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# Estimated Model for Crop Selection According to the Environment of the New-Valley, Egypt

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THE PRESENT study aims to build a model within the Automated Land Evaluation System (ALES) that can make use of the expert knowledge and information locally available to get insight in the profitability of growing ten crops. The New-Valley area of Egypt was selected as a case study site. The quantitative land evaluation (physical suitability) was performed using ALES. Fifteen soil profiles in the summer season of 2000, with their analytical data were used in the model. The selected soil profiles represent shale-derived soils (Vertic Torriorthents), unstable aeolian sandy deposits soils (Typic Torripsamment) and intermediate texture of sandy clay loam soils (Typic Torriorthints). The application of ALES to the study area revealed that three sites presented by profiles no. 5, 9 and 10 from El Sherka no. 5, Beer El Tanmia, and Bedkhulo village at Dakhla oasis were found to be suitable for all the studied ten crops (wheat, maize, rice, sorghum, alfalfa, green pepper, tomato, potato, strawberry and date palm). Nine sites presented by profiles no.1-4 and 11-15 from Kharga oasis (Hosha no.1 and no.12, Hosha-El Tanmia, Hosha Khareeg El zemam) and soils from Dakhla oasis (Balat village, south Balat, southeast Balat and south west Balat village) were found to be suitable for most crops. But were found to be moderately or marginally suitable for strawberry due to their relatively high salinity, soil reaction and / or fertility limitations.

The studied soil profiles no.6, 7 and 8 from El-Sherka no.1, 3 and 5, respectively have unsuitable conditions such as rooting conditions, fertility status limitations for more than three crops. Therefore, the recommendation can be the proper choice of the crops in the successive seasons to increase the agriculture income of these areas.

**Key words**: Current and potential suitability, ALES,New Valley,Egypt.

Due to the rapid increase in population in Egypt, there is a great need to expand the cultivated areas. One of the suggested areas for the horizontal expansion is Kharga and Dakhla oases. Kharga and Dakhla oases cover about 12,000 $km^2$ representing nearly 1.2% of the total Egyptian territory.

This area is one of the most promising agricultural extension areas in Egypt. Therefore, the agricultural development is one of the main components for the investment of the New Valley area. Land evaluation is important in establishing any land use planning and cropping pattern programs.

The main goal of this study is to establish a model for alternative land utilization types under a particular farming system on a sustain basis for selected field crops (maize, wheat, sorghum, alfalfa and rice), vegetables (tomato, potato, strawberry and green pepper) and date palm.

The proposed model based on climate and soil chemical properties,was evaluated according to their influence on the above mentioned crops. To realize this objective, 15 representative soil profiles have been selected from Dakhla and Kharga oases. The selection of the representative profiles was based on the previous studies of the origin of Kharga and Dakhla depression, which was discussed by Attia (1970) and Hermina (1990). Also soils and geomorphology of Kharga and Dakhla were discussed by several investigators, out of them: Abu-El Nour (1968) and Ageeb (1999).

Land evaluation moves much further in the direction of recommending particular uses of land. The term "land evaluation" became familiar since 1960, and defined as the fitness of a given tract of land for a specific use (FAO, 1976 and Sys, 1985). Sys and Verheye (1974) reported that land suitability evaluation deals with a comparative suitability rating of the land for a given range of utilization types, using an objective evaluation scale, which cover the major growth requirement.

Ageeb (1994) evaluated Giza area for maize grain production using FAO land suitability approach. He concluded that the study area is greatly determined by: soil conditions, availability of N-fertilizers to the farmers and efficiency of irrigation water supply to the farmers.

## Material and Methods

*Setting and field study*

Fifteen soil profiles (Fig. 1) were selected from the New Valley (Kharga and Dakhla Oases) in the summer season of 2000 as the following:

*Seven soil profiles from Kharga oasis*: Profile no.1 from Hosha no.1 (Kharga district), no. 2 from Hosha no. 12 (Kharga district), no. 3 from Hosha El Tanmia, no. 4 from Hosha Khareeg El Zemam, no.5 and 6 from El Sherka no. 5 and profile no. 7 from El Sherka no. 3.

*Eight soil profiles from Dakhla oasis*: Profile no. 8 from El Sherka no.1, no.9 from Bedkhulo,Beer El Tanmia, no.10 from Bedkhulo village, nos. 11-15 from Balat village. These soil profiles were morphologically described according to FAO (1990).

