

# ACTIVITIES FOR COMBATting AGRICULTURAL DROUGHT IN TURKEY

## I. Introduction

Turkey is a developing country with rapidly growing economy and its population approximately half of which is under age of thirty. Agricultural Gross Domestic Product of Turkey is 62.7 billion dollar (in 2011). Agricultural per capita income is 3.653 (three thousand six hundred and fifty-three) dollar. Turkey has the seventh biggest agricultural economy in the world (according to OECD Report in 2011). Rate of population employed in agriculture is 25.5%. Turkey targets to have 150 (one hundred and fifty) billion dollar agricultural Gross Domestic Product and 40 (forty) billion dollar agricultural export by 2023. Turkey is member of Organization for Economic Cooperation and Development and also candidate country for European Union (EU). Agricultural sector is a sensitive and strategic sector all over the world since it is dependent on natural conditions. Also, agriculture is an important resource for nutrition, employment and development of countries. Studies for agricultural productivity and technology intensive production models have been continuing in Turkey in order to achieve targets for 2023. However, in addition to these activities, another important element that should be taken into consideration is natural disasters of which occurrence frequency and severity level have been increasing due to climatic changes. Drought is the most difficult natural disaster to manage when compared to other natural disasters. There can be losses in agricultural production as the result of disasters (Plant, Animal and Aquaculture Production). This is a risk that can threaten the sustainability of agricultural production.

Drought is a natural threat that has great negative effects on lives of living creatures, leads to important ecological problems limiting various activities of human beings and that can turn into a natural disaster in any moment. Results of this natural event that occurs in a given period gradually reach to dangerous extent as period of event has extended.

At the present day, drought which is one of the most important problems on global scale affects all parts of our lives including physical and natural environment, city life, development and economy, technology, agriculture and food, clean water and health considered as of current situation.

According to scenarios of Intergovernmental Panel on Climate Change (IPCC), threats that will probably increase are listed generally as heat wave, forest fire, **drought**, heavy rains, tropical storms, effects on agriculture and agro-culture.

Drought occurs gradually compared to other extreme events, it often continues for a very long time and although its effects are wide it is the most difficult natural disaster to estimate.

Climate changes in the world and in our country that are negative for drought and increasing water demand require a planning and management in a way to take drought risk into consideration. At this point, it is foreseen that warming at national level will affect our country and it will be felt more especially in the region in Mediterranean basin. Only one geographical region in our country will be affected by **agricultural drought** that will probably occur with global warming, also all regions can be affected by this natural disaster.

## II. Applications of Strategy for Combatting Agricultural Drought and Action Plans

Agricultural drought is described as lack of water in the soil to meet the need of plant.

In order to mitigate effects of agricultural drought likely to occur in our country and to determine measures to be taken to this end, for the purpose of, first of all, ensuring coordination in activities to be realized with the participation of related ministries, universities, governorships, local governments and non-governmental organizations and regulating procedures and principles about duties, authorities and responsibilities in these activities;

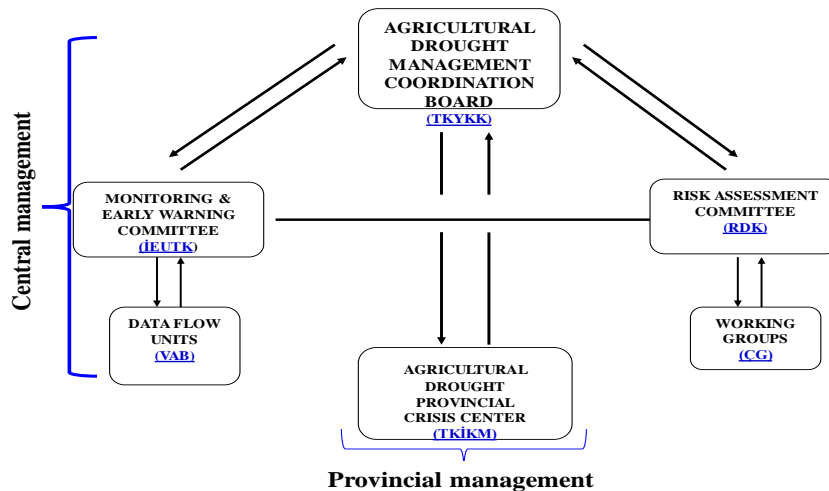
Firstly, Decision on Procedures and Principles of Activities for Combatting Agricultural Drought and Drought Management has put into force by publishing on Official Gazette on 8<sup>th</sup> of July, 2007 and under this decision "Regulations on Agricultural Drought Management Duties and Working Procedures and Principles" has been published on 02 March 2008 dated Official Gazette and in line with this regulations 5 year **Agricultural Drought Combating Strategy and Action Plan** for 2008-2012 period has been prepared and has been put into effect.

