljazeera and the White Nile states and is irrigated from the Sennar Reservoir (ESCWA, 2019).

Aljazeera scheme divides into 18 sections (10 sections in Aljazeera and 8 sections in Almanagil) and the section includes 5 to 10 inspections (Taftish) with an area between 60 and 190,000 feddan (Abd al-Baqi, 2010). The irrigation network of the Aljazeera scheme is one of the largest, most interconnected, and efficient irrigation networks in the world, consisting of (150,680) km a total irrigation network long and comprising two main Canals with 260 km long, 11 Sub-channels (Megir) with 650 km long, 107 main Canals (Canar) with 1,650 km long, 1,570 km small Canals (Canals) with 8,120 km long, 29,000 Abu-Ashrin Canals with 40,000 km long, 35,000 Abusta Canals. It is characterized by high efficiency in terms of performance and low cost due to natural flow irrigation. The scheme is divided into seven large irrigation departments (four in Aljazeera and three in Almanagil). This department divides into 23 small departments (13 in Aljazeera and 10 in Almanagil) (Billal, 2020). It is characterized by high efficiency in terms of performance and low cost due to natural flow irrigation. The scheme is divided into seven large irrigation departments (four in Aljazeera and three in Almanagil). This department divides into 23 small departments (13 in Aljazeera and 10 in Almanagil) (Billal, 2020). In terms of how farmers interact with agricultural innovations. In a study by Al-Hadi Taj Al-Din Suleiman (Suliman, 2001) on the obstacles to adopting technical packages for Cotton and Sorghum crops in the International Fund for Agricultural Development

(IFAD) projects. The study indicated that there is a positive direct correlation between each of the adoption levels of the technical packages for Cotton and Sorghum crops and education, social participation, farm size, association with agricultural extension office, and adequacy of funding. The study also revealed an inverse correlation between the adoption rate in cotton farming and farm age, family size, and cultural openness. The study also found that there is no correlation between the overall income rate of farmers and the technology adoption rate of sorghum packets. As for the regression analysis, the study showed that the most important factors positively affecting the cotton package are the adequacy of financing, the size of farms, the link with agricultural extension systems. As for sorghum yield, the study showed that the most important factors that positively influence uptake are, respectively, the adequacy of funding, farm size, and social participation. Also, it has been shown that Cultural openness is one of the most important factors that negatively affect the adoption of the technical packages of Sorghum and cotton crops together, followed by the farmer's age in cotton cultivation and years of experience in Sorghum. As it became clear to Yasser Omar Taha (Taha, 2000) in a study of the impact of the Umm Jawasir project for integrated rural development, that the most important factors that significantly affect the technical packages of adoption wheat are obtaining indicative information, farm size. The study concluded that the incentive to adopt agricultural innovations is related to the desire to increase commercial wheat production and thereby increase farm income. Muhammad Ali Mansour Bilal (Billal, 1993) on the adoption of innovations is positively affected by the provision of agricultural inputs obtaining extension information, direct liaison with cities, positive and negative social participation with age indirectly, because age negatively affects access to information, while social participation affects this variable.

**Objective:**

To assess the farming practices of wheat farmers in the Jazeera Scheme and their effect on Wheat productivity per-feddan.

**Materials and Methods:**

The study depended on secondary and primary data to enrich it with information. Secondary data was obtained from references, documents, and reports from the General Administration of Agricultural Extension, the Agricultural Research Corporation - the National Wheat Project and Aljazeera scheme, in addition to scientific sources in Arabic and English related to the subject of study, including books, periodicals, brochures, research papers, studies, and academic theses, in addition to the global information network. The primary data were collected by a questionnaire and observation through participation and visits to the Aljazeera scheme.

**Study population:** (3100) farmers representing the total number of Abu Jen Taftish farmers (990 farmers) + Al Arik Taftish (890 farmers) + Ras-Elfil Taftish (1220 farmers).

