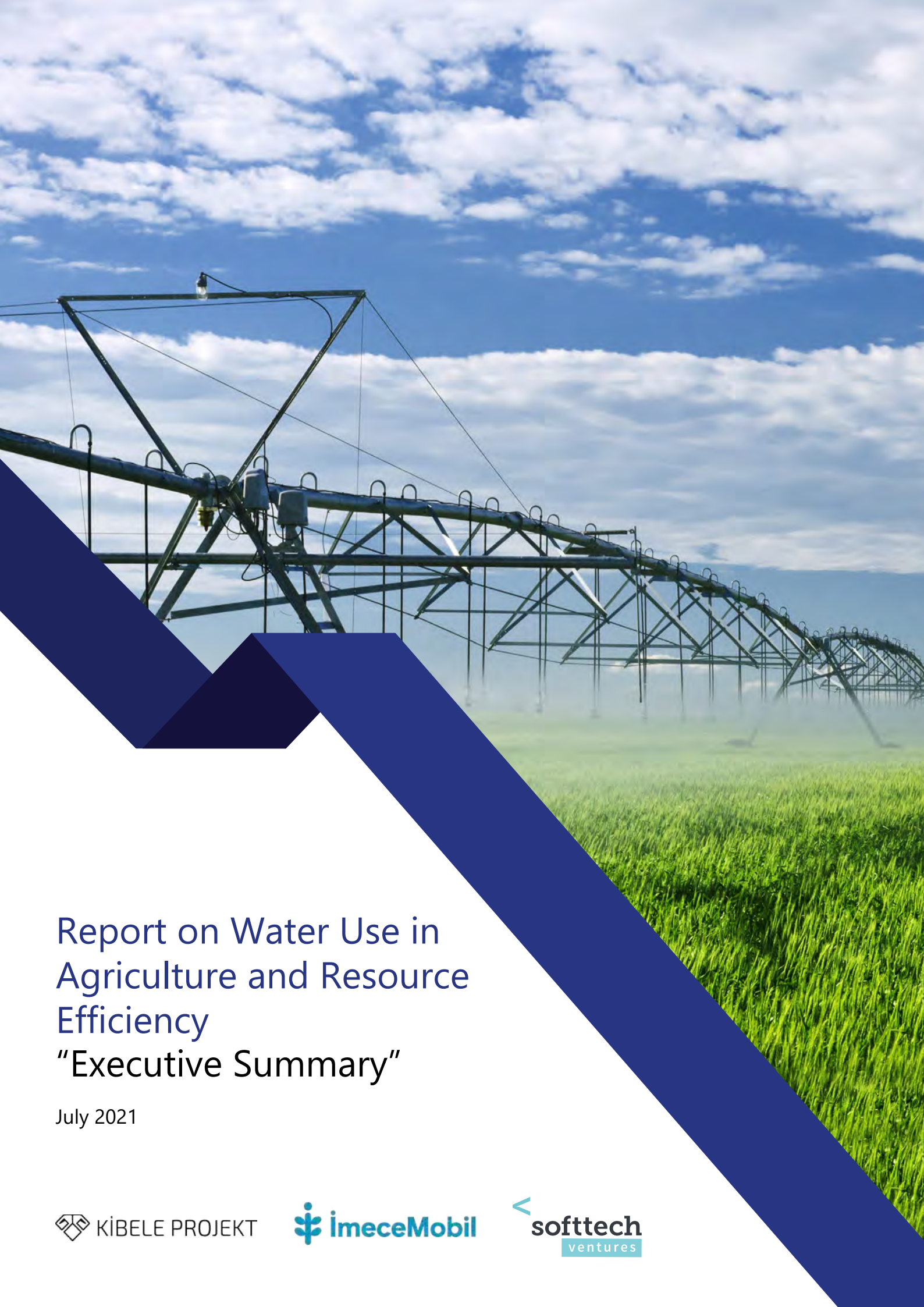


Report on Water Use in Agriculture and Resource Efficiency

"Executive Summary"