*Laboratory studies*

Samples were collected for the following analyses:

Grain size distribution, soil reaction (pH) of soil water suspension (1:2.5), EC ($dS/m^{-1}$) of soil paste extract, total calcium carbonate ($CaCO_3$%) and cation exchange capacity (CEC) were conducted according to the methods described by USDA (1991). The studied soils are classified to the subgreat group level according to Soil Survey Staff (1999).

*Evaluation methodology:* The model is built in the Automated Land Evaluation System "ALES" software (Rossiter and Van Wambeke, 1995) based on the following characteristics: effective soil rooting depth, $CaCO_3$%, salinity, pH-$H_2O$ and texture/structure class. Air temperature parameter comes from the climatological data of Egyptian Meteorological Authority (1996). Values of pH-$H_2O$ for the upper surface layer, effective soil depth (information from profile description), $CaCO_3$ %, EC $dS/m^{-1}$, texture class and CEC values are weight average (Sys *et al.*, 1993).

Determination of the requirements for the considered land utilization types are based on the guideline of Sys *et al.* (1993) and for strawberry and date palm from Ministry of Agriculture of Egypt (1994).

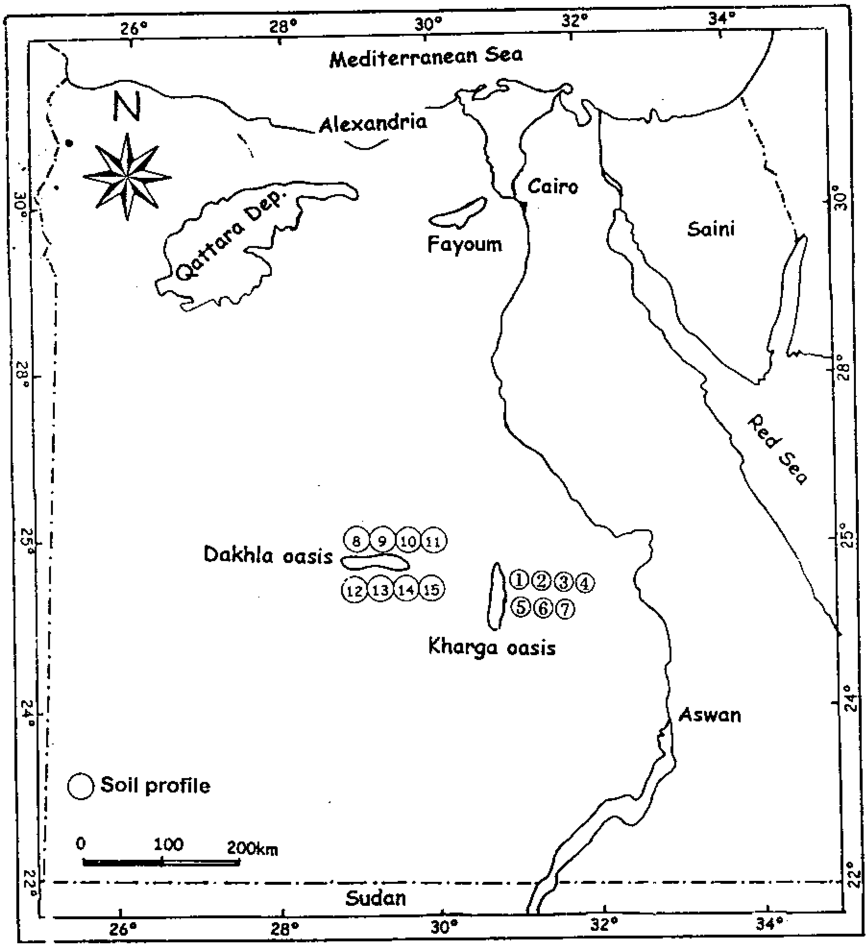


**Fig. 1. The location of the studied soil pofiles in the New-Valley.**

## Results and Discussion

*Climate*

The maximum and minimum air temperatures of the study area are 31.1, 14.9 and 32.1, 16.0 C° for Dakhla and Kharga oases, respectively.

Precipitation in this area is very rare. The considered physical and chemical characteristics of the studied soil profiles are shown in Table 1.

