Rice Research and Its Prospect of Production in Arid Regions of Saudi Arabia

I. Constraints of Climate, Soils and Water to Rice Cultivation in Al-Hassa and Gassim Areas

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Introduction

The Al-Hassa Oasis in the Eastern Province and the Great Nafud Sedimentary Basins in Gassim Province were two of the most important agricultural regions in arid Saudi Arabia. The potential arable land was estimated 21,000 ha. In the former and 70,000ha. In the latter. The cultivated or irrigated land, so for, in the former was approximately 12,000 ha. and 20,000 ha in the latter.(5,8,13,44) Rice cultivation in Al-Hassa was assumed to be handreds of years with annual acreage of 790 ha., whereas in Gassim was only for 5 years with10 ha. Hassawi, an indica red rice tolerent to adverse environments, was the sole traditional commercial cultivar grown once yearly. It was transplanted in June and harvested in November in Al-Hassa Oasis. Another indicarice, namely Amberbook, with tall stature, aromatic long-grain, prefered eating quality, but sensitive to extreme temperatures, was directly seeded in May and harvested in October on Gassim.

Several factors shown below were found limiting the rice crltivation and production in the above two regions of this Kingdom.

1.Scarce rainfall and limitted irrigation water from artesians and underground wells;

2.Extremely dry (RH 15-40%) and hot (mid-day 40-46℃) weather in the summer but severely cold (0-6℃ at night) in the winter;

3.High sodium contents in both siols (handreads to thousands meq/1) and irrigation water (11-12meq/1), especially in Al-Hassa area;

4.Mostly sandy soils with too high percolation rate (15-24 cm/day) in Al-Hassa, but very low (0.5-1 cm/day) in Gassim basins;

5.Many biological detriments and obstacles such as weeds competition(4) , rat andbird damages, date-palm shading and geographical limitation to mechanized cultivation;

6.Shortage of laborers, particularly in cropping season, and lack of small farming machinery; and

7.Problems of rice cultivars and cultural techniques suitable to adverse environmens.

Rice reseach activities under Agricultural Cooperation Agreement between Republic of

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China and Kingdom of Saudi Arabia was inaugurated since 1965. Meanwhile,some amazing results had been obtained. The new semi-dwarf Hassawi hybrid rices and introduced Taiwan varieties NTU 306 and Taichung Sen 3 were found to be particularly suitable for double croppings, besides the irrigation methods related to salts amendment, the application of fertilizers, planting season, and methods of cultivation, etc., had gradually been improved.[5,14]

Climate

Location

1.Al-Hassa Farms

Two experimental farms were used in 1971. One was an old rice field at Holeila Village, 27km south-east of Agricultural Research Center (HARC 25°N, 49°E, 145cm elvation) and another was a newly reclaimed field in HARC. Both farms were located in the Al-Hassa Oasis 75km from the Arabiam Gulf.

2.Gassim Farm

The rice experimental farm in 1978 was set on the farm of HRH Prince Naif ibn Abdul Aziz, 80 km in the south of Unayzah Town, Gassim Province, in the central northern part of the Saudi Kingdom. Unayzah Agricultural Resarch Center (UARC, 26°N, 43°59' E, 724 m elvation) was adjacent to Unayzah Town in south-easterm part of Gassim.

Temoerature

1. HARC

Being in the arid subtropic plain, the absolute maximum temperature in the daytime during the summer often reached 46.0℃, but the minimum temperature in the night was 20.1℃ at HARC, whereas in the winter it droped to 27.0℃ in the daytime and 1.2℃ in the night. The difference of temperatures between day and night were greater than seasonal variation. Since cold injury usually takes place while temperature is lower than 7℃. The optimum time for transplanting spring rice in Al-Hassa Oasis should be in late March (Fig. 2). In order to make sure the rice to be flowering before June, for eacaping heat stress prevailing during late June to July, early maturing varieties such as NTU 306 with 40-50 day seedlings were considered to be safty. NTU 306 was found to be a suitable cultivar resistant to heat and drought due to its leaf canopy covering over the panicles. For summer rice, the optimum transplanting time was in July 15-25 to ensure the flowering stage could be finished before the temperature was still higher than 18℃ which was critical for the formation of pollens and pollination.

2. UARC

The higher latitude of UARC resulted in lower temperature than that of HARC. In the summer, the absolute maximum temperature at UARC reached 44.6℃ or 1.4℃ lower than that at HARC and the absolute temperature went down to 19.7℃ or 0.4℃ lower than HARC. In the winter, the absolute maximum temperature at UARC was 27.6℃ higher than at HARC, but the minimum temperature went down to-1.5℃ or 2.7℃ lower than that at HARC. The optimum time for transplanting spring rice was in early April to late June. It was, therefore, possible to grow two crops of rices in Al-Hassa Oasis but absolutely impossible in Gassim. However, rice cultivation

and productionin Gassim seemed to be more favorable due to its lower temperature or less heat stress in summer than that in Al-Hassa (Fig. 1&2).