July 2021

KİBELE PROJEKT

İmeceMobil

softtech ventures

Impressum

Prepared by: Hasan Turunçkapı
Intern: Tutku Nur Saraç
Intern: Hande Turunçkapı
Design: Kerem Umut Önal

Legal Note:

Water is not only a highly significant resource for agricultural input but also a substantial element of life. As for water, there is serious competition between industries. That is because we have limited resources with high demand. Freshwater is mainly used for the agriculture industry in the world. The use of agricultural water has recently been a prevalent topic in our country as well. Although water investments are increasing, drought is still an essential part of society's agenda. You can see this rate from the sectoral water consumption chart.

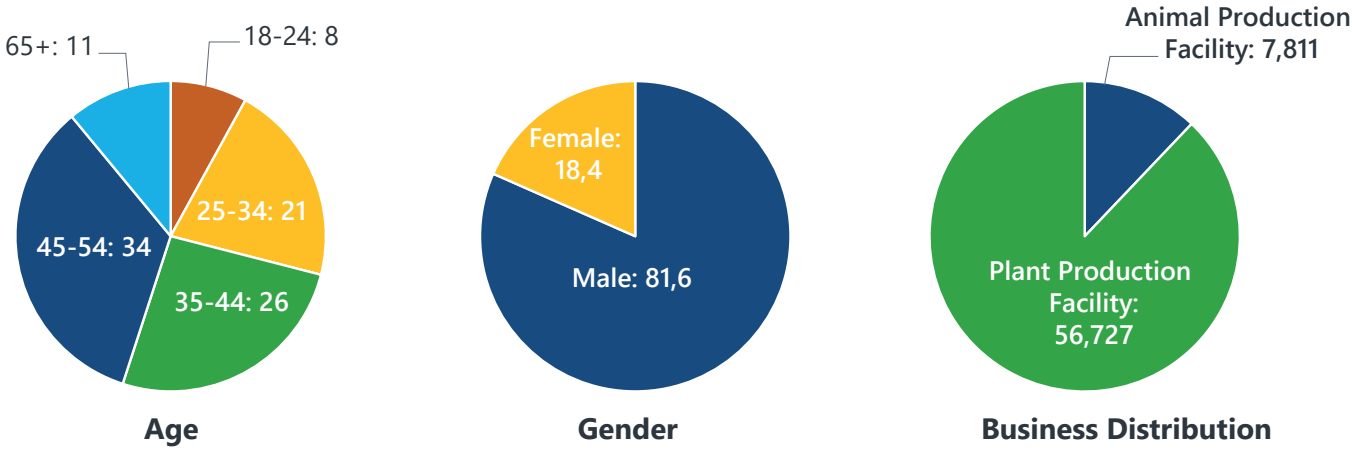
Chart 1 - Water Consumption by Sector in the World and Turkey

[3]World Sectoral Distribution Chart: Source: United Nations Food and Agriculture Organization, Turkey Sectoral Distribution Chart: Source: Tema

Agricultural output growth is expected to rise due to the anticipated population growth in the near future and similar reasons. Of course, it will also bring along the increased water demand. The water demand in other sectors will also increase for sure, and water conservation will be a need. Accordingly, the agricultural industry will step forward. Our reviews on the sectoral water use chart show agriculture as the top sector that uses freshwater. Therefore, water use and efficiency in agriculture will be among the issues we will discuss the most in the next decade. Here, we wanted to present the current situation, problems, and solutions by conducting research[1].

For our research, we primarily conducted a literature review. Our research related to irrigation focused on the general discussion topics and issues in the world and our country. Applying the random selection method, we then submitted questions to ImeceMobil's user database. We consulted experts on the results obtained by these questions, performed an accuracy analysis, and made a comparison. Then, we had one-on-one interviews with some manufacturers applying the random selection method again. All of these points put this report in a different place among its peers. You can review the demographic background we used for our survey in our demographic data chart. We conducted the survey with 1100 farmers from 81 provinces of our country.