**TABLE 1. Some chemical and physical soil characteristics of the studied profiles.**

| Profile No. | depth (cm) | Grain size distribution Sand % | Silt % | Clay % | Texture class | $CaCO_3$ % | ECe dS/m | CEC cmol(+) /kg | pH 1:2.5 |
|---|---|---|---|---|---|---|---|---|---|
| **Kharga oasis profiles** | | | | | | | | | |
| 1 | 0-30 | 27.0 | 17.5 | 40.5 | C | 5.1 | 1.6 | 35.0 | 7.9 |
| | 30-90 | 20.3 | 27.3 | 52.5 | C | 1.6 | 3.4 | 40.0 | 8.6 |
| 2 | 0-30 | 17.0 | 33.0 | 50.0 | C | 2.0 | 1.0 | 38.0 | 7.7 |
| | 30-100 | 10.3 | 30.0 | 59.2 | C | 3.5 | 0.7 | 42.0 | 7.4 |
| 3 | 0-40 | 20.0 | 17.0 | 53.0 | C | 7.5 | 0.3 | 40.0 | 7.4 |
| | 40-90 | 27.5 | 15.0 | 57.5 | C | 3.9 | 0.2 | 43.0 | 7.5 |
| 4 | 0-20 | 21.0 | 25.0 | 54.0 | C | 9.8 | 0.3 | 39.0 | 7.5 |
| | 20-80 | 24.9 | 15.1 | 60.0 | C | 4.7 | 0.2 | 45.0 | 7.7 |
| 5 | 0-35 | 65.2 | 7.3 | 27.5 | SCL | 5.1 | 0.2 | 25.0 | 7.6 |
| | 35-100 | 74.9 | 5.0 | 20.0 | SCL | 5.5 | 0.3 | 23.0 | 7.6 |
| 6 | 0-40 | 62.5 | 17.5 | 20.0 | S | 4.3 | 0.3 | 15.0 | 7.7 |
| | 40-100 | 61.9 | 15.0 | 15.0 | S | 6.2 | 0.3 | 17.0 | 7.8 |
| 7 | 0-25 | 67.0 | 28.0 | 5.0 | SL | 6.1 | 1.0 | 12.0 | 8.0 |
| | 25-50 | 69.0 | 25.0 | 6.0 | SL | 9.0 | 0.4 | 13.0 | 7.9 |
| | >50 | 70.0 | 25.0 | 5.0 | LS | 2.4 | 0.3 | 10.0 | 7.7 |
| **Dakhla oasis profiles** | | | | | | | | | |
| 8 | 0-10 | 78.0 | 12.0 | 10.0 | LS | 7.0 | 1.0 | 13.0 | 7.6 |
| | 10-50 | 72.0 | 17.0 | 11.0 | LS | 7.3 | 0.3 | 14.0 | 7.8 |
| | 50-100 | 69.0 | 20.0 | 12.0 | LS | 2.1 | 0.1 | 16.0 | 7.6 |
| 9 | 0-15 | 28.5 | 22.5 | 49.1 | C | 4.7 | 0.3 | 36.0 | 7.4 |
| | 15-30 | 26.0 | 27.5 | 46.1 | C | 5.5 | 1.1 | 34.0 | 7.5 |
| | 30-90 | 22.5 | 30.0 | 47.5 | C | 5.9 | 0.8 | 35.0 | 7.3 |
| 10 | 0-20 | 28.0 | 15.0 | 57.0 | C | 5.9 | 0.4 | 40.0 | 7.4 |
| | 20-60 | 26.0 | 22.0 | 52.0 | C | 3.5 | 0.4 | 38.0 | 7.4 |
| | 60-80 | 30.0 | 12.5 | 57.5 | C | 7.4 | 0.5 | 42.0 | 7.4 |
| 11 | 0-25 | 22.0 | 25.0 | 53.0 | C | 5.5 | 0.4 | 41.0 | 7.3 |
| | 25-90 | 19.8 | 40.0 | 50.2 | C | 2.0 | 0.5 | 39.0 | 7.4 |
| 12 | 0-30 | 12.1 | 22.5 | 55.0 | C | 2.7 | 0.7 | 42.0 | 7.5 |
| | 30-100 | 17.5 | 25.0 | 57.5 | C | 3.1 | 0.9 | 45.0 | 7.4 |
| 13 | 0-10 | 45.0 | 25.0 | 30.0 | SCL | 4.7 | 1.5 | 27.0 | 7.6 |
| | 10-35 | 16.0 | 26.0 | 58.0 | C | 6.8 | 1.5 | 42.0 | 7.7 |
| | 35-150 | 7.0 | 30.0 | 63.0 | C | 2.4 | 2.0 | 46.0 | 7.9 |
| 14 | 0-25 | 10.0 | 33.0 | 57.0 | C | 1.3 | 2.3 | 40.0 | 8.0 |
| | 25-100 | 36.0 | 29.0 | 35.0 | CL | 1.7 | 1.7 | 35.0 | 7.6 |
| | >100 | 25.0 | 38.0 | 37.0 | CL | 1.2 | 1.2 | 37.0 | 7.5 |
| 15 | 0-25 | 20.0 | 24.0 | 56.0 | C | 2.4 | 0.8 | 42.0 | 7.3 |
| | 25-70 | 15.0 | 25.0 | 60.0 | C | 1.9 | 0.7 | 45.0 | 7.4 |
| | 70-150 | 13.0 | 22.0 | 65.0 | C | 1.1 | 0.5 | 48.0 | 7.4 |