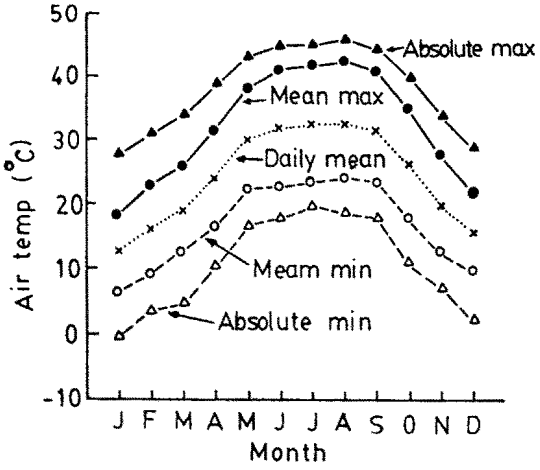


Fig. 1. Changes in air temperature with months for 1973-77 average at Unayzah ARC.

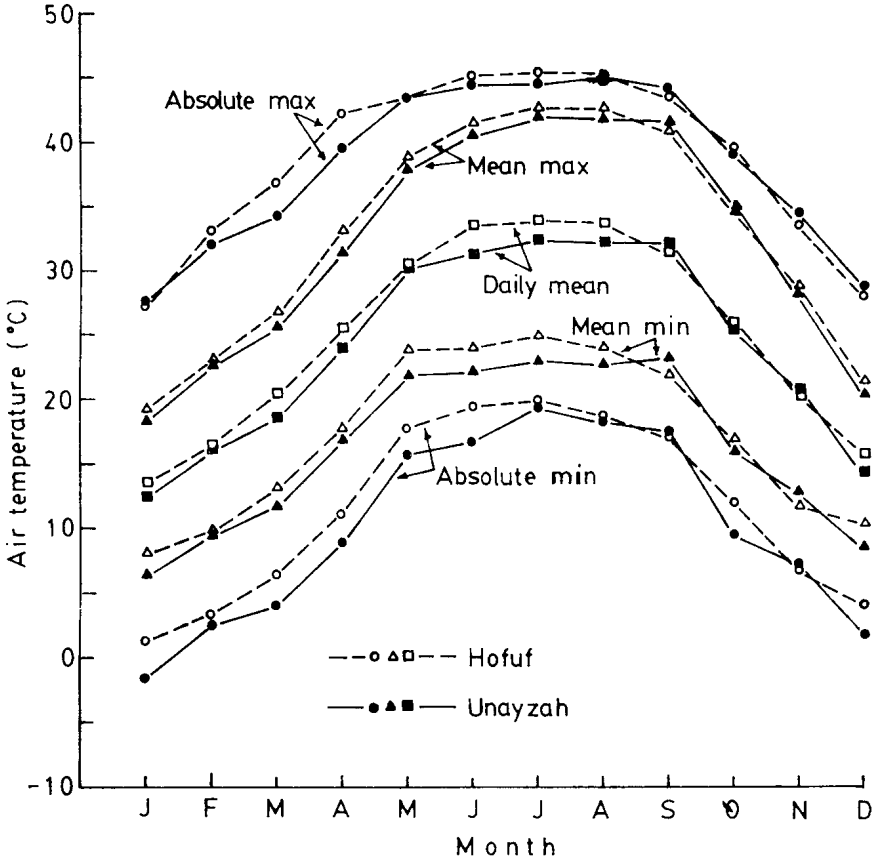


Fig. 2. comparative curves of air temperatures for 1973-75 average at Hofuf and Unayzah ARC.

Solar radiation

1. HARC

The least solar radiation (SR) at HARC was in December with 290 cal/cm^2/day. A rapid linear increase of SR was seen from January up to the peak of June with 619 cal/cm^2/day, following a swift decline (Fig. 3&4). The extremely strong SR in summer associated with extremely high temperature and drought stress were particularly harmful to rice gorwth, causing serious evapotranspiration losses, leaf burning and high sterility in spring crop.

2. UARC

The lowest SR was also seen in December at UARC with 278 cal/cm^2/day or 12 units less than that at HARC. Similar trend of increasing from January up to peak of June with 610 cal/cm^2/day or 9 units less than that at HARC and followed by the same decline with exceptions of July and August that were slightly higher than that at HARC. The lower average SR Gassim seemed to be one of reasons of the lower temperature than in Al-Hassa.