Chart 2 - Demographic Background of the Study

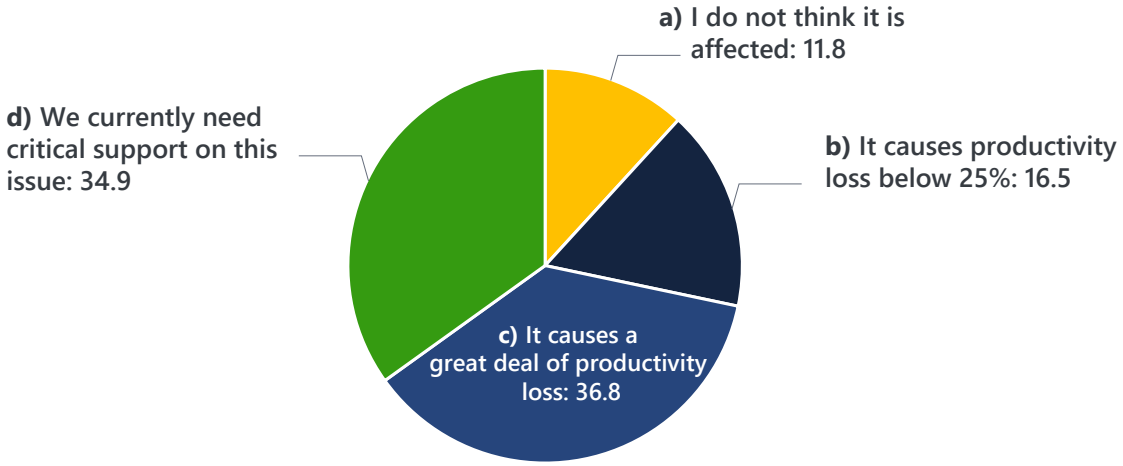


[1]As Kibele Projekt, we conducted this study at ImeceMobil's request, an in-house initiative of Softtech Ventures.

In the survey we conducted for our research, we first wanted to learn our manufacturers' opinions on drought. You can find our manufacturers' answers to our survey question regarding drought in Question-2's chart below:

Question 2

To what extent is your area affected by agricultural drought?

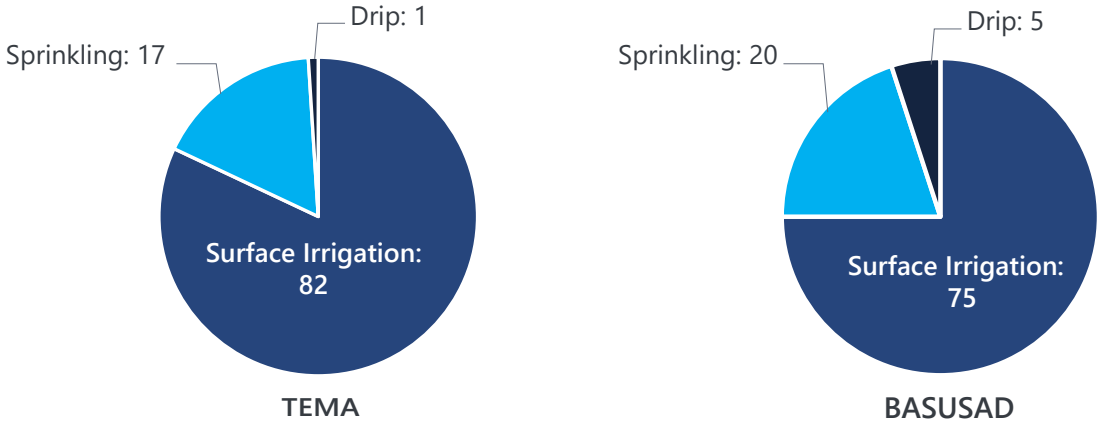


We also identified the problems below regarding agricultural water use:

1. Farmers Do Not (Can Not) Invest in Drip Irrigation

In Chart 3, you can find the irrigation systems data shared by TEMA (The Turkish Foundation for Combating Soil Erosion), known for its environmental activities. You can also see the relevant data of BASUSAD (Pressurize Irrigation Association), the association of the pressurized irrigation systems sector. There are significant differences between the two data.