*soils*

From Table 1, it is clear that the effective soil depth for the studied soil profiles is different. Profile no. (7) is considered as a moderately shallow profile due to presence of slightly permeable layer of sandstone at 50 cm depth. Profiles no. 4 and 10 are considered to be moderately deep profiles due to presence of the compacted layers of clay at 80 cm depth. While profiles no.1, 2, 3, 5, 6, 8, 9 and from 11 to 15 are considered to be deep and very deep profiles because its depth ranged between 100-150 cm.

The grain size distribution analysis and texture classes, show three main groups of the soils texture, which were in the consideration at the time of profiles selection in that area. The first group is the clay profiles, which was called shale derivedsoils (Quasar shale) as cited by Ageeb (1999). The representative soil profiles are from 1 to 4 and from 9 to 15 content more than 30% clay. The second soil texture group is unstable aeolian sand deposits, which was represented by the sandy soil profiles no.6 and 7. The last ones is sandy clay loam (profile no.5) and loamy sand (profile no.8) profiles soil texture.

Total calcium carbonates content, generally decrease towards the lower layer for the most of the studied soil profiles and ranged between 1% and 9.8%. Except profiles no.2, 6, and 10 have the opposite trend and have values between 2% and 7.4%. While for profiles no. 7 and 13 the high calcium carbonate contents 9% and 6.8% were found at the depth of (25-50 cm) and (10-35 cm), respectively.

Salinity level of the soils was indicated by EC values. Table 1 shows EC values of ≤ ldS/m for profiles no. from 2 to 12 and 15 .High EC values than 1 dS/m till value of 205 dS/m have been found in profiles no.1, 13 and 14.

Values of soil pH, indicate that, in shale derived soil profiles (1-4 and 9-15) with relatively high CEC values (reach 48 cmol (+)/kg), the pH values are low (7.3-7.5) as these soils have high buffering action, while those obtained from coarser texture (profiles no. 5-8) with low CEC values (10-25 cmol (+)/kg) maintain high pH values (reach 8.6). Also the slightly high salinity profiles (no.1, 13 and 14) are accompanied by increase in pH values (7.6-8.6) due to the fact that high levels of soluble salts.

According to Soil Survey Staff (1999) and the previous soil data, the studied soil profiles are classified to the following three subgreat groups:

1- Shale-derived soils profiles no. from I to 4 and from 9 to 15 are belonging to Vertic Toiriorthents.
2- Profiles no. 5 and 8 are classified as Typic Torriorthents.
3- Profile of aeolian sand deposits nos.6 and 7 are classified as Typic Torripsamments.

*Land evaluation*

Data of the effective soil depth was obtained directly from the profile description. The other land characteristics were recalculated over a certain depth (upper 25 cm or depth of the rooting system) by using the recommended weight factors (Sys *et al.*, 1993) for different profile sections.

Land characteristics which influence the rooting conditions of the crop were recalculated over 100 cm depth. pH-$H_2O$ value is recalculated for the upper 25 cm, while CEC, soil salinity, $CaCO_3$%, texture and the associated soil structure are recalculated using weighting factors for the different profile sections.

