

A Case Study on Recent Development in Irrigation Drainage Management in Turkey

IRRIGATION FACILITIES SPATIAL INFORMATION SYSTEM

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24th International Congress on Irrigation and Drainage & 73rd IEC Meeting
3-10 October 2022, Adelaide, Australia



ICID-GHD

RECENT DEVELOPMENT IN IDM IN TURKEY

- ▣ Monitoring & evaluation of irrigation projects in technical, social, economic and environmental aspects is one of the most important factors for the success.
- ▣ Establishing an effective monitoring and evaluation system during the operation phase is important in measuring the expected benefit from irrigation projects.
- ▣ Performance results of irrigation facilities operated and transferred by DSI are published every year by collecting data from the each organisation taken the responsibility of the irrigation facility.
- ▣ A new comprehensive software has been developed to make these studies easier.

IRRIGATION FACILITIES SPATIAL INFORMATION SYSTEM

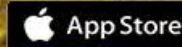
A digital platform **to monitor, evaluate and report the O&M activities of irrigation facilities** serves gross 4,6 Mha operated by DSİ and transferred to WUOs.

<http://sutem.dsi.gov.tr>

SUTEM is a kind of management information system that provides the basis for the decision support system.



The screenshot shows the SUTEM login interface. At the top, there is the SUTEM logo and the text "Sulama Tesisleri Mekansal Bilgi Sistemi". Below this, there are input fields for "Aktif Dönem" (set to 2018), "TC / Kullanıcı Adı" (set to sutem), and "Şifre" (masked with dots). There are two buttons: "Yeni Kullanıcı" (New User) and "Giriş Yap" (Login). Below the login fields, there are checkboxes for "Beni Hatırla" (Remember Me) and "Şifremi Unuttum" (Forgot My Password). At the bottom, there is a section titled "SUTEM ÇAĞRI MASASI" (SUTEM Call Center) with contact information: E-Posta: sutemdestek@dsi.gov.tr, Telefon: +90 (312) 454 47 90 - 91, and Çalışma Saatleri: P.tesi - C.tesi (08:30 - 17:30).



BEFORE SUTEM



- ▣ Needs of multiple software,
- ▣ Loss of time and labor,
- ▣ Control and audit problems,
- ▣ Data security vulnerability,
- ▣ Failure to create standard data structure

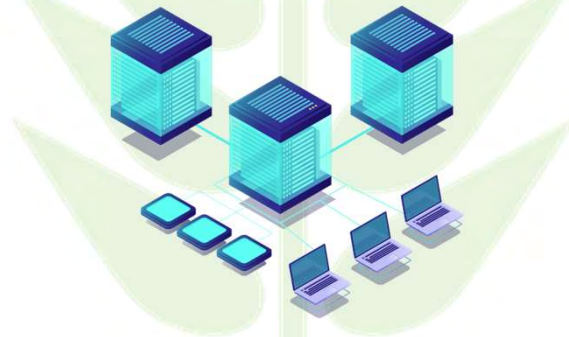
for DSI and WUOs.