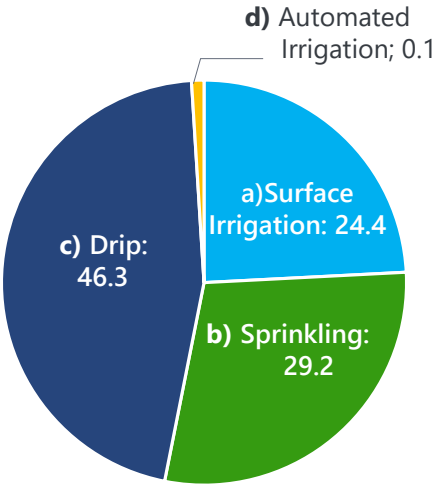
Chart 3 - Distribution of Irrigation Systems in Turkey



The use of irrigation systems declared by our manufacturers in our research can be found in the chart of Question-1 below:

Question 1

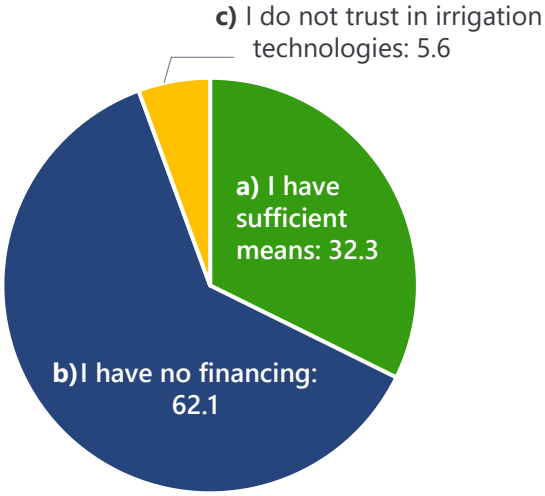
What type of irrigation method do you use?



There are significant differences between the figures we obtained in our study and the distribution chart of irrigation systems in Turkey. That is because our respondents are young farmers who adapted to agricultural technologies. That these manufacturers are the ImeceMobil users prove this. With the farmer population getting younger, we will see more investments in controlled irrigation systems instead of wild-flooding irrigation. However, varied and primarily financial reasons we obtained in our survey showed that some manufacturer groups do not plan to invest in controlled irrigation systems. Thus, in our research, we asked the reasons to those who stated that they do not use drip irrigation:

Question 3

I do not make new irrigation investments because:



As seen in the chart, 62% of the farmers participating in our research said that financial insufficiency is why they do not invest. While 5.6% stated their distrust in irrigation technologies, the remaining 32% explained they did not need such an investment. Based on the results we reached through the data we obtained, pressurized irrigation systems are still financially challenged technology to access despite the recent supports and grants given to irrigation investments. We asked the reasons for this to Bertan Balçık. He stated, "In Turkey, especially open conduit and canalette-style irrigation systems come to the fields. In these systems, there is a 40% water loss as well as pollution. Filtration costs are also added to making the necessary investments in drip irrigation systems. And this poses a problem." We also asked the same question to Okan Başaran from Netafim Turkey. He said, "Although it does not apply to large lands, this can create a serious problem for 5-6 acres of land."

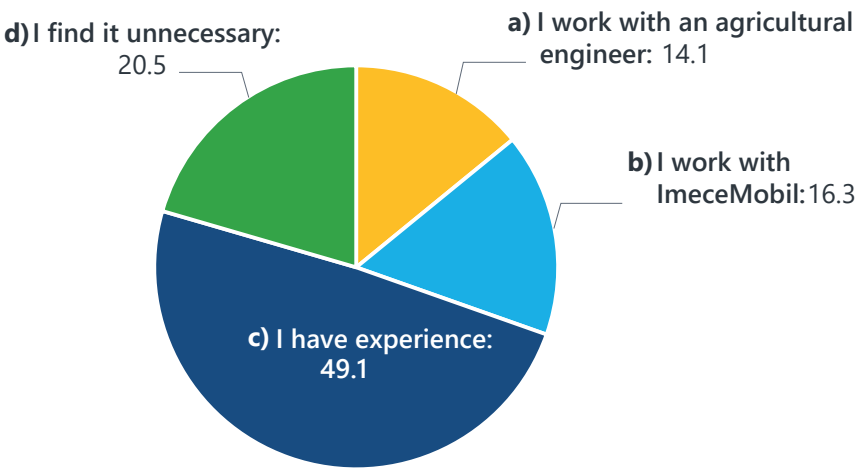
In our survey, almost 1/3 of the participant farmers stated that they do not need new investments. Following in-depth interviews, we found they have different reasons for this. Some stated they have already been using drip irrigation systems. The main reasons were the distrust in the benefits of new technologies and the practice of dryland farming. The sample we selected consists of young farmers below the average age of our country's farmer population. However, the data we obtained during our research shows young farmers' interest in pressurized irrigation systems, increasing our hopes for the future.

2. Farmers Do Not Receive Consultancy Services

Although irrigation is vital for plant health, we observed that farmers do not receive consultancy services in this respect. We asked our participants two questions on this subject to confirm the consistency of the survey responses.

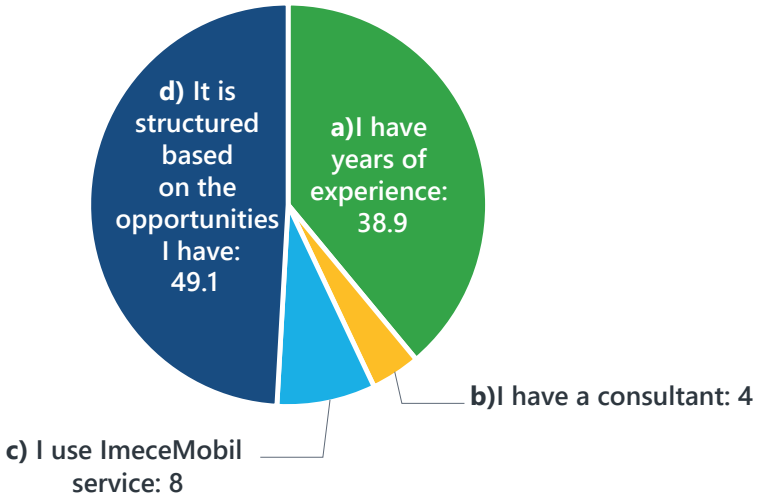
Question 4

I do not need consultancy for irrigation because:



Question 5

How do you plan your irrigation program?



The questions we asked our experts about field observations provided us some notable points. Also, the farmers we interviewed in-depth provided consistency with these results. Our findings are:

a) They may not trust agricultural engineers due to unpleasant experiences in the past. Manufacturers may no longer lean towards consultancy because of the incorrect formulas produced by some agricultural engineers in the past.

b) Although the consultant's solution is effective, the effort becomes insignificant, and the consultancy gets nowhere due to the financial literacy problems in agricultural production and the hasty manufacturers who focus on receiving direct and rapid results.

3.Partly Inadequate Government Investments

The growing irrigation investments and water transport systems in the world are being moved underground. That is because the channels made on the water surface are inefficient systems due to evaporation. We see that the classic and canalette systems are still primarily used water transport lines in Turkey.