Cation exchange capacity of the studied profiles is taken as indicator for soil fertility in the designed model. Values of Land characteristics used are given in Table 2.

TABLE 2. **The main parameter used for land suitability classification and the actual land use of each profile.**

| Profile No. | Depth (cm) | Texture class | $CaCO_3$ % | Salinity dS/m | CEC cmol(+)/kg | pH in water 1:2.5 | The actual land use in the summer of 2000 |
|---|---|---|---|---|---|---|---|
| | | | Kharga Oasis profiles | | | | |
| 1 | 90 | C | 3.5 | 2.4 | 35.0 | 7.9 | date palm |
| 2 | 100 | C | 2.4 | 0.8 | 38.0 | 7.7 | rice |
| 3 | 90 | C | 6.3 | 0.3 | 40.0 | 7.4 | alfalfa |
| 4 | 80 | C | 6.9 | 0.2 | 39.0 | 7.5 | alfalfa |
| 5 | 100 | SCL | 5.3 | 0.3 | 25.0 | 7.6 | date palm |
| 6 | 110 | S | 5.1 | 0.3 | 15.0 | 7.7 | after wheat |
| 7 | 50 | SL | 7.1 | 0.8 | 12.0 | 8.0 | strawberry |
| | | | Dakhla Oasis profiles | | | | |
| 8 | 100 | LS | 6.0 | 2.3 | 13.0 | 7.6 | after wheat |
| 9 | 90 | C | 5.4 | 0.7 | 36.0 | 7.4 | alfalfa |
| 10 | 80 | C | 4.8 | 0.4 | 40.0 | 7.4 | tom./pota./gre.* |
| 11 | 90 | C | 3.6 | 0.4 | 41.0 | 7.3 | rice |
| 12 | 100 | C | 2.9 | 0.8 | 42.0 | 7.5 | maize |
| 13 | 150 | SCL | 4.8 | 2.0 | 27.0 | 7.6 | sorghum |
| 14 | 100 | C | 1.5 | 2.0 | 40.0 | 8.0 | tom./pota./gre.* |
| 15 | 150 | C | 2.1 | 0.8 | 42.0 | 7.3 | tom./pota./gre.* |

Note: tom. = tomatoes, pota.= potatoes, gre. = green pepper

The physical land suitability was applied to assess the suitability of the study area for 10 actual cultivated crops, using Automated Land Evaluation System "ALES" and guidelines given by Sys *et al.* (1993). Several steps were used to assess the physical suitability. The first step of the Land Utilization Types "LUTs" were defined, for each land use type, specific land use requirements were defined. Four Land Use Requirements 'LUR" were considered to assess the physical suitability of each site.

The corresponding Land Qualities "LQs" were put into one of five limitation classes (non, slight, moderate, severe and very severe). Land presenting slight, moderate or severe limitations reduces suitability for the actual cultivated crops in that order, while land presenting very severe limitation is physically unsuitable. Each "LQ" was defined by specific combination of selected land characteristics "LCs" . The LQs were matched with the "LURs" to determine the suitability level.

In this study, the physical suitability subclasses decision tree was constructed to determine the physical suitability of the land from the "LQ" ratings. Four physical suitability classes were distinguished: (1) suitable, (2) moderately suitable, (3) marginally suitable and (4) unsuitable. Lower-case letters suffixing the class symbol denote the kind (s) of limitation (s). There are five levels of discrimination in the physical suitability subclass and decision tree with a number of decision branches at each level. The final land suitability subclass (Table 3) is based on the highest "LQ" rating found along the path of decision.

The final results of the used model built in ALES to the study area (Table 3) revealed the following groups:

1- Soils with no limitations for all the studied 10 crops: represented by profiles no. 5, 9 and 10 were found to be suitable for all the studied 10 crops.
2- Soils have limitations for only one crop: represented by profiles no. 2 and 11 which were found to be moderately suitable for strawberry due to the presence of relatively soil salinity and fertility limitations, respectively, but they were suitable for the other mentioned crops. Profiles no. 3 and 4 were also moderately suitable for date palm due to the limitation of the effective rooting depth. Profiles no. 1, 12, 13, 14 and 15 were found to be marginally suitable for strawberry due to the limitations of soil salinity and / or fertility.
3- Soils have limitations for more than one crop: represented by profiles no. 6, 7 and 8. Profie no.6 is marginally suitable for rice and date palm and moderately suitable for tomatoes due to shallow rooting depth and /or high calcium carbonate content, but it is suitable for wheat, maize, sorghum, alfalfa, green pepper, potatoes and strawberry. Profile no. 7 is moderately suitable for wheat, maize, sorghum, alfalfa, green pepper, tomatoes and