Due to restructuring of our ministry and some ministries that have responsibilities under Agricultural Drought Management Coordination Board and expiration of 5 year Agricultural Drought Combating Strategy and Action Plan for 2008-2012 period, new legislation studies have been realized and

- **Cabinet Decision on Activities for Combatting Agricultural Drought and Drought management** has been published. In accordance with this cabinet decision,

▪ **Regulations on Agricultural Drought Management Duties and Working Procedures and Principles** has been made. In accordance with this regulations; **Agricultural Drought Management Coordination Board** has been established under the leadership of Undersecretary of Ministry of Food, Agriculture and Livestock with the participation of representatives from related Directorates, non-governmental organizations and universities and has begun its activities. Management chart is indicated below:

### AGRICULTURAL DROUGHT MANAGEMENT



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Due to risk of drought occurrence at any moment since it is a natural disaster, **5 year Agricultural Drought Combating Strategy and Action Plan for 2013-2017 period** has been prepared according to our country's conditions under the coordination of our ministry with the participation of ministries, universities, governorships, local administration and non-governmental organizations determined by Cabinet Decision and has been put into effect.

Main Strategy for Combatting Agricultural Drought is

- To develop an institutional structure with sufficient capacity,
- To realize combatting within an integrated and comprehensive plan,
- To achieve a structure in which agricultural sector is affected by drought at minimum level.

Activities under the Action Plan have been prepared by grouping on the basis of determined strategy, main development center and priorities. Titles of measures from which related institutions are responsible have been prepared and duties have been distributed. These activities are as follows:

#### 1. Drought Risk Estimation and Crisis Management

- Crisis management on agricultural drought estimation will be applied.

#### 2. Provision of Sustainable Water Supply

- Potential water holding capacity will be increased.
- Water delivery channels will be modernized, investments on maintenance and renewal of water storing and deliver channels will be realized in a timely manner.
- Taking measures for collection of waste water, using waste water treated in agriculture and industry sector will be ensured.
- Effective management of underground water will be ensured.
- Land using techniques increasing preservation of water in the soil will be developed, land usage plans for protecting and developing soils that are the most important natural storage for water will be prepared.

#### 3. Effective Management of Agricultural Water Demand

- The most suitable cultivation areas for agricultural products in the determined agricultural basins will be determined by taking water availability into consideration and effective water usage will be ensured.
- Water delivery systems will be modernized.
- Effective use of underground water for agriculture will be ensured.

- Incentive programs directed to production guidance for sectors and productions that are most affected by drought, including plant production, animal production, bee-keeping and domestic aquaculture will be established. Plant production and livestock production policies will be implemented by taking drought risk into consideration.
4. **Acceleration Re-De Activities and Increasing Training/Extension Services**
    - Re-De activities supporting combatting drought will be accelerated.
    - Training and extension services for at the outset farmers and related parts.
  5. **Developing Institutional Capacity**
    - Necessary legal regulations for effective combatting agricultural drought will be made and institutional structuring will be strengthened.
    - Necessary institutional capacity for fires out of forest will be developed.

In line with aforementioned titles, duties of related institutions are determined, their activities about Priority / Measure for which they are responsible are asked and reported in order to assess them at the end of the year.

### **III. Establishment of Committees and Agricultural Drought Provincial Crisis Centers**

Duty distribution is divided into two groups in order to carry out Agricultural Drought Combatting Strategy and Action Plan in a coordinated way. These are studies to be realized at the central level and studies to be realized at the provincial level.