TARGETS

- Meeting the requirements through a single application



- Centralized data security



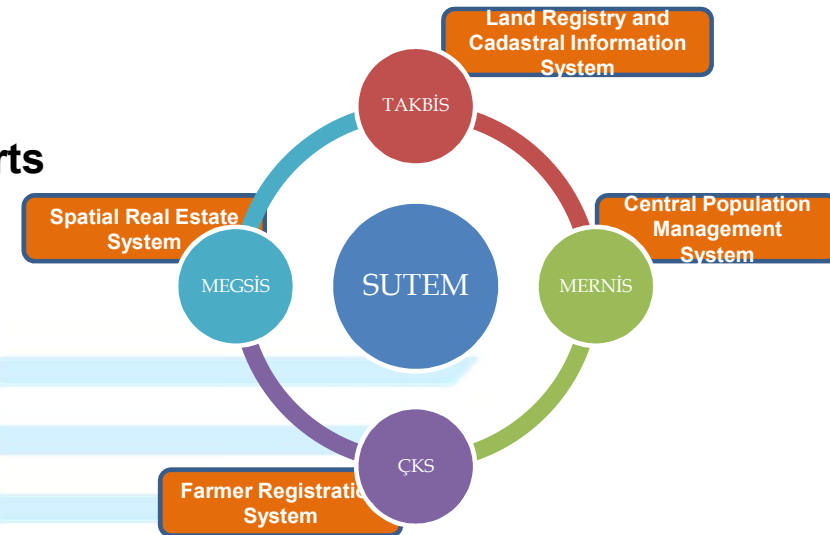
- Standardization in reports



- Saving time and labor