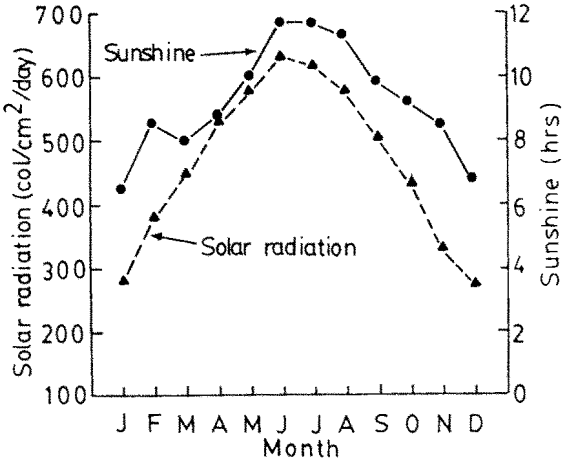


Fig. 3. Changes in solar radiation and sunshine hours with months for 1973-77 average at Unayzah ARC

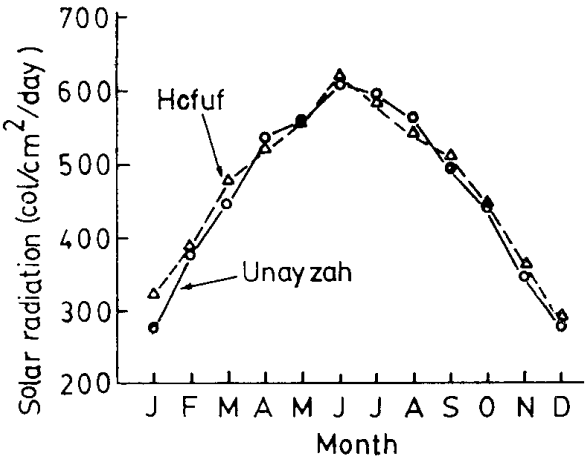


Fig. 4. comparative curves of solar radiation for 1973-75 average at Unayzah and Hofuf ARC.

Sunshine

Owing to lack of sunshine data at HARC, the sole information collected from UARC were shown in Fig. 3. The shortest sundhine was seen in January with 6.5 hrs/day. It increased rapidly and reached the peak of 11.7 hrs/day in June and declined after July. The sunshine in such arid regions were particularly longer than other humid countries due to less cloudiness.

Relative humidity

1. HARC

The relative humidity (RH) varied greatly with seasons and days. Very clear V-shape of RH at HARC was seen in Fig. 6 which showed monthly changes from January through Decmber. The

highest average daily RH was 67% in December and the lowest was 27% in June. The critisal low RH to pollination of rice plant was 40% which covering from May through August. Therefore, in spring crop, rice plant particularly Hassawi variety having pnnicles on the leaf canopy was apt to suffer from drought causing high percentages of sterility.

2. UARC

The RH at UARC was markedly lower than that at HARC (Fig. 6). Monthly changes from January through December was in U-shape. The highest average daily RH was nearly 60% in January and the lowest was 17% in June. Since then it maintained lower than 20% until October following rapid increase. The difference btween HARC and UARC was wide since May to November than other months. The two absolute extremes of RH at UARC were as wide as 8-100% in the chill months but as narrow as 5-30% in the summer. The harmful months which RH showing lower than 40% from April to November.

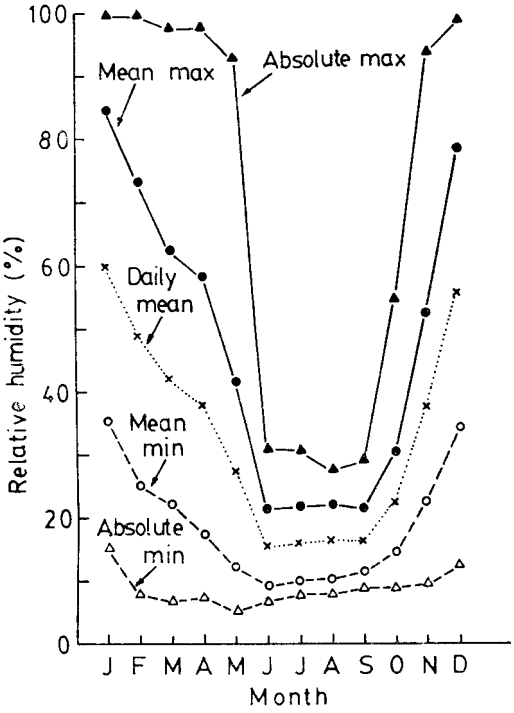


Fig. 5. Changes in relative humidities with months for 1973-77 average at Unayzah ARC