At the central level,

- **Monitoring, Early Warning and Estimation Committee,**
- **Risk Assessment Committee and**
- **Data Flow Unit** has been established under the coordination and secretariat of Agricultural Insurance and Natural Disasters Department under General Directorate of Agricultural Reform.

At the provincial level, **Agricultural Drought Provincial Crisis Centers** have been established under the coordination of Provincial Directorates of Food Agriculture and Livestock.

**Monitoring, Early Warning and Estimation Committee;** Agricultural Insurance and Natural Disasters Department that is responsible for coordination calls for meeting every month and meeting is held between 15<sup>th</sup> and 20<sup>th</sup> of the month. Necessary data is gathered from institutions responsible under Data Flow Unit and Monitoring, Early Warning and Estimation Committee report is prepared. Aim of this activity is to monitor possible drought on a regular basis. This committee consists of experts from related Directorates.

“Phenological Observation Reports” for agricultural products cultivated in the province are gathered from Provincial Directorates of 81 provinces while preparing report of Monitoring, Early Warning and Estimation Committee,

Reservoir Levels of Dams for Irrigation from General Directorate of State Hydraulic Works,

Quarterly Estimation Maps from Mid-term Weather Forecast Center,

Regional, Monthly and Cumulative Precipitation Analysis, Watershed Precipitation Analysis, Agricultural Basin Precipitation Analysis, Temperature Analysis, Monthly and Cumulative precipitation assessment Charts by Regions from General Directorate of Meteorology have been gathered.

For the analysis of Drought Analysis, following indexes are used :

- ✓ **Percent Of Normal Index-PNI** (Percent of normal index is the simplest index of drought indexes and principally obtained by dividing precipitation in a given period into average as percentage.)
- ✓ **Standardized Precipitation Index-SPI** (Standardized Precipitation Index is obtained principally by dividing difference between precipitation in a given period and average into standard deviation. Program can calculate time and rate incidence of drought index quarterly, semi-annually, yearly and biennially and for any combinations of these periods for the requested station and also program provides opportunity to make analysis at different drought severity categories.)
- ✓ **PALMER Drought Severity Index - PDSI** (PDSI is calculated on a monthly basis in general. Precipitation, temperature and field moisture capacity are used as data in calculation. By these data, evaporation, loss in moisture due to absorption by soil, surface flow and also loss in moisture on the surface can be determined.)

Different drought analyses realized in our country are considered for a general assessment, however phenological observation reports coming from Provincial Directorates of Food Agriculture and Livestock are more determinative in detecting agricultural drought. **Percent of Normal Index, PALMER Drought Severity Index and Standardized Precipitation Index** maps are used in our reports and these maps ensure to indicate drought on the map. Year and biennial Standardized Precipitation Index maps are used in our reports.

Data stated above are gathered and “Monitoring, Early Warning and Estimation Committee report” is prepared and this report is signed after the approval of the committee members. Prepared “Monitoring, Early Warning and Estimation Committee Report” is submitted to “Risk Assessment Committee” for evaluation.

**Risk Assessment Committee** works under Drought Management Coordination Board. Committee of which coordination and secretariat are carried out by Agricultural Insurance and Natural Disasters Department meets on a day between 20<sup>th</sup> and 25<sup>th</sup> of this month and examines the report submitted by Monitoring, Early Warning and Estimation Committee. Risk Assessment Committee consists of experts from related Directorates and NGOs.

Risk Assessment Committee prepares precipitation scenarios for future and estimates drought for following 6 months by using estimation maps prepared quarterly and semi-annually by Medium term Weather Forecast Center and prepares its report in this context. These scenarios are considered under three titles:

1. **Good scenario** (Situation where precipitation is 20% more than normal)
2. **Normal scenario** (Situation where precipitation is at seasonal normal measures)
3. **Bad scenario** (Situation where precipitation is 20% less than normal)

In the report, territorial and regional drought estimations are made according to these scenarios. According to results of the report, if considered as necessary, Agricultural Drought Provincial Crisis Centers are warned.

Agricultural Drought Provincial Crisis Centers are established in the provinces under leadership of governors and each province has prepared its Agricultural Drought Action Plan in accordance with its own conditions.