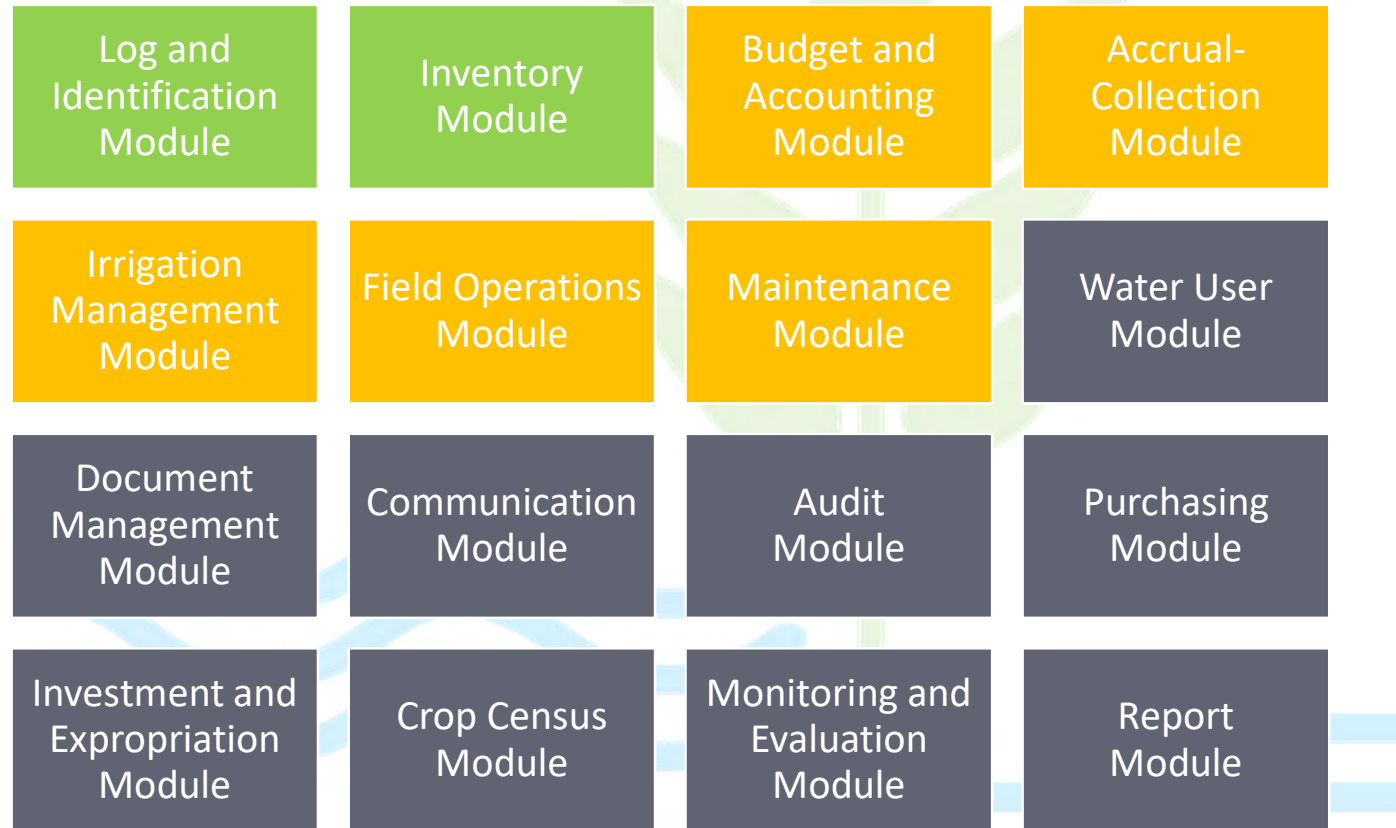
- Effective use of external services



- Ease of control and inspection



DESIGN AND INTEGRATION



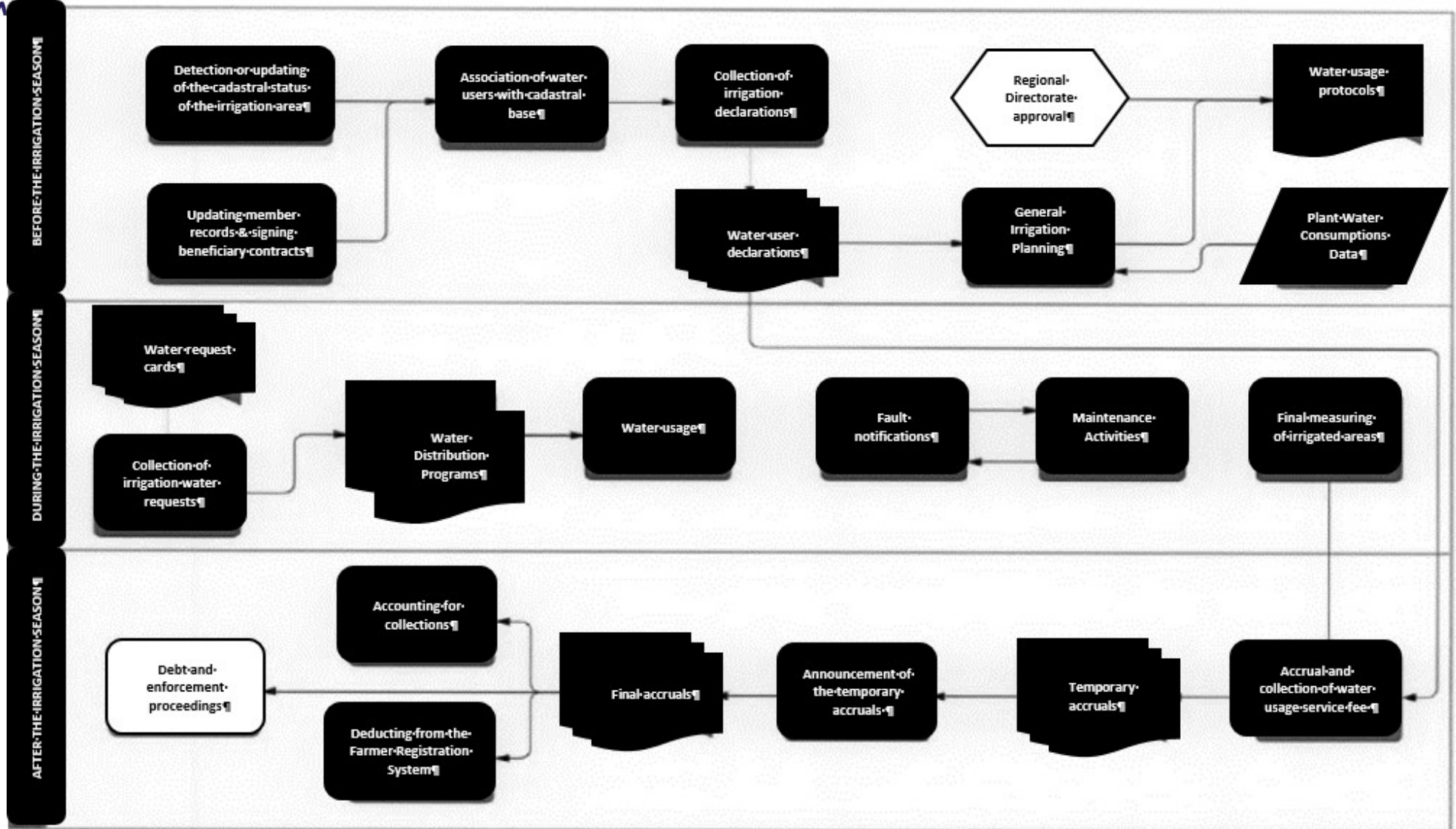
MULTI-USER MANAGEMENT

A person has one or more roles.