Solution Recommendations

Regarding the problems, we also reviewed the commonly suggested solutions. The solution suggestions presented are generally as follows:

- Technological solutions regarding the amount and time of irrigation should become widespread.
- Water users' participation should be increased by applying a reasonable water tariff in irrigation,
- Enforcement of legal regulations should be ensured,
- The frequency of operation and maintenance services should be increased,
- Evaporation and other losses should be minimized by building underground lines through which water will be delivered to the field,
- The use of pressurized irrigation systems like drip irrigation should become prevalent,
- Water distribution should be planned, and irrigation should be ensured,
- The public institutions directing irrigation should be educated on modern technology,
- Irrigation systems should be expanded with grants and incentives to optimize the performance,
- Controlling the water efficiency by intently following the crops and other agricultural planning establishes the technical solutions of many resources and experts.

What is ImeceMobil?

ImeceMobil is a free mobile application that offers many features such as weather services, agricultural notifications, remote agricultural expert consultancy, essential balance calculation, campaigns, agricultural news, commodities prices, financial applications, and TÜRİB ELÜS market knowledge. Also, "Fertilization Service" and "Satellite Assisted Irrigation Service" are included under special services.

https://imecemobil.com.tr/

What is ImeceMobil Irrigation Service?

ImeceMobil Irrigation Service is a satellite-based service. It regularly transmits the irrigation amount specially calculated based on the location of the manufacturers, climatic conditions, and soil structure. With satellite support, the required irrigation amount for your products is estimated and updated regularly by making calculations based on the humidity, evaporation, and temperature in your location daily. Irrigation service offers you irrigation information from planting to harvest period, from the first frost date to the last one, along with the daily detailed irrigation calendar.

125 – With the formulas, it developed on Plant Variety, it is found that it provides;

40% – Water and Energy Conservation

25% – Yield Increase

Although it is a paid service, it reduces the cost paid by the farmer to the consultant. It also provides profit to the producer with its savings and increased efficiency.

Delivering consultancy service during the establishment of the system, Prof. Dr. Ali ÜNLÜKARA describes ImeceMobil's solution:

"We determine the farmer's location via the coordinates. Using this data, ImeceMobil obtains a value, the basic value of the plant's water consumption. We estimate the water amount the plant will need based on some values globally accepted with our algorithm. We monitor the farmer's location via the meteorological stations and update the process. For instance, if we said to the farmer that their next irrigation would be in 10 days and it rains, we regularly monitor the process and provide information by telling the farmer to irrigate after 12 days." So, with the savings and the other opportunities it provides, ImeceMobil's Irrigation Service forms a highly significant alternative, especially for producers who do not prefer or cannot receive consultancy services.