TABLE 3. Suitability classification of the studied profiles.

| Crops | Physical suitability classes | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Profile No. | | | | | | | | | | | | | | |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| wheat | 1 | 1 | 1 | 1 | 1 | 1 | 2 rot/fer | 2 rot/fer | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| maize | 1 | 1 | 1 | 1 | 1 | 1 | 2 rot/fer | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| rice | 1 | 1 | 1 | 1 | 1 | 3rot/ca | 4rot/fer | 3rot/ca | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| sorghum | 1 | 1 | 1 | 1 | 1 | 1 | 2 rot/fer | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| alfalfa | 1 | 1 | 1 | 1 | 1 | 1 | 2 rot/fer | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| green pepper | 1 | 1 | 1 | 1 | 1 | 1 | 2 rot/fer | 2rot/ca | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| tomatoes | 1 | 1 | 1 | 1 | 1 | 2rot/ca | 2 rot/fer | 2rot/ca | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| potatoes | 1 | 1 | 1 | 1 | 1 | 1 | 2 rot/fer | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| strawberry | 3slt/fer | 2 slt | 1 | 1 | 1 | 1 | 1 | 2slt | 1 | 1 | 2 fer | 3slt/fer | 3slt | 3 slt | 3 slt |
| date palm | 1 | 1 | 2 rot | 2 rot | 1 | 3 rot | 3 rot | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |

Notes

1 = suitable, 2 = moderately suitable, 3 = marginally suitable, 4 = unsuitable.

slt = salinity limitations, rot = rooting depth limitations and fer = fertility limitations.

potatoes. But it is marginally suitable for date palm and unsuitable for rice due to the limitations of rooting and / or fertility status. Strawberry is the only suitable crop, which already cultivated in this site. Profile no. 8 is found to be moderately suitable for wheat, green pepper, tomatoes, and strawberry and marginally suitable for rice due to the limitation of rooting, fertility and / or calcium carbonate. It is suitable for maize, sorghum, alfalfa, potatoes and date palm.

Therefore, the recommendation is the proper choice of the crop in the successive seasons to increase the agricultural income and to reduce the inputs of these areas.

## Conclusion

In spite of the relatively high summer air temperature, rare precipitation and limited irrigation water in the Dakhla and Kharga oases, there are some very suitable crops would be successful in such critical soil and climate factors.

The purpose of this study is to build a model within the Automated Land Evaluation System (ALES) that can make use of the expert knowledge and information locally available to get insight in the profitability of growing ten crops.

The designed model was based on the following factors: air temperature, effective soil depth, texture class, soil salinity, CEC as an indicator for soil fertility, $CaCO_3$% and pH values.

According to Soil Survey Staff (1999) and the obtained data, the studied soil profiles are classified as follows:

Shale-derived soils profiles no. from 1 to 4 and from 9 to 15 are belonging to Vertic Torriorthents. Profiles no. 5 and 8 are classified as Typic Torriorthents. Profile of aeolian sand deposits nos. 6 and 7 are classified as Typic Torripsamments.

Most of the studied areas and their representative soil profiles are considered to be suitable for the current land use type. These areas are mainly representing the shale-derived soils and unstable aeolian sand deposits.

On the other hand, the unsuitable areas were due to some of the soil limitations such as follows. Salinity limitation which can be removed by reclaiming these soils through leaching, specially the good quality irrigation water are available, application of gypsum and other management practices besides the proper cropping pattern can be followed in these area.

Constraints that related to rooting conditions refer to either very shallow profiles or sandy texture. These soils represent the moving or unstable aeolian sandy deposits. These limitations are difficult to reclaim. Under such conditions, it may advisable to look for alternative land use types.

The limitations due to fertility status are mainly associated with low cation exchange capacity and relative high pH values (7.9 or more) of these soils. In the study area, most of the farmers are capable to improve the fertility status through an application of proper fertilization program.