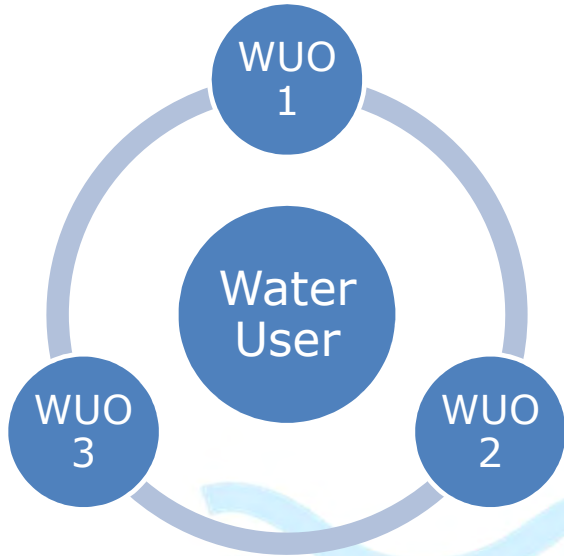
1. Administration user
 - 1.1. Headquarters User
 - 1.2. Regional directorate user
2. WUO user
3. Water user



FLOW CHART



CENTRALIZATION OF WATER USER DATA



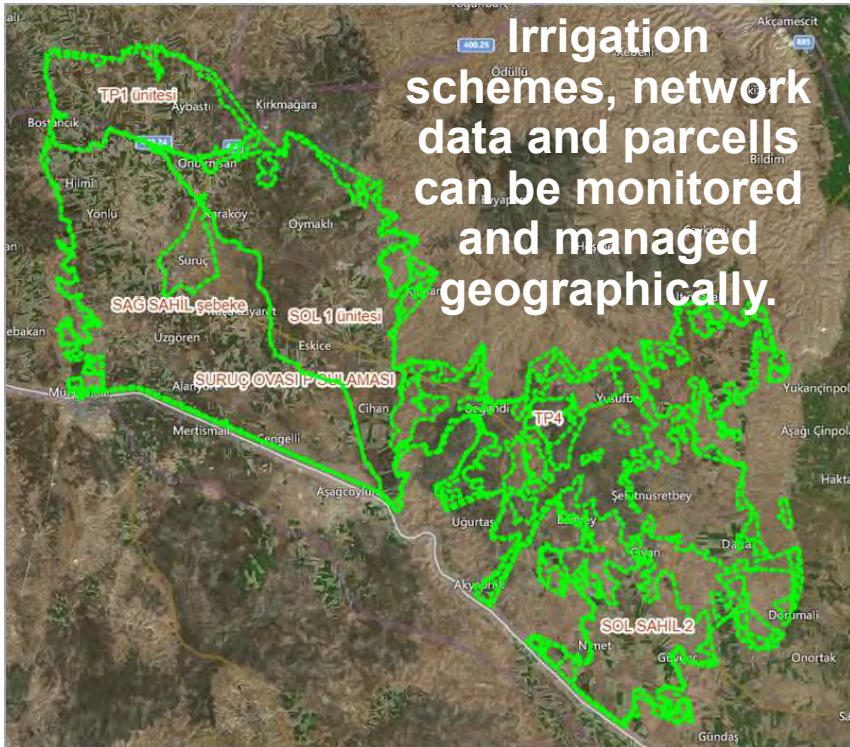
The screenshot shows the SUTEM web interface with the following data table:

İl	İlçe	Mahalle/Köy	Ada	Parsel	Alt Bölüm	İşleten	Durum	Alan (da)	
ESKİŞEHİR	ALPU	BAHÇECİK		4559		ESKİŞEHİR SULAMA BİRLİĞİ	Malik	14,21	İşleten
ESKİŞEHİR	ALPU	BAHÇECİK		4144		ESKİŞEHİR SULAMA BİRLİĞİ	İcar	11,30	İşleten
ESKİŞEHİR	TEPEBAŞI	CUMHURİYET	136	4		ESKİŞEHİR SULAMA BİRLİĞİ	İcar	4,79	İşleten
ESKİŞEHİR	TEPEBAŞI	KIZILCAÖREN	171	B		ESKİŞEHİR SULAMA BİRLİĞİ	Malik	27,73	İşleten