Agricultural Drought Provincial Crisis Center consists of provincial representatives from related ministries, local representatives from related general directorates under related ministries, provincial director of health, district governors considered as appropriate by the governor, representative from provincial special administration, representative from metropolitan municipality or municipality of province, mayors of districts, representative from university, president of agriculture chamber, irrigation, drinking water and producer unions, chairmen of cooperatives and representatives from other non-governmental organizations under leadership of governor or deputy governor appointed by governor. Following information is indicated in the report:

- General information about the province
- Soil and Land Resources
- Classes of dry and irrigated agricultural lands
- Available Water Resources
- Medium Term and Long Terms Study Plans to be Prepared under Normal Conditions
- Measures To Be Taken in Drought Periods
- Plans for Combatting Diseases and Pests
- Drinking Water and Using Water Planning
- Non-agricultural activities to be developed
- Training plans.

Measures to be taken in years with normal conditions become more important than measures to be taken in years with drought in combatting drought. Activities to be realized in years without drought are indicated in action plans. These are:

1. Developing and ensuring sustainability of provincial drought action plan,
2. Reviewing activities in accordance with laws, regulations and rules and filling deficiencies,
3. Developing farmers registration systems continuously,
4. Developing early warning systems of drought,
5. Continuing to implement Rangeland Rehabilitation and Developing Projects implementations in Rangelands, summer pastures and winter pastures,
6. R&D activities:
  - a- Developing varieties less affected by drought,
  - b- Developing techniques and technologies of water harvest,
  - c- Accelerating studies for determining product pattern according to regions,
  - d- Realizing simulation activities and modeling by working under controlled conditions,
  - e- Accelerating activities for using more intensively GIS and UA systems under monitoring and evaluation studies,
  - f- Increasing awareness via realizing trials and demonstrations of results under producer conditions,
7. Generalizing basin erosion control activities to direct basin rain water to soil and underground and terracing on streams by using stones,
8. Terracing on graded lands,
9. Foresting all unprotected hills,
10. Land usage planning.

4 steps have been determined for activities on irrigated and dry agricultural lands under the prepared Provincial Drought Action Plan. These are:

- 1<sup>st</sup> step is preparation for drought,
- 2<sup>nd</sup> step is drought alert,
- 3<sup>rd</sup> step is immediate action,
- 4<sup>th</sup> step is limitation. There is a coordinated action with Provincial Directorates in order to follow these steps regularly.

An evaluation is realized by considering data indicating which province is at which level obtained in April and May of each year from each province.

Agricultural Drought Provincial Crisis Center prepares its report by making an annual evaluation each year whether drought occurs or not and sends its decisions taken during their meeting to General Directorate of Agricultural Reform that carries out coordination and secretariat.

#### **IV. Conclusion**

During the action plan covering years 2008 - 2012, important steps have been taken and awareness has been increased about drought throughout the country. Provincial crisis centers have been established in provinces and Provincial Action plans have been prepared.

Agricultural Drought Management Coordination Board have initiated its activities and Risk Assessment and Monitoring, Early Warning and Estimation Committees working under this board have been established and they have prepared their reports by realizing their monthly meetings.

We have the experience and institutional capacity for gathering necessary data and improving techniques in combatting agricultural drought. Our country's sufficient amount of soil and water resources for meeting the needs of its population compared to its neighbors and most of our rivers' springing in our land make it more advantageous in terms of drought risk. However, the small scale and fragmental structure of agricultural enterprises and continued use of traditional production techniques are our complications in combatting drought. To overcome these difficulties, particularly training and extension services have been accelerated and government subventions have been given for transition to modern irrigation systems.

The Erosion of natural resources and pollution due to unplanned urbanization and industrialization and the demand for water from other sectors due to industrialization have been increased in the country. Besides these, duties' and authorities' on water and soil management being under different ministries' jurisdiction remains as another problem in combatting drought.

As a result, combatting agricultural drought will continue in an effective way in the framework of **Strategy for Combatting Agricultural Drought and Action Plan** prepared in a way to cover 2013-2017 according to current conditions in order to ensure not interrupting activities of Agricultural Drought Management Coordination Board, committees and provincial crisis centers established for combatting agricultural drought.