**Project Number 2**

**Investigation of Dust Haze Phenomenon, Resources and Control Techniques in Thi-qar Province, Iraq**

**Introduction**

Cropping pattern, green belt establishment and wetland restoration will result in reducing dust haze formation and mitigating negative effects of dust haze on people and their living area and also agricultural crops for food productions. Health recommendations and measures simultaneously could also support people life quality.

Land degradation related to desertification and soil erosion due to natural causes and human disturbance thorough inappropriate practices on soil resources would create the lower capacity of the soil to support human life in the region. The land degradation causes contributions including internal and external factors affecting Thi-Qar province land degradation vulnerability will be recognized in details. After then active and passive soil degradation controls in form of short length period and long term solution will be pursued. Passive controls included short term solutions such as non-biological mulch for sand dune stabilization. Artificial and biological wind breaks and green belt establishment are medium term to long term practical measures. Active controls included biological mulching and a forestation activities. The main projects would be a solution package involved short to long term measures.

**Dust Haze Phenomenon, Resources and it’s Adverse Effects**

Iraq is located on the dry belt, the proportion of the world's arid regions level, and 50.6 percent of its area involves with dry climate and sometimes causes ultra dry, about 2 times over the world average (10.6 percent). This leads to the degradation of soil and resulted dust haze particles. As the dust haze phenomenon in recent years intensified, damages to various sectors including agriculture which is estimated based on production about 40 to 50 percent of its damage to different crops. When the crop leaves covered by dust haze the produced yields would reduce and quality will be low. The amount of sunlight absorption and photosynthesis resulting on the development and production of green plant components which will be suffered severely because of dust haze covering around crop leaves. Accordingly, given that the foreign origin of this phenomenon is so deal with it or the need for national unity to identify the exact origin of the dust haze particles and identify the effectiveness ways to reduce dust haze impacts, particularly in the agricultural sector for better crop growth conditions and economical yield production.

**Amis and Definitions of the Projects**

The main aim of this multi-dimensional and multi objective project is more sustainable exploitation of soil and water natural resources of Thi-qar province of Iraq in term of society, environment and economy. We will consider all aspects and variables which play a great division in achieving social, environment, economic, safety and health goals in this area to help Thi-qar people. Geographical, Climatical, agricultural crops and practices, surface and under surface water resources, water table, waste water resources, soil properties, social, technical, economical and environmental issues will be peer evaluated. Based on differential gap between in request expected status from Iraqi's decision makers officials and not so good current status, and social benefits of sub projects we will plan triple constraints of the main project, including performance specifications, cost budget and time procedure for all sub projects in details.

Among dust haze mitigating measures, wetland restoration, green belt establishment, afforestation and moving to more efficient agricultural cropping pattern development projects in the Thi-Qar province and elsewhere in arid zones, there are a large degree of overlap in prerequisites, enforcement and specially in the sub project objectives, which should be considered systematically to guarantee a high degree synergy to secure additional effectiveness resulting in more water and soil productivity, economization and environmental friendly usage.

For completing the above project, we will negotiates and get help the Faculty of Agricultural Engineering and Rural Development College at Khouzestan Ramin Agriculture and Natural Resources University which is located in Mollasani, Khouzestan, Iran.

Therefore the purpose of this study is Identification and checking the conditions and the feasibility of dust haze phenomenon resources, method of collecting data, and factors related to the research objectives. Also, methods for controlling dust haze phenomenon in the region will be investigated. The main **Suggested Themes** for this research are as follows:

1. **Investigation and identification of important factors involved with the creation of dust haze phenomenon**

# 1-1 Climate change – investigating the trends in climate change and the solutions

# 1-2 Identifying the main origins of dustification – the critical areas of wind erosion

# 1-3 Environmental factors (environmental change, wetland and lake dry-up or decline, reducing water resources and their limitations, desertification,…)

# 1-4 Natural disasters (droughts, earthquakes,…)

# 1-5 Human factors (environmental degradation, overexploitation of natural resources, desertification, urbanization, construction and development projects, wars,…)

1. **Investigation of affected regions and geographical extent area of dust haze phenomenon**

# 2-2 Remote sensing applications in determining the geographical extent and dust storm trends

# 2-3 GIS applications in determining the geographical extent of dust storm impacts

# 2-4New technologies used in forecasting the geographical extent of dust storm impacts

# 2-5 Effects of geographical features on the extension or curbing of dust storm impact domains

1. **Investigation of impacts and consequences of dust haze phenomenon in agriculture and industr**y

3-1 Mechanisms used to assess and quantify the damages caused by dust storms in the different agricultural and industrial sectors

3-2 Reducing livestock yield and performance in livestock breeding and fisheries and the related meat industries

3-3 Reducing the quality of agricultural and livestock products

3-4 Imposing limitations on farming crops of interest

1. **Investigation of environmental impacts and consequences of dust haze** **phenomenon**
2. **Investigation of impacts and consequences of dust haze on human health**
   1. Effects of suspended/saltating dust on causing/intensifying various human (coronary, respiratory, infectious, allergic, …) diseases
   2. Effects of dust particles on maternal and fetal health

4-2 Relationships between dust storms and cancerous and other malignant diseases

4-3 Effects of dust storms on children’s mental (IQ) and physical development

4-4 Effects of dust storms on human psychological health

1. **) Investigation of socioeconomic impacts and consequences of dust haze**
   1. Intensified migration/immigration, specifically among the more educated population, from endangered areas to safer areas
   2. Reduced income and/or unemployment in urban and rural areas
   3. Damages and reduced income in the agricultural sector
   4. Declining income from tourism
   5. Flight safety due to reduced visibility
   6. Socioeconomic consequences of limitations imposed by dust storms (such as reduced individual and social productivity, suspension or closedown of recreational and educational centers, flight delays/cancellation,…)
2. **Preparing methods and combating dust haze phenomenon to reduce its harmful impacts**
   1. Adapting urban development projects and water development schemes to the environmental conditions and the local ecosystem
   2. Capacity-building in the health service system (development and equipment of health centers, training, investigation of the effects of dust storms on human health, …)
   3. Desertification control, increasing vegetative cover, and creating protective green belts
   4. Development of the infrastructure in both urban and rural areas required for combating and reducing the adverse effects of dust storms
   5. Monitoring and alarming systems and techniques to warn dust storm arising within and without the national boundaries
   6. Protection and reclamation of water bodies, especially wetlands and lakes in the region, which are effective in controlling and reducing dust and dust storm generation
   7. Raising public awareness and offering training to rural and urban communities for self-protection
   8. Short-term, mid-term, and long-term practices for soil protection and anchoring blowing sand dunes
3. **Investigation of legal and international aspects of dust haze** **phenomenon**
   1. Legal aspects of damages caused by dust storms
   2. Multilateral coordination and cooperation among the states in the region and international agencies
   3. Providing legal support to the legal sufferers and individual victims of dust storms
   4. The legal issues associated with the prevention and limitation of dustification factors and providing protection against its adverse effects.
4. **Providing the possibility of Gathering scholars and researchers of Iran and other countries in order to exchange and experience transfer the latest scientific and technical findings regarding the identification of dust haze phenomenon and combating methods**
5. **To inform and introduce researchers and experts with the latest research in this area with their finding results**
6. **Motivate experts for the required research we need for the future**
7. **Awareness and to inform state officials and planners to the range of risks and damages caused by dust and importance of decision making and extensive region and international programs to control and reduce its adverse effects**
8. **Awareness of and access to data produced by the phenomenon of dust haze in the environment and introducing the value of gathering systems, control and monitoring of this phenomenon**