Buttons: AnaSayfaya Dön

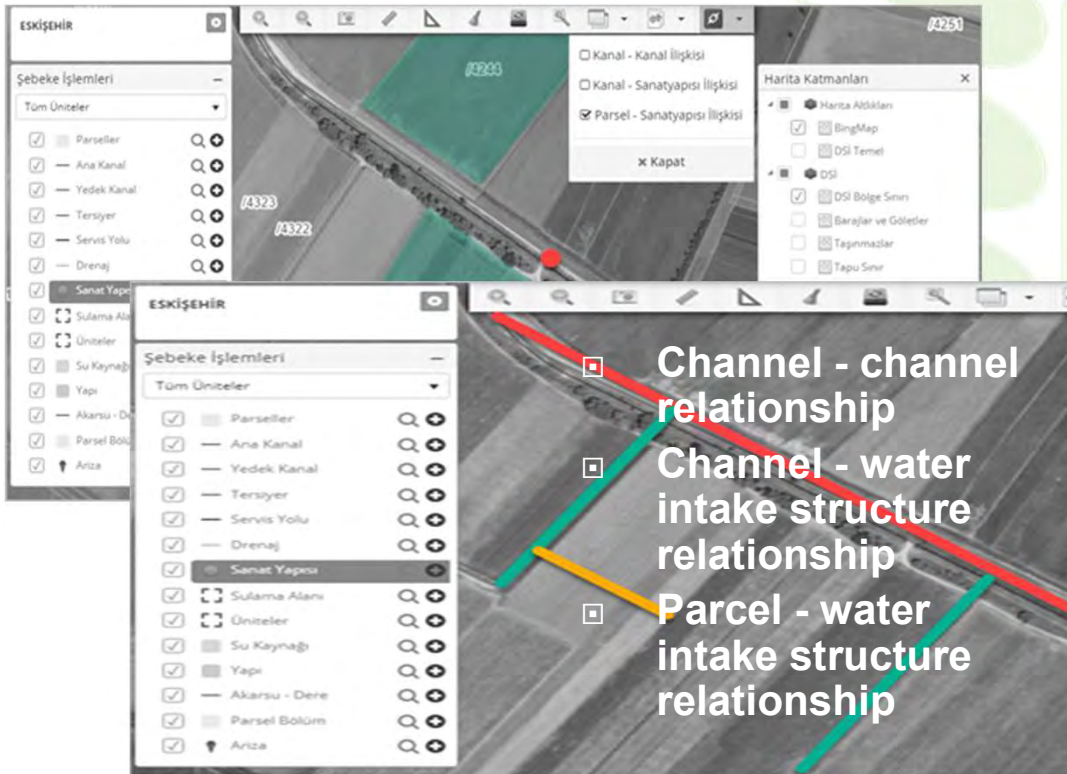
- ❑ Water user may also be a member of more than one WUO
- ❑ Can monitor all irrigation areas from a single interface
- ❑ Can give their irrigation declarations,
- ❑ Can follow their measurement of irrigated area after the irrigation season

SPATIAL MANAGEMENT WITH SUTEM

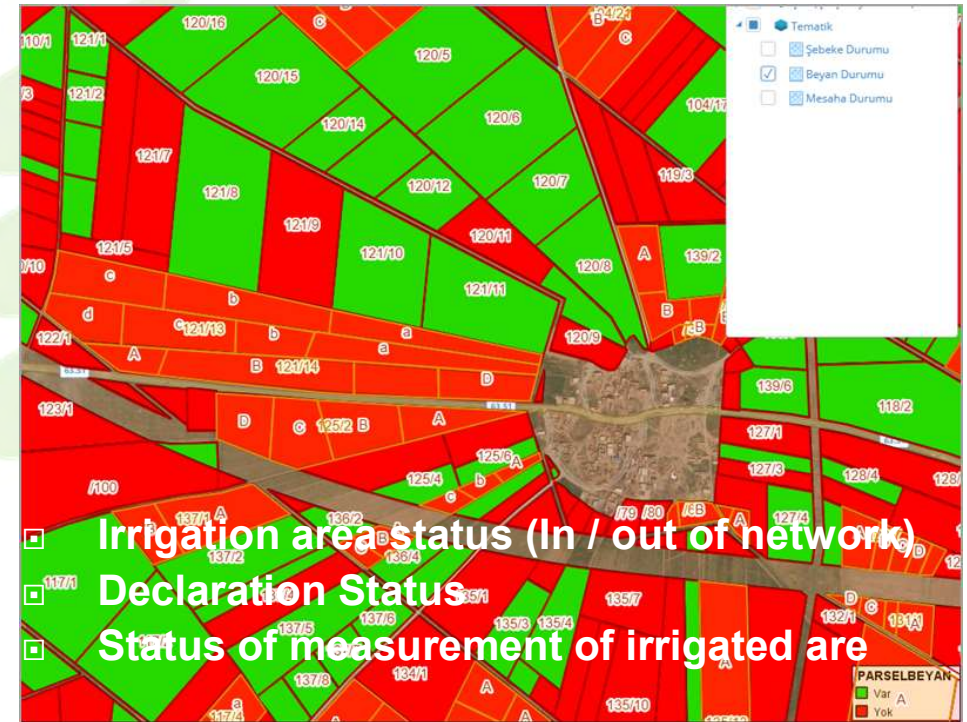


SPATIAL MANAGEMENT WITH SUTEM

- Relationships between irrigation network data can be defined geographically



- Channel - channel relationship
- Channel - water intake structure relationship
- Parcel - water intake structure relationship



- Irrigation area status (In / out of network)
- Declaration Status
- Status of measurement of irrigated are

- Geographical information can be made on the parcels with thematic maps.