**Study sample:** To achieve the non-impact of irrigation problems on study results, two Taftish affected by irrigation problems for long periods during the season were selected which Abu Jen Taftish and Al Arik Taftish (suffering from a thirst), and another Taftish have regular irrigation during the season which Ras-Elfil Taftish (not suffering from a thirst), to conduct the study. A random sample of 100 farmers was selected, consisting of 25 farmers to Abu Jen and Al Arik Taftish for each, in addition to 50 farmers to Ras-Elfil Taftish. The questionnaire was randomly distributed to the sample members, and 100 questionnaires were collected, all of which are valid for conducting the statistical study.

## Results and discussion:

After data unpacking and analyzing, the following results were obtained:

Table (1) The correlation of certain farmers' agricultural practices with their productivity (n = 100)

Practices	Productivity (Showal / Feddan)		Ranking <sup>***</sup>
	Pearson corr.	Sig. level	
Seed rate (kilogram/feddan)	* - 0.228	00.22	V (-)
Dose of Urea fertilizer (Showal <sup>****</sup> )	0.495 <sup>**</sup>	0.000	II
Dose of DAP fertilizer (Showal <sup>****</sup> )	0.273 <sup>**</sup>	0.006	IV
Number of irrigations during the season	0.770 <sup>**</sup>	0.000	I
Number of days between Irrigation	0.669- <sup>**</sup>	0.000	III (-)
Cost of planting feddan	* - 0.212	0.035	VI (-)

(Source: Statistical Analysis, 2020)

<sup>\*\*</sup> statistically significant at (0.01)

<sup>\*</sup> Statistically significant at (0.05)

Ranking <sup>\*\*\*</sup>: it is organized according to correlation strength was ordered from strength to weakness.

<sup>\*\*\*\*</sup> Showal = 50 kilogram

Table (2) The relationship of some farmers' agricultural practices to their productivity (n = 100)

Practices	Productivity (Showal / Feddan)		Ranking <sup>***</sup>
	Chi square	Sig. level	
Sowing Date	32.175	0.000	IV
Cultivation Method	63.852	0.000	II
How to add Urea fertilizer	79.378	0.000	I
How to add DAP fertilizer	28.940	0.000	VI
How to add Municipal fertilizer	19.023	0.004	VII
Time of Urea application	31.089	0.000	V
Agricultural Environment "Thirsty"	44.724	0.000	III

(Source: Statistical Analysis, 2020)

Ranking <sup>\*\*\*</sup>: it is organized according to relationship strength and was ordered from strength to weakness.

### 1) The first step: agricultural practices affected and related to productivity. (What are farmers' agricultural practices affect or linked to the wheat productivity by feddan?)

From Table (1) it is clear that:

#### A- There is a statistically significant correlation (Quantitative Variables):

It was clear that there is a statistically significant correlation between farmers' agricultural practices regarding (number of irrigations during the season (0.000), a dose of Urea fertilizer (0.003), a dose of DAP fertilizer (0.007), and there is an inverse correlation between the number of days between Irrigation (0.000), seed rate (kilogram/feddan) (0.000) and cost of planting feddan (0.035) on the one hand, and wheat productivity by feddan in another.

**B- There is a statistically significant relationship (Qualitative Variables):**

From Table (2), it becomes clear that there is a highly statistically significant relationship between farmers' agricultural practices regarding (how to add Urea fertilizer (0.000), cultivation method (0.000), how to add DAP fertilizer (0.000), agricultural environment "thirst" (0.000), sowing date (0.000), time of Urea application (0.000), and how to add the municipal fertilizer (0.004) on the one hand and wheat productivity by feddan. From the above result, we can answer the question (What are farmers' agricultural practices affect or linked to the wheat productivity by feddan?), with no exception, all the farming practices that Farmers followed in Aljazeera scheme Taftish where's a study site during the winter agricultural season 2019-2020 affect directly in wheat productivity.

Table (3) Distribution of farmers with their commitment to some agricultural practices according to the agricultural environment (irrigations problems /thirst) (n = 100)

Variable	Agricultural Environment	Measuring Scale	Distribution	Total
Commitment by The Recommended Sowing Date	Did not suffer from irrigation problems (Thirst)	According to Recommendation	51 (68)	75 (100)* ** (4)
		Early from Recommendation	14 (18.7)	
		Late from Recommendation	10 (13.3)	
Sowing Methods	Suffer from irrigation problems (Thirst)	According to Recommendation	3 (15.8)	19 (100)* ** (3)
		Early from Recommendation	13 (68.4)	
		Late from Recommendation	3 (15.8)	
Agricultural Environment	Did not suffer from irrigation problems (Thirst)	Planter	20 (25.3)	79 (100)*
		Wide Disc	47 (59.5)	
		By hand and cruiser	12 (15.2)	
Agricultural Environment	Suffer from irrigation problems (Thirst)	Planter	20 (95.2)	21 (100)*
		Wide Disc	0 (0)	
		By hand and cruiser	1 (4.8)	
Agricultural Environment	Did not suffer from irrigation problems (Thirst)	Did not suffer from irrigation problems (Thirst)	79 (79)	100 (100)*
		Suffer from irrigation problems (Thirst)	21 (21)	

(Source: Social Survey, 2020)

\* The number in parentheses is a percentage / \*\* The number in parentheses is a missing data

Table (4) Distribution of farmers with their commitment to the fertilization program and the number of irrigations during the season according to the agricultural environment (irrigations problems /thirst) (n = 100)

Variable	Agricultural Environment	Measuring Scale	Distribution	Total
Commitment by Urea Fertilization	Did not suffer from irrigation problems (Thirst)	Committed to the Recommendation (2-3 Showal <sup>**</sup> )	69 (87.3)	79 (100)*
		Not committed to the Recommendation (Less than 2 Showal <sup>**</sup> )	10 (12.7)	
	Suffer from irrigation problems (Thirst)	Committed to the Recommendation (2-3 Showal <sup>**</sup> )	11 (52.4)	21 (100)*
		Not committed to the Recommendation (Less than 2 Showal <sup>**</sup> )	10 (47.6)	
Commitment by DAP Fertilization	Did not suffer from irrigation problems (Thirst)	Committed to the Recommendation (2-3 Showal <sup>**</sup> )	44 (55.7)	79 (100)*
		Not committed to the Recommendation (Less than 2 Showal <sup>**</sup> )	35 (44.3)	
	Suffer from irrigation problems (Thirst)	Committed to the Recommendation (2-3 Showal <sup>**</sup> )	6 (28.6)	21 (100)*
		Not committed to the Recommendation (Less than 2 Showal <sup>**</sup> )	15 (71.4)	
Number of Irrigations Times during The Season	Did not suffer from irrigation problems (Thirst)	Higher than Recommendation by 2 watering or more	3 (3.8)	79 (100)*
		Higher than Recommendation by one watering	0 (0)	
		According to Recommendation	54 (68.4)	
		Less than Recommendation by 2 watering or more	11 (13.9)	
		Less than Recommendation by one watering	11 (13.9)	
	Suffer from irrigation problems (Thirst)	Higher than Recommendation by 2 watering or more	2 (9.5)	21 (100)*
		Higher than Recommendation by one watering	0 (0)	
		According to Recommendation	0 (0)	
		Less than Recommendation by 2 watering or more	2 (9.5)	
		Less than Recommendation by one watering	17 (81)	

\* The number in parentheses is a percentage / \*\* Showal = 50 kilogram (Source: Social Survey, 2020)

Table (5) Distribution of farmers with their commitment to the number of days between irrigation according to the agricultural environment (irrigations problems /thirst) (n = 100)

Variable	Agricultural Environment	Measuring Scale	Distribution	Total
Commitment by The Recommended number of days between irrigation	Did not suffer from irrigation problems (Thirst)	Uncommitted tends to thirst	9 (11.9)	76 (100)* ** (3)
		Uncommitted tends to bring irrigations	2 (2.6)	
	Suffer from irrigation problems (Thirst)	According to Recommendation	65 (85.5)	16 (100)* ** (3)
		Uncommitted tends to thirst	13 (81.2)	
		Uncommitted tends to bring irrigations	0 (0)	
		According to Recommendation	3 (18.8)	

(Source: Social Survey, 2020)

\* The number in parentheses is a percentage / \*\* The number in parentheses is a missing data

Table (6) Distribution of farmers by way of adding fertilizers according to the agricultural environment (irrigations problems /thirst) (n = 100)

Variable	Agricultural Environment	Measuring Scale	Distribution	Total
How to Add Urea Fertilizer	Did not suffer from irrigation problems (Thirst)	Added in two doses	56 (70.9)	79 (100)*
		Added in one dose	23 (29.1)	
		Not added	0 (0)	
	Suffer from irrigation problems (Thirst)	Added in two doses	0 (0)	21 (100)*
		Added in one dose	19 (90.5)	
		Not added	2 (9.5)	
How to Add DAP Fertilizer	Did not suffer from irrigation problems (Thirst)	Added in two doses	6 (7.6)	79 (100)*
		Added in one dose	64 (81)	
		Not added	9 (11.4)	
	Suffer from irrigation problems (Thirst)	Added in two doses	0 (0)	21 (100)*
		Added in one dose	15 (71.4)	
		Not added	6 (28.6)	
How to Add Municipal Fertilizer	Did not suffer from irrigation problems (Thirst)	Added in one dose	5 (6.4)	79 (100)*
		Not added	74 (93.7)	
	Suffer from irrigation problems (Thirst)	Added in one dose	0 (0)	21 (100)*
		Not added	21 (100)	

\* The number in parentheses is a percentage  
2020)

(Source: Social Survey,

(The second step: How are farmers apply the recommended farming practice (Are effective farmers farming practices doing according to the agricultural research recommendation for the Wheat farming practices?)

**A- Commitment by The Recommended Sowing Date (Mid-November as recommended):**  
From table (3) it's clear that more than half of farmers (68.4%) suffering from irrigation problems (thirst) Taftish were sowing in October, which is early from the recommendation sowing date (mid-November), and this is good with the late-maturing varieties of wheat crop. In general, it appears that few farmers (15.8%) are committed to the recommendation regarding the sowing date in Taftish is suffers from irrigation problems (thirst), and more than half of farmers (68%) in a Taftish aren't suffering from irrigation problems (thirst) were committed by recommendation. This is an indication of weakness in extension service in this part of the technical package.

**B- Sowing Methods** (Using the planter machine, and if it is not available, use the wide disc as recommended):

From table (3) it's clear that most of the farmers (95.2%) were used a planter machine for seeding in a Taftish that is suffering from irrigation problems (thirst). And half of the farmers (59.5%) have used a wide disc machine in a Taftish that isn't suffering from irrigation problems (thirst), and this is as recommended. In addition, this indicates the commitment of the farmers in this part of the technical package.



### **C- Agricultural Environment:**

From table (3) it's clear that (79%) of the farmers did not suffer from irrigation problems (thirst) during the season, while (21%) did suffer from irrigation problems (thirst). According to the Ministry of Water Resources and Irrigation through a weekly electronic newsletter report in 2020, irrigation problems attributed to Gasoline scarcity that affects the cleanliness of the irrigation canals' at the proper time. In addition to bad practices of some farmers whose farms were located at the beginning of the irrigation canals, which affect the farmers at the end of the canals. In addition to cultivation crops outside the planned agricultural cycle, like some farmers who had planted all their area (20 feddan) without agricultural cycle engagement (just 40% out of 20 feddan for the winter season according to the agricultural cycle followed in the scheme), all this consumes an unforeseen quantity of water and thus creates a thirst for the other farmers who had committed by the agricultural cycle. This indicates weak supervision and poor coordination between Ministries of Finance, Energy and Water Resources, Agriculture, and Aljazeera Scheme.

### **D- Commitment by Urea Fertilization (100Kg Urea fertilizer per-feddan as recommended):**

From table (4) it's clear that more than half and above of the farmers are committed to meet the crop nitrogen requirements according research recommendation, if it's a Taftish isn't suffer from thirsty (87.3%) or Taftish is suffer from thirsty (52.4%). This is due to high cost of the fertilizer, lack of availability, sometimes can be attributed to extension lack in this part of the technical package, as there are farmers who apply the fertilizer and wait for one more day to irrigation which makes Urea fertilization ineffectiveness, also this is a weakness in extension process.

### **E- Commitment by DAP Fertilization (50Kg DAP fertilizer per-feddan as recommended):**

From table (4) it's clear that more than half and above of the farmers were committed to meet crop requirements of nitrogen according to the agricultural research recommendation if in a Taftish that isn't suffering from irrigation problem (thirst) (87.3%) or Taftish is suffering from irrigation problem (thirst) (52.4%). The weak of use Urea due to the high cost of the fertilizer, lack of availability, in addition, sometimes can be attributed to extension lack in this part of the technical package, as there are farmers who apply the fertilizer and wait for one more day to irrigation which makes Urea fertilization ineffectiveness, and this is a weakness in agricultural extension process.

### **F- Commitment by The Number of Irrigations Times during The Season (8-9 times):**

From table (4) it's clear that more than half of the farmers (68.4%) who did not affect by irrigation problems (thirst) during the season are committed by the irrigation number times between (8-9 times) during the season, in addition (3.8%) of farmers increase the number of irrigation times above the recommendation, while other farmers don't commit with the recommendation (13.9%), (13.9%). This indicates poor supervision in the irrigation process, and this part of the technical package has an obvious weakness, noting that (9.5%) of the farmers affected by irrigation problems (thirst) have completed or increased the number of irrigation times, and this is what reported by the Ministry of Water Resources and Irrigation and Aljazeera Scheme, which bad irrigation practices for some farmers are affecting on the rest of the farmers. Also, some farmers randomly run

the irrigation process and leaving the irrigation canals open at night this causing overflowing and the Wheat crop is very sensitive to overflow.

**G- Commitment by The Number of Days between Waterings** (10 - 12 days after the appearance of the spikes and 12 - 14 days before that as recommended):

From table (5) it's clear that most of the farmers (85.5%) who did not affect by irrigation problems (thirst) during the season are committed by the recommended period between irrigations watering's (12 – 15 days), while (81.2%) of farmers who are affected by irrigation problems (thirst) during the season, tend to crop thirst naturally if irrigation water isn't available, and the period between irrigation and the next can sometimes increase up to a month, which affects badly on productivity because those who spaced between the irrigation for a month (with 3-4 waterings) due to thirsty conditions achieved lower productivity (4-5 Showal of feddan).

**H- How to Add Urea Fertilizer** (In the case of add DAP fertilizer, the dose of Urea is divided):

From table (6) it is clear that (70.9%) and (0%), respectively, of farmers who did not affect by irrigation problems (thirst) nor affect by irrigation problems (thirst), committed to the correct way of add urea fertilizer, by dividing it into two doses. This result shows that a large proportion of farmers' crops doesn't benefit from urea fertilizer. It's known from the research program for wheat cultivation that the correct way to add nitrogen, increases productivity by (20 to 50%).

**I- How to add Phosphorus fertilizer** (DAP fertilizer add in one dose with Land preparation as recommended):

From table (6) it's clear that a majority of farmers (81%) and (71.4%) respectively, who did not affect by irrigation problems (thirst) or did affect by irrigation problems (thirst), are committed to the correct way adding Phosphorus fertilizer, which a once add-ship with land preparation. While (11.4%) of farmers who did not affect by irrigation problems (thirst), and (28.6%) of farmers who did affect by irrigation problems (thirst) don't use DAP fertilizer, which affects productivity and crop quality. Weak use of the DAP can be attributed to unavailability, high price, and lack of convinced that it should be added, which reflects weakness in agricultural extension.

**J- How to add Municipal fertilizer:**

From table (6), it's clear that the vast majority of farmers (93.7%), (100%), respectively, who did not affect by irrigation problems (thirst) or did affect by irrigation problems (thirst) don't use municipal fertilizers.

**Productivity:**

Table (7) Distribution of farmers by productivity per-feddan (n = 100)

Agricultural Environment	Above productivity average	Productivity Productivity average	Below productivity average
Did not suffer from irrigation problems (Thirst)	55 (69.6)	7 (8.9)	17 (21.5)
Suffer from irrigation problems (Thirst)	1 (4.8)	1 (4.8)	19 (90.5)
Total	56 (56)	8 (8)	36 (36)

\* The number in parentheses is a percentage (Source: Social Survey, 2020)

From table No. (7) is clear that less than half of farmers (36%) achieve lower productivity and half of the farmers (56%) achieve Higher productivity than the average productivity obtained in case of following the recommended package from land preparation to harvesting. (15 to 17 Showal per feddan). The above result explains wide contrast variation in average productivity obtained between farmers and research or demonstration farms, and between farmers themselves in the same section or Taftish within the Scheme. Productivity fluctuation can attribute to non-compliance by farmers with research recommendations it's because of difficulties facing the Agri-season like unavailability of Agri-inputs, lack of finance, and funding at specified times. In addition to low coverage of agricultural extension education service. In addition to the thirst in some Scheme Taftish. A study by the Ministry of Water Resources and Irrigation and Irrigation Agency and the research and development irrigation operations office revealed the causes of thirst and wasted water in Jazeera scheme, and that with the main reason for which absence of the Ministry of Water Resources and Irrigation with the Jazeera scheme administration in whole or part from 1999-2015, in technical supervision of the Canals clearing process, which led to the unfair drilling of Canals, and the non-observance of planting dates and specified Agri-areas, and a large area was cultivated outside the Agricultural cycle and not included to the irrigation plan, so the Scheme faced so many problems like thirst and drowning. (Abu guota, Hajj Abdullah, Al-Matwari and Al-jamousi) (Billal, 2020).

#### Conclusion:

Cultivation and care of the wheat process are simple and easy because most agricultural transactions have to be done by machines. But in this study, it has become clear that the farmers' farming practices play an influencing role in the productivity of one unit of agri-area (feddan), whether by increase or decrease. This study looked at the farmers' farming practices for the Wheat Cultivation process from seeds selection to harvesting. All of the farmers' farming practices had a significant effect on productivity. Regardless if a Wheat crop has been infected by any conditions, such as irrigation problems (thirst) or not. Paying attention to the wheat good farming practices would limit a fluctuation in feddan productivity from one farmer to another, or even within the same Hawasheh. However, 36% of the respondents achieved lower than average productivity (15 to 17 Showal by feddan), this's Wheat productivity waste, could be avoided if agricultural research recommendations were followed by the farmers.

#### Recommendations:

- The Ministry of Water Resources and Irrigation and Aljazeera scheme Administration must provide irrigation water for the planned cultivation areas until the end of the season.

With a commitment by farmers to at least 8-9 waterings during the crop life cycle. And must establish demonstration fields to teach farmers the irrigation processes by the Agricultural Extension department in the Scheme.

- The necessity for the Agricultural Research Corporation - Wheat Research Program to research plant densification per feddan with seed quantity 150 kg and fertilization program (100 kg urea + 100 kg DAP) with sprinkling high Phosphorus and potassium foliar fertilizer for Imam and Bohem varieties. To confirm some pioneer farmer's experiences who have achieved good productivity (Exceeded 25 Showal per feddan) by this way.

- The necessity for the Agricultural Research Corporation - Wheat Research Program to Intensifying research work to adapt the varieties to climate change factors, especially heat stress. This stress leads to slowing wheat growth and accelerating weeds growth, which could ultimately affect productivity.

- The necessity for Federal Agricultural Extension Administration and Agricultural Research corporation - Wheat Research Program and the Seed Administration to conduct an intensive training program for farmers through their various organizations on planting, purifying, and approving seeds for the next season by themselves.

- The necessity for the Producers Organizations Coordinator at the Federal Ministry of Agriculture to conduct a study to establish a single Qualitative Organization in Sudan that is a joint-stock specialized company for seeds production from different wheat varieties, to settle the wheat seed industry inside.

- Raise the funding ceiling for fertilization to achieve the research recommendation (80 kg Urea + 40 kg DAP) to cover all planned Wheat areas in Sudan.

- The necessity for Agricultural Extension Department in Jazeera scheme to train farmers on how to follow an agricultural cycle and not repeat planting the same crops on the same land, and add Municipal fertilizer every five years to improve soil components.

- The Agricultural Engineering Department, through a Muosaad center in Madani City, must train the preparation machines operators on good preparation and adjust the planting depth (5-7.5 cm), along with train the harvester machines operators on the appropriate control to prevent losing part of the crop when harvesting.

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