Development of Zanjan province dry land wheat atlas

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Abstract: In this study we analysed climate capabilities and limitations for dry land wheat. The study takes into account and analyzed the rainfall and temperature data of the research region. In the first stage, proper planting date was defined according to the first rain after September. Then the different levels of dry planting wheat's growth was calculated by the GDD method. In the following stage annually and in autumn, winter, spring and June rainfall were reviewed and the average was calculated. The probability of germination temperatures, maximum temperature 25 and 30 °C in the flowering stage and grain filling stage was also calculated. The calculated quantities in the GIS system by using the overlap method were first given a weighing value and afterwards were incorporated. Then finally Zanjan Provinces Dry Land Wheat Atlas area was classified in 4 zones: Very suitable lands, Suitable land, Average lands and Unsuitable lands was prepared.

Keywords: Rainfall, GIS, GDD, Planting date.

INTRODUCTION
Various studies around the world have taken place on the relation between climate factors and plant development. In wheat as the most important crop, needed for humans, we face some national and international articles, which are mentioned, in the following. Norwood (2000), studied on planting dryland wheat in the great plains of Kansas. Sharma et al. (2006) evaluated the effect at high temperature on grain growth in different types of wheat. Ouda et al. (2005) evaluated the effect of planting dates and water stress on wheat production in the south delta. Farajzadeh and Taklohighash (2001) did Bandab agroclimatic area of Hamadan province in a GIS area according to dryland wheat planting.

MATERIALS AND METHODS
This study was conducted in Zanjan province (Iran). After the delta was gathered, because of lack of long term statistical stations in Zanjan, the statistics were gathered from the neighbor provinces. At first, the data gaps were filled according to the difference and ratio methods. Also the run test exam was used to evaluate data homogeneity. Afterwards the specified region's climate was classified by Jamab according Domarton and Ambrejeh climate thumb methods (personal communication). In the next level, rainfall geographical distributions were evaluated annually and in autumn, winter, spring and June month intervals. The first day in which the precipitation in one or two consecutive days is more than 5 mm was determined analyzing the precipitation series (Bazgir 1999). Consequently the dryland wheat sowing date was determined. According to the achieved sowing dates, and due to the required thermal units for different dryland wheat levels development, in the region, the results are as following:

- Planting until becoming green: 180 degree day
- Planting until the beginning of flowering stage: 1300 degree day
- Planting until the finishing of flowering stage: 1500 degree day
- Planting until complete growth: 2300 degree day (Behnia, 1997)
could be taken into considerations other factors such as, terrain, topography of the region, soil type, lack of integrity and small pieces of farming land, farmers lack of awareness, using traditional methods, using proper digits and etc, to have an accurate determination on fertile lands.

CONCLUSIONS

The analysis of climatic data in the Zanjan province defines a cold semi-arid climate. Generally it has the conditions for planting dryland wheat.

According to the dates of wheat growth stages, (Tab. 1), the shortest growth period is 203 days (Manjil) and the longest growth period was 309 days. (Khalkhal and Zarineh Obato).

The final province map is divided in 4 regions according to the dryland wheat sowing vocation as follows (Fig. 1):

1. Very suitable lands: (1152.5 km²) this region covers about 5.2% of whole Zanjan province's area and includes northern parts, center of Khodabandeh and eastern Ijroud.
2. Suitable land: (10494.7 km²) this vast area represents about 47.35% of the province and includes most of the central parts of the province, northern and southern parts of Zanjan county, Mahneshan eastern parts, northern and western parts of Abhar, most areas of Khorramderreh east and

RESULTS AND DISCUSSION

The accuracy of the achieved data is limited and then these data must be modified according to real information based on farmers' polls.

The analysis of meteorological data for the last 15 years (1990 – 2004) evidenced that the lack of rainfalls of the last years causes drought period in this region then the budding season and the other growth stages had a delay. Despite the rainfall delays, the farmers sowed but some seeds were destroyed or their viability was reduced.

This research is only based on the climate data, it
center of Khodabandeh, and Ijroud counties east and north.
Average lands: (9891.8 km²). This area represents about 44.63% of the province. These areas are mainly located in Tarom county, center of Zanjan country, south of Abhar, west of Mahnesan, west of Ijroud and Khodabandeh. In these regions, dryland wheat cultivation could met some problems due the possible drought period Unsuitable lands. This area is about 2.82% (625 km²) of the whole province which is located in east of Zanjan county, west of Khodabandeh county and south of Mahnesan. This areas is no suitable for wheat cultivation for adverse climatic condition.

REFERENCES