SULAMA BEYANNAMELERİ

Filtre PDF EXCEL

Sulama	Dönem	Su Kullanıcısı	İl	İlçe	Mahalle/Koy	Mevki	Ada	Parsel	Alt Bölüm	Bitki Türü	Ürün Dönemi	Sulama Yöntemi	Ekilecek Bitki Alanı (da)	Priz/Hidrant No
SURUÇ OVASI P SULAMASI	2018	Mehmet BEŞALTI	ŞANLIURFA	MERKEZ	GEÇİT	ÇEMBE						Yağmurlama		
SURUÇ OVASI P SULAMASI	2018	Hakkı BEŞALTI	ŞANLIURFA	MERKEZ	GEÇİT	ÇEMBE								
SURUÇ OVASI P SULAMASI	2018	Abdulkadir AĞIŞ	ŞANLIURFA	SURUÇ	GÖLEN	ŞEHİTLİ								
SURUÇ OVASI P SULAMASI	2018	Abdulkadir AĞIŞ	ŞANLIURFA	SURUÇ	GÖLEN	ŞEHİTLİ								
SURUÇ OVASI P SULAMASI	2018	Abdulkadir AĞIŞ	ŞANLIURFA	SURUÇ	GÖLEN	ŞEHİTLİ								
SURUÇ OVASI P SULAMASI	2018	Abdulkadir AĞIŞ	ŞANLIURFA	SURUÇ	GÖLEN	ŞEHİTLİ								
SURUÇ OVASI P SULAMASI	2018	Abdulkadir AĞIŞ	ŞANLIURFA	SURUÇ	GÖLEN	ŞEHİTLİ								
SURUÇ OVASI P SULAMASI	2018	Sabri BİLGİN	ŞANLIURFA	SURUÇ	GÖLEN	ŞEHİTLİ								
SURUÇ OVASI P SULAMASI	2018	Sabri BİLGİN	ŞANLIURFA	SURUÇ	GÖLEN	ŞEHİTLİ								

Bitki Türü	Ekim Alanı(he)	Ekim Oranı(%)	OCAK	ŞUBAT	MART	NISAN	MAYIS	HAZİRAN	TEMMUZ	AĞUSTOS	EYLÜL	Ekim	KASIM	ARALIK	TOPLAM
Arpa	2,00	0,01	10,00	10,00	10,00	10,00	10,00	10,00	10,00	10,00	10,00	10,00	10,00	10,00	10,00
Bak	7,00	0,03	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
Biber	26,00	0,14													
Buğday	140,00	0,87													
Bulgur	9,00	0,06													
Hububat	1.740,00	11,27	11,00	12,00	13,00	14,00	15,00	16,00	17,00	12,00	8,00	20,00	12,00	20,00	194,00
Mayıs	27,00	0,16	1,24	1,35	1,47	1,58	1,69	1,80	1,94	1,35	3,81	2,50	1,25	2,50	21,86
Yaprak	280,00	1,82	10,00	12,00	13,00	14,00	15,00	16,00	17,00	18,00	12,00	22,00	22,00	22,00	177,00
Yulaf	2,00	0,01	0,23	0,26	0,30	0,33	0,37	0,41	0,45	0,28	0,51	0,51	0,51	0,51	4,19
Yulaf	4,00	0,03													
Yaprak	12.911,00	79,97	23,00	40,00	12,00	30,00	12,00	20,00	20,00	20,00	65,00	22,00	11,00	20,00	310,00
Yaprak	1,00	0,01	18,32	17,87	9,36	23,80	9,36	15,93	16,32	19,92	51,79	25,49	6,76	18,92	203,34
Yaprak	0,00	0,00													
Yaprak	11,00	0,07	10,00	12,00	13,00	14,00	15,00	16,00	17,00	18,00	21,00	20,00	20,00	10,00	203,00
Yaprak	88,00	0,57	0,82	0,91	0,91	0,91	0,91	0,91	0,91	0,91	0,91	0,91	0,91	0,91	6,48
Yaprak	0,00	0,00	10,00	10,00	10,00	10,00	10,00	10,00	10,00	10,00	10,00	10,00	10,00	10,00	270,00
Yaprak	88,00	0,57	0,49	0,56	0,56	0,56	0,56	0,56	0,56	0,56	0,56	0,56	0,56	0,56	4,24
Yaprak	1,00	0,01	10,00	10,00	10,00	10,00	10,00	10,00	10,00	10,00	10,00	10,00	10,00	10,00	280,00
Yaprak	4,00	0,03	4,42	5,31	2,61	3,72	2,72	4,15	4,59	4,83	12,25	6,27	2,39	5,04	62,48
Yaprak	1,00	0,01	0,06	0,06	0,06	0,06	0,06	0,06	0,06	0,06	0,06	0,06	0,06	0,06	0,48
Yaprak	0,00	0,00													