The present land uses are corresponding fairly with the assessment given by the model that built in ALES. Outputs of the model enable the user to select management options to alleviate identified limitations. The obtained results also can be employed by land use planners to select areas suitable for other land use types.

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# تصميم نموذج رياضى لاختيار المحاصيل الزراعية الملائمة حسب الظروف البيئية السائدة بمنطقة الوادى الجديد - مصر

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بالرغم من الحرارة العالية نسبيا خاصة فى فصل الصيف وندرة المطر ومحدودية مياه الرى الجوفية بالواحات الداخلة والخارجة بالوادى الجديد ءالا أنه يمكن تفوق نجاح زراعة عدد من المحاصيل عند الأخذ فى الاعتبار عدد من العوامل المحددة لإنتاجها. لهذا الغرض تم تصميم نموذج رياضى باستخدام برنامج ALES يلائم ظروف المنطقة معتمدا على عدد من العوامل الأرضية والبيئية الفعالة وهى: المناخ ممثلا فى درجة الحرارة - العمق المؤثر - القوام - درجة الملوحة الأرضية - السعة التبادلية الكاتيونية (اختبر كدليل على مستوى الخصوبة الارضية) - كربونات الكالسيوم الكلية - درجة تفاعل التربة. وذلك بغرض إعطاء المشورة للمزارعين ووضع التوصيات أمام متخذى القرار بشأن الاستمرار فى زراعة ما هو قائم من زراعات أم يتغير هذا النمط التقليدى بغرض الوصول بأعلى إنتاج وتقليل تكاليفه، لذلك تم اختيار عدد ١٥ قطاع من الوادى الجديد تمثل أراضى طفلة ورملية وأخرى متوسطة القوام.

الأراضى الطفيلية مثلت بقطاعات أرقام من ١-٤ ومن ٩-١٥ قسمت إلى تحت رتبة Vertic Torriorthents والقطاعات متوسطة القوام مثلت القطاعات أرقام ٥ ، ٨ وقسمت إلى تحت رتبة Typic Torriorthents أما القطاعات المتبقية أرقام ٦ ، ٧ فكانت تمثل لأراضى الرملية وقسمت إلى Typic Torripsamment.

النتائج المتحصل عليها من التقييم تشير إلى أن القطاعات أرقام ٥، ٩ ، ١٠ متوسطة القوام والطينية الطفلية بأرض الشركة رقم ٥ و بدخلو بئر التنمية على التوالى كانت ملائمة جدا

للزراعات القائمة وأيضا ملائمة جدا لكل من الأرز - القمح - الفراولة - الذرة - السورجيم بينما القطاعات أرقام ١، ٢، ٣، ١١،٤، ١٢، ١٣، ١٤، ١٥ وهى تمثل أراضى طفلية طينية أيضا، وجدت أنها ملائمة لكل المحاصيل المختبرة ولكن متوسطة إلى هامشية الملائمة للفراولة فقط، وذلك لأن هذا المحصول بالتحديد لا يلائمه الملوحة العالية نسبيا لهذه القطاعات وأيضا الارتفاع النسبى لرقم pH المائل للقلوية فهو لا يناسب الفراولة وتدنى مستوى الخصوبة بها.

القطاعات أرقام ٦، ٧، ٨ وهى القطاعات الرملية (٦،٧) والمتوسطة القوام (٨) يوجد بها بعض المحددات التى تتمثل فى عمق القطاع (قطاع رقم ٧) ودرجة الخصوبة المتمثلة فى CEC منخفض (قطاع رقم ٦،٨) فهى لا تلائم زراعة أكثر من ثلاثة محاصيل مختبرة. فقطاع رقم ٦ يلائمه زراعة القمح - الفراولة -الذرة - السورجيم -الفلفل والبطاطس. أماقطاع رقم ٨ فيلائمه زراعة الذرة - السورجيم- برسيم -بطاطس والبلح بينما قطاع رقم ٧ لا يلائمة إلا زراعة الفراولة فقط

لذلك التوصية هى أن الاختيار الجيد للمحصول المنزرع مطلوب جدا عند إجراء الزراعة فى المواسم التالية لزيادة العائد الاقتصادى الزراعى من هذه الأراضى الخصبة.