Chart 4 - Total Amount of Water Used in Agriculture

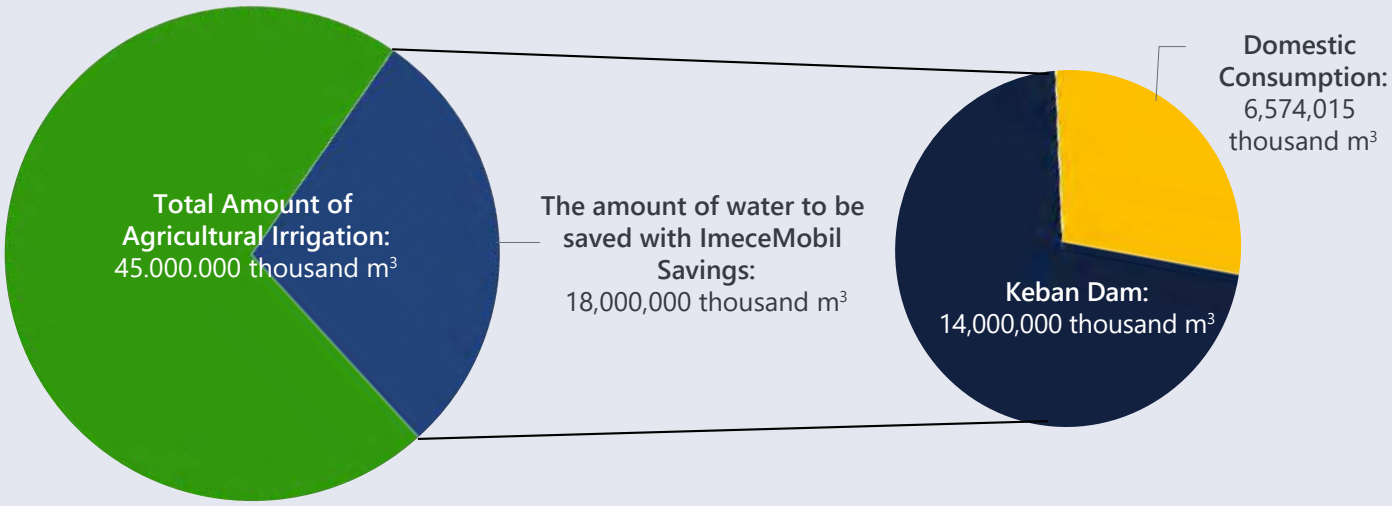


Table 3 - Annual Domestic Water Consumption in Turkey

Turkey's per capita daily water consumption:	217 lt
Turkey's total (83 million people) daily water consumption:	18,011,000 lt
Turkey's total (83 million people) annual water consumption:	6,574,015 thousand m^3

Table 4 - Keban Dam Usable Amount of Water Volume

Min. operating level water volume:	17,074,200 thousand m^3
Max. operating level water volume:	31,001,600 thousand m^3
Usable water volume: 31,001,600 - 17,074,200:	13,927,400 thousand m^3

In Chart 4, we set forth what kind of water conservation ImeceMobil will provide. During our calculation, we found that if all farmers in our country utilize this service for agricultural irrigation, approximately 18,000,000 thousand m^3 of water will be saved. This almost equals the water capacity of Keban Dam's annual operations and Turkey's domestic yearly water use.

The ultimate conclusion we reached as a result of this evaluation has shown us that although we design our solution recommendations by paying attention to people in agriculture and valuing their needs, none of them will ensure the efficient use of water at the end of the day as the individual is always the one who gives the ultimate decision. The only way to reach an eco-friendly and water-saving agricultural production is to invest in the human factor. However, public investments in agricultural irrigation, the growth of irrigation systems, and other technical innovations should not be considered insignificant. Based on our reviews, the best solution to this problem is understanding people's problems, making a whole design with people, and applying it.

KİBELE PROJEKT

Report on Water Use in Agriculture and Resource Efficiency

arastirma@kibeleprojekt.com

MASLAK MAH. TASYONCASI SK. OD
NO: 1 Y INTERIOR DOOR NO: B183 SARIYER/ ISTANBUL
T: +90 850 441 0157

Legal Note:

This report has been prepared for personal use and information purposes within the scope of the consultancy activities conducted by Kibele Projekt Danışmanlık Limited Şirketi. Taking any action based on this report is not stipulated by us. The opinions expressed are solely and exclusively our current opinions. While updating the information included in this report on a reasonable basis, expediency may not be fully achieved due to regulatory, compliance, or other reasons. This report is based on publicly available information. No inaccurate or incomplete statements have been given. In case you have any questions herein, you can submit them to **arastirma@kibeleprojekt.com.**

KİBELE PROJEKT

Report on Water Use in Agriculture and Resource Efficiency

arastirma@kibeleprojekt.com

MASLAK MAH. TASYONCASI SK. OD
NO: 1 Y INTERIOR DOOR NO: B183 SARIYER/ ISTANBUL
T: +90 850 441 0157

KİBELE PROJEKT İmeceMobil softtech ventures