- Irrigation declarations can be given by Water User or WUOs in the system
- Irrigation declarations deadlines can be defined on the system
- According to the declarations «General Irrigation Planning» is created by the system in order to define irrigation water needs of the irrigation area
- Water usage protocols can be prepared via the system

MEASUREMENTS OF IRRIGATED AREA & DETECTION OF PLANT PATTERN



Saha Operasyonları

Seçiniz: Beyan



MESHAH İŞLEMLERİ

+ Yeni Kayıt

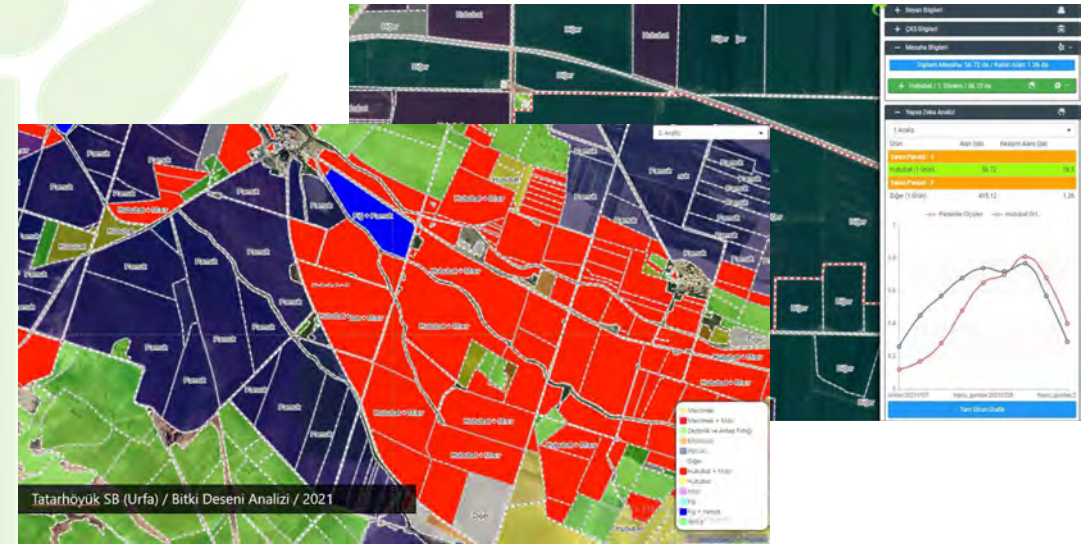
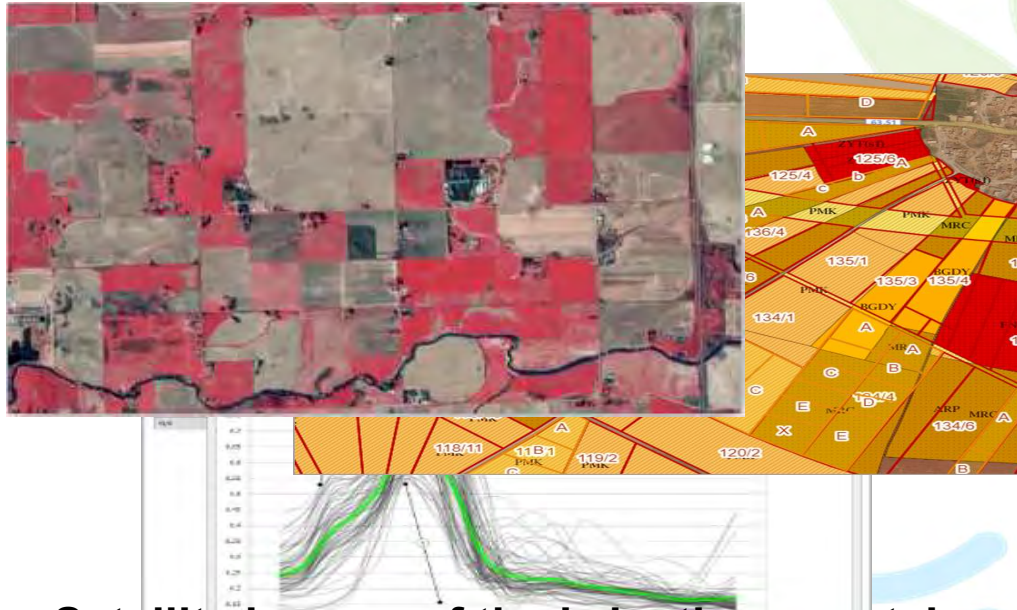
T. Filtre PDF EXCEL