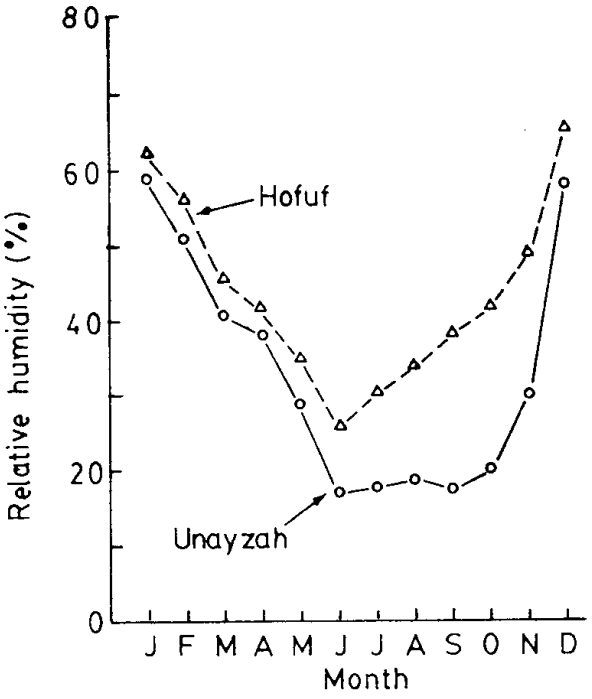


Fig. 6. Comparative curves of relative humidity for 1973-75 average at unayzah and Hofuf ARC.

Soil temperature

The available data of soil temperature (ST) was collected only from UARC (Fig. 7). Changes in ST at various depths with months showed lagged behind and coincided with that of air temperature. Great differences were found between depths of 5 cm at 2 pm and 5 cm at 9 am, 30cm at 9 am, 60 cm at 9 am or 90 cm, at 9 am, whereas very narrow differences were observed

between depths of 5 cm and 30 cm, 30 cm and 60 cm, and 60 cm and 90 cm at the same 9 am. The monthly difference between 9 am and 2 pm at the depth of 5 cm was the least (8℃) in January and the most (14℃) in September with a range from 12℃ at 9 am to 20℃ at 2 pm for the former and 33℃ to 47℃ for the latter, respectively. The influence of air temperature on ST was greater in the daytime but lesser in the night particularly in summer time. Therefore, timely irrigation was necessary for rice plant to prevent excessive ST and AT during daytime in the summer. It was observed that the water-temperature in such arid regions ranged from 25 to 30℃ regardless of high AT and ST in dry and hot summer.

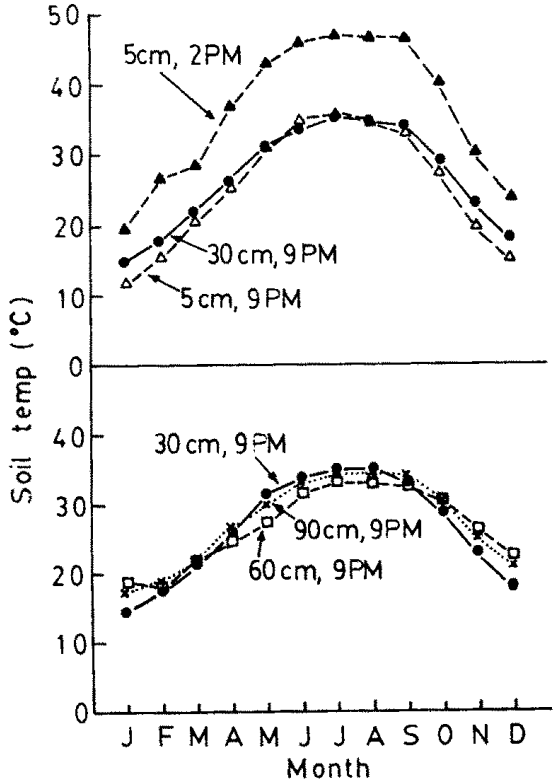


Fig. 7. Changes in soil temperatures at varius depths with months for 1973-77 average at Unayzah ARC.

Wind velocity

1. HARC

Available data of absolute maximum wind velocities measured at a hight of 10 m at HARC(12) during the period from 1969 to 1971 (Table 1) indicated that the lowest was in November and the highest in April with 11.1 and 19.5 m/s, respectively. April was the month when sand storms were most likely to occur. The sandstorm prevailed during June to July uaually associated with extreame hot and drought which often caused serious damage to spring rice with tip burn and high sterility.

Table 1. Aboslute maximum wind velocities (m/s) measured at a hight of 10 m at HARC

Year	J	F	M	A	M	J	J	A	S	O	N	F
1969	16.0	15.3	15.2	20.5	15.5	14.0	15.0	18.5	12.5	11.0	11.8	11.5
1970	115.6	13.0	14.2	20.0	17.5	–	116.0	11.0	13.0	15.0	9.2	12.7
1971	12.1	14.4	17.0	17.0	14.6	16.9	15.5	15.8	13.7	13.3	12.3	15.3
Mean	14.6	14.2	15.5	19.2	15.9	15.5	15.5	15.1	13.1	13.1	11.1	13.2

2. UARC

The maximum average wind velocities for 1973-77 at UARC (Fig. 8) reached the peak in March, with 27.3 m/s, followed with slight decline till July and increased again after November. During February to May, very strong wind occasionally associated with heavy sandstorms often caused damage to leaves and growth of rice plant. However, after June no strong wind caused damage to rice with the exception of tip burn due to by extreme drought and hot air.

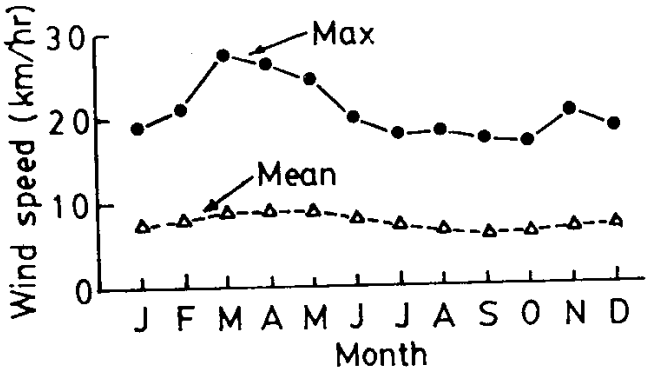


Fig. 8. Comparison of maximun and mean wind speeds for 1973-77 average at Unayzah ARC.

Evaporation

1.HARC

The daily mean evaporation at HARC was the least in December showing only 2.7 mm/day and reached to the highest of 13.2 mm/day in July (Fig. 10) making a sharp mountain peak in the year round. The three-year (1973-75) average total annual E from a Class A Pan on soil surface was 2350 mm with daily mean at 6.4 mm. The daily E during rice cropping season ranged from 6.0 to 13.2 mm in spring and 13.2 mm to 3.8 mm in summer started form planting to harvest. It suggested that the vegetative growth in spring rice was under lower temperature, more moist air thus with less E than the reproductive growth and vice versa in summer rice.

2. UARC

The least daily mean E at UARC was 4.3 mm in January and the most was 17.9 mm in June also showing the same single mountain peak as at HARC from the same period of years (Fig. 10). The same trend was seen from a longer period of observation (1973-77, Fig, 6). The annnual E

from 5-year average measured at UARC was as muchas 4213 mm which nearly twice of that at HARC. The daily E during rice cropping season ranged from 12 mm in April to 18 mm in July. This amount was about ten times more than that in humid rice growing areas.

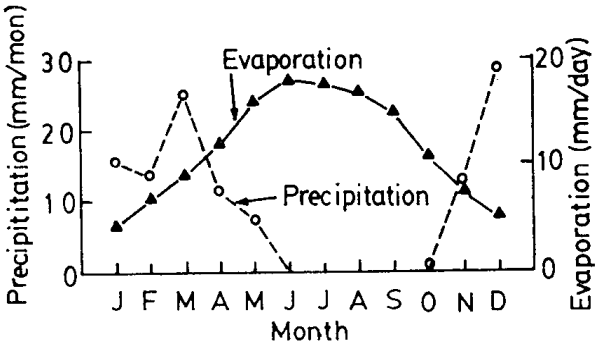


Fig. 9. Changes in precipitation and evaporation with months for 1973 -77average at Unayzah ARC

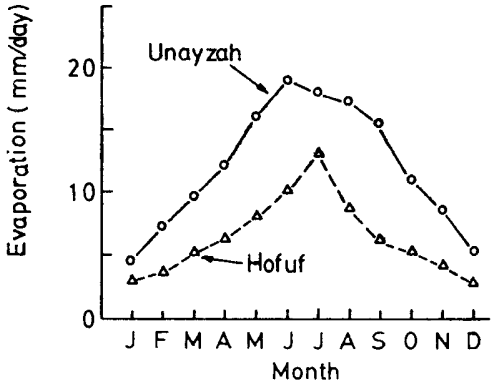


Fig. 10. Comparative curves of evaporatoin for 1973-75 average at Unayzah and Hofuf ARC.

Precipitation

1. HARC

Precipitation in this arid regions happened only during December through May (Fig. 9 and 11). The annual amount of precipitation during the years of 1973 to 1975 varied greatly from 16.5 mm to 115.9 mm with annual average of 70.9 mm at HARC. The maximum monthly precipitation was 26.8 mm in March, whereas the other months ranged from 7 mm to 12 mm. These scarce rainfalls were useless for normal rice growth.

2. UARC

In Gassim, distribution of precipitation was similar to that in Al-Hassa (Fig. 11 and 9). However, the annual amounts ranging from 84.9 mm to 136.4 mm for 1973-75 with annual average of 112.1 mm were higher and monthly distribution was more uniform than that at HARC. The maximum monthly precipitation was 40 mm in December followed with 23.5 mm in March and other months were ranging from 10 mm to 16.5 mm. These amounts were also insignificant for irrigated rice, as the rain did not occur during rice cultivation.

Solis

Al-Hassa Oasis

1. Holeila soil

The soil of the Oasis was mostly formed from limestone. The Holeila soil which CATM had been using for rice experiment since 1965 to 1978 was formerly grown to rice by the local farmers. It was a typical old soil in the Oasis, with dark grey brown sandy loam, crumble and friable in 0-22 (or 27) cm layer, with light grey to pink loamy sand, gradually changing to sand, massive

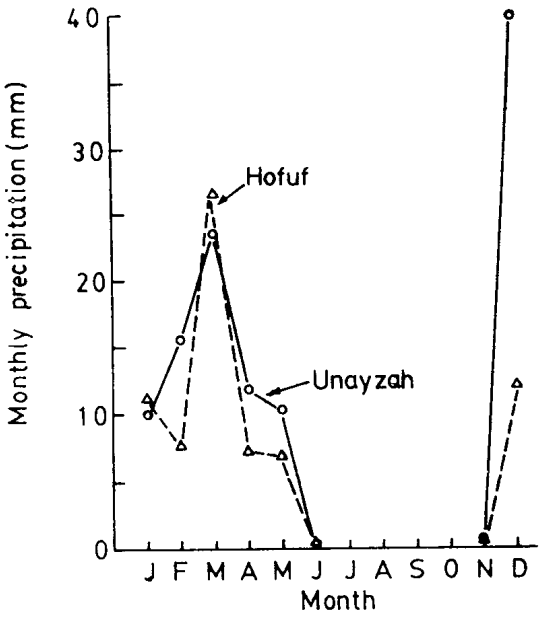


Fig. 11. Comparative curves for monthly precipitation during 1973-75 average at Unayzah and Hofuf ARC.

near loose in 22-34 (or 27-44) cm layer, and with pink to white sand and loose in 34 (or 44)-70 cm. The soil had PH of 7.9-8.0, electrie conductivity of 1.5-2.0 mmhos/cm at 25℃, organic matter at 1.6-1.8%, exchangeable Na^{+}, K^{++}, Ca^{++}, and Mg^{+} at 0.96, 0.24, 20.1 and 2.00 me/100 gms soil, respectively.

2. HARC soil

The land, located in the west adjacent to the CATM Office, was used for rice experiments in the summer of 1977 at HARC. It was formerly grown with corn but never with rice. It was a newly reclaimed desert land, formed from loamy sand mixed with gravels. There was no clear development of soil profile between surface (0-15 cm) and subsurface (15-30 cm) layers. The surface soil had pH of 7.9, E.C. at 5.95 mmbos/cm at 25℃ organic matter at 2.15%, exchangeable bases of Na, K, Ca, and Mg at 4.40, 0.31, 38.32 and 3.55 me/100 gms, respectively. Rice seeds in this soil did not or little germinate, but gradually withered after two-leaf stage in case without initial salts leaching. After two times of puddling and drainage its E. C. decreased to 1.90 mmhos/cm and Na 1.40 me/100 gms showing no hazard for rice sowing and transplanting. The contents of to sodium chloride and calcium carbonate were rather high.

Gassim basins

There were many low-lying basins as called as the Great Nafud Sedimentary Basins in Gassim Province devloped for agricultural production. The Prince Naif's farm was a typical desert basin in Gassim area.

1. Low-lying soil

It was formed from Quaternary alluvial and a eolian deposits having an uniform soil Profile

with accumulation of salts on the soil surface. The soil texture was sandy clay loam without distinquishable development of horizon within one meter depth. White crusts were accumulated on soil surface where the topography was particularly low. Table 2 indicated that the virgin soil io this low basin contained extremely high sodium at 17.02 me/100 gms and high amount of calcium carbonates. Without previous leaching treatment any crop was imposible to germinate and survive in such saline soil. In the higher parts of the basin, bowever, salts were rather low in the soils and rice was able to grow after 2-3 times leaching tr eatment. Its deep percolation was as low as 5 mm/day.

2. Highland soil

The highland surrounding the rice farm, approximately 5 m above the said lowland basin, located in the northern part of the farm was loamy sand soil mixed with diverse gravels which formerly grown with Cantaloupe but never with rice. It was a newly reclaimed desert land. However, its soil salinity and salts contants were lower than that in basin although its variation was also wide (Table 1). This soil was used for screening upland rices in the summer of 1978.

Water

The water resources for agricultural irrigation in Al-Hassa Oasis were mainly from artesian wells or dug wells, whereas majority of the wells in Gassim were dug or drilled and the remainders were minor springs. The Ministry of Agriculture and Water of Saudi Arabia proposed [(13)] a criteron that the electrical conductivity may be classified into 4 levels, i.e., low: 0.10-0.25 mmhos/cm, medium: 0.25-0.75 mmhos/cm, high: 0.75-2.25 mmhos/cm, and very high: 2.25-5.00 mmhos/cm at 25℃.

Chemical analysis for irrigation water at HARC indicated that E.C. was at 2.30-2.36 mmhos/cm belonging to very high, whereas at the spring of Prince Naif's farm was at 0.79 mmhos/cm showing lower but still belonging to high (Table 3 and 4). The rests of well water in Gassim were in medium to high levels with E. C. at 0.74-1.77 mmhos/cm at 25℃, generally increasing from south to north. The pH of HARC water was 7.6, and in Prince Naif's spring was 7.3.

In general, the most suitable sources of ground water for irrigation in Al-Hassa had a very high salinity and very high sodium hazard, but only high salinity and low sodium hazard in Gassim[(13)] . This suggested that Gassim seemed to have higher potential for agricultural production than Al-Hassa, not only from the view point of milder weather and better soil properties, but also, from the most important reason of its better quality of irrigation water.

Acknowledgement

The authors are deeply indebted to both Agricultural Research Centers of Hofuf and Unayzah for providing the original meterological data which make this report possible.

Table 2. Characteristics of soils in Gassim 1978. CATM

Location	Texture*	pH	Organic matter %	E.C. mmhos /25℃	Exchangeable C^{++}	Na^{+} ppm	K^{+}	Carbo- PO_4 %	nates
Unayzah ARC									
Area 1: Maximum	SL	8.0	0.40	7.2	–	860	314	42.0	23.50
Minimum	SL	7.6	0.13	2.7	–	103	190	2.0	9.75
Mean	SL	7.8	0.31	3.5	–	264	249	15.8	16.42
Area 2: Maximum	LS	7.9	0.54	10.7	–	1300	560	35.0	11.25
Minimum	LS	7.7	0.13	2.0	–	110	140	1.0	4.25
Mean	LS	7.8	0.31	4.2	–	393	268	6.3	6.65
Prince Naif's farm									
Low-land: Pre-cropping (2 locatoins)									
Maximum	SCL	8.0	1.20	106.5	–	7400	1980	21.0	14.50
Minimum	SCL	8.0	0.54	2.5	–	500	710	20.0	13.50
Mean	SCL	8.0	0.87	54.5	–	3450	1345	20.5	14.00
After 1-cropping (3 locatons) with rice									
Maximum	SCL	8.1	0.67	2.7	–	460	1000	23.0	13.5
Minimum	SCL	7.9	0.27	1.3	–	280	470	1.8	10.5
Mean	SCL	8.0	0.49	2.0	–	346	673	14.9	12.20
After 2-cropping (3 locations) with rice									
Maximum	SCL	8.2	0.40	2.2	–	480	940	20.0	13.50
Minimum	SCL	8.0	0.27	1.2	–	220	640	7.0	12.50
Mean	SCL	8.1	0.36	1.6	–	309	773	14.3	12.90
High-land: After 1-cropping (10 locations) with cantaloupe									
Maximum	S	8.1	0.54	23.0	7250	840	380	–	8.00
Minimum	S	7.6	0.27	1.1	4350	75	85	–	3.50
Mean	S	7.9	0.36	10.7	4885	262	156	–	5.33

* SL: sandy loam; LS: Loamy sand; SCL: Sand-clay loam; S: Sand

Table 3. Chemical analysis for irrigation water, Hofuf ARC.

Detcrmination	Unit	spring	Farm well
Electrical conductiviey	mmhos/cm	2.36	2.30
PH		7.6	7.6
Disolved salts	ppm%	1619	1578
Souble-sodium	%	46	48
Sodium-adsorption-ratio		4.38	4.60
Boron	%	0.57	0.20
Cation: Ca^{++}	meq/l	8.5	7.94
Mg^{++}	meq/l	4.8	4.8
Na^{+}	meq/l	11.3	11.6
K^{+}	meq/l	0.5	0.3
Sum of cations	meq/l	25.1	24.6
Anions: CO_4^{--}	meq/l	–	–
HCO_3^{--}	meq/l	3.6	3.4
Cl^{-}	meq/l	13.3	13.1
SO_4^{--}	meq/l	7.1	6.8
NO_3^{-}	meq/l	–	–
Sum of anions	meq/l	24.0	23.3

Table 4. pH and electrical conductivity of water samples in Gassim.

Town/Village	pH	E. C. mmhos/cm, at 25℃
Prince Naif's farm:		
Spring*	7.3	0.79
After soil puddling*	7.8	1.28
Al-Amar	–	0.74
Unayzah ARC*	7.8	1.14
Unayzah 63	–	1.69
Unayzah 64	–	1.17
Hilaliyah	–	1.50
Buraydah 77	–	1.10
Buraydah 78	–	1.12
Buraydah 79	–	1.44

* Tested by the CATM/SA, the rests are from Literature (13).

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沙烏地阿拉伯旱區之稻作研究及其生產展望

I.阿哈薩及卡新地區之氣候、土壤及水對稻作之抑制

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摘　要

東省阿哈薩綠洲及卡新省高原沈積盆地爲沙國最重要農業區，各有可耕地21,000公頃及70,000公頃，唯實際灌溉耕地各僅有12,000公頃及20,000公頃，其中年稻作面僅爲790公頃及10公頃。Hassawi及Amberbook爲阿哈薩農民及卡新王子農場所栽培之當地秈稻品種，農技團已將此在來稻與IRRI及臺灣引進之NTU 306及臺中秈3號等雜交，現已育出半矮性高產之紅米及白米供爲當地之需，栽培技術如洗鹽方法、施肥、種植季節等，亦已漸獲改進。本報告係就Hofuf（位於綠洲西緣）及Unayzah（位於卡新省東南）兩農業研究中心所收集之氣象資料加以整理分析，並就土壤及水三項環境研討稻作受抑制情形及其可行性。

在氣候方面，此兩農業區因在亞熱帶均呈夏長而秋冬春甚短，夏季自五至九月，午間最高氣溫常達46℃左右（唯田間水溫僅及25～30℃），晝長夜短，日照強烈，滴雨不下，乾天旱地，相對濕度均在15～40%之間。午間地溫亦隨氣溫上昇而變燙熱，尤其在乾旱沙土地溫會超過氣溫。在Hofuf夏季風速雖不大，亦鮮見，但偶而會伴隨滿天狂風砂，不但乾熱又有沙塩，因此春作水稻常受熱風害導致嚴重之葉燒及不稔而減產，夏作即無此現象，故產量較爲可靠在Unayzah即未曾發生。由於夏季炎熱乾燥，日蒸發量在Hofuf高到13 mm, Unayzah即達18 mm，卡新之氣候比阿哈薩較爲溫和，即氣溫較低，但較乾旱，風沙偶見於春天。稻作前者一年僅可一作，即於四月初至六月廿五日以前插秧，開花至成熟期間受熱旱災害極爲輕微，故產量甚高，但後者一年可兩作。

在土壤方面，阿哈薩綠洲之土質大部由石灰岩風化而成之砂土居多。在椰棗園之稻田已有相當久之歷史，爲一深灰褐色砂壤土，表土酥鬆易粉碎，越深色澤越淡，但仍然粗糙鬆懈。PH7.9-8.0電導度在1.5-2.0 mmhos/cm之間，有機質1.5-1.8%交換性鈉爲0.96，鉀爲0.24，鈣爲20.1而鎂爲2.00 me/100gms。Hofuf 試驗田爲一新開發沙漠土壤，由壤質砂土混合碎石而成。剖面無明顯之發育層，pH爲7.9電導度甚高達5.95 mmhos/cm，有機質亦較高達2.15%，交換性鹽基鈉爲4.40、鉀爲0.31、鈣爲38.32、鎂爲3.55me/100gms，故經2～3次洗鹽之後始可種稻。在卡新省王子農場爲一典型由風及雨水所沈積之砂粘壤土，質地細粘，而無明顯之層次發育，至一公尺深亦無變化。在低窪之地有明顯的白鹽層存於表土面，較高者即無積鹽現象，低窪之盆地區鹽含量高達17.02me/100gms並有高成分碳酸鈣，如無先洗鹽絕無法種稻，即使洗鹽亦須5～6次始可下降至種稻之濃度，但無白色積鹽地經洗2～3次鹽即可種稻，滲透率很低一天僅5 mm。至於較高處部份係由砂質壤土混合碎石而成，鹽分較盆地爲低，可不經洗鹽行種植陸稻。

在水源方面，阿哈薩綠洲多由自流井及開鑿而來，而卡新地區多數由開鑿而來，自流井甚少。Hofuf 研究中心水井之E.C.高達2.30～2.36 mmhos/cm，而王子農場者僅爲0.79 mmhos/cm，但其餘井水在0.74～1.77 mmhos/cm，pH在前者爲7.6在後者王子農場爲7.3。

由氣候、土壤及水質等三環境因子觀之，卡新省較適宜種水稻，但一年僅可一作，產量很高，唯水源較缺，而阿哈薩綠洲一年雖可兩作，但因春作有熱害產量甚差，水源雖較充足，但滲漏很厲害，用水不經濟。