Su Kullanıcısı	İl	İlçe	Mahalle/Köy	Mevki	Ada/Parsel	Alt Bölüm	Bitki Türü	Şebeke Türü	Prog/Hidrant No	İşlemler
Abdulkadir AĞIŞ	ŞANLIURFA	SURUÇ	GÖLEN	ŞEHİTLİK	1107		Pamuk	Şebeke İçi		
Sabri BİLGİN	ŞANLIURFA	SURUÇ	GÖLEN	ŞEHİTLİK	1363		Pamuk	Şebeke İçi		
Sabri BİLGİN	ŞANLIURFA	SURUÇ	GÖLEN	ŞEHİTLİK	1151		Zeytin	Şebeke İçi		
Sabri BİLGİN	ŞANLIURFA	SURUÇ	GÖLEN		1365		Pamuk	Şebeke İçi		
Sabri BİLGİN	ŞANLIURFA	SURUÇ	GÖLEN		1365		Zeytin	Şebeke İçi		
Sabri BİLGİN	ŞANLIURFA	SURUÇ	GÖLEN	ŞEHİTLİK	13		Zeytin	Şebeke İçi		
Sabri BİLGİN	ŞANLIURFA	SURUÇ	GÖLEN	ŞEHİTLİK	136		Zeytin	Şebeke İçi		
Sabri BİLGİN	ŞANLIURFA	SURUÇ	GÖLEN	ŞEHİTLİK	147		Zeytin	Şebeke İçi		
Yusuf AKSOY	ŞANLIURFA	SURUÇ	AŞAĞI KARINÇALI	KIRMIZIÇAY	1690		Pamuk	Şebeke İçi		
Yusuf AKSOY	ŞANLIURFA	SURUÇ	AŞAĞI KARINÇALI	KIRMIZIÇAY	1696		Pamuk	Şebeke İçi		
Mehmet ÖZDEMİR	ŞANLIURFA	SURUÇ	AŞAĞI KARINÇALI	ÇALI	1545	*	Hububat	Şebeke İçi		
Aysel AKSOY	ŞANLIURFA	SURUÇ	AŞAĞI KARINÇALI	KIRMIZIÇAY	1642		Pamuk	Şebeke İçi		
Aysel AKSOY	ŞANLIURFA	SURUÇ	AŞAĞI KARINÇALI	KIRMIZIÇAY	1643		Pamuk	Şebeke İçi		
Kadir ÖZTÜRK	ŞANLIURFA	SURUÇ	AŞAĞI KARINÇALI	KIRMIZIÇAY	1641		Pamuk	Şebeke İçi		

BEYAN VAR
BEYAN YOK

- ☐ Measurements of irrigated area are carried out in the field by means of tablets only to make water distribution technicians go to the irrigated parcels.
- ☐ Mobile devices work offline in the field
- ☐ Photo can be integrated in the field
- ☐ Measurement operations performed in the field can be viewed on the system.

DETECTION OF PLANT PATTERN BY SATELLITE IMAGES



- Satellite images of the irrigation area taken on different dates throughout the year are obtained.
- The declaration information in SUTEM is entered into artificial intelligence and this information becomes learning data.

- As a result of a series of analyzes using artificial intelligence, the plant pattern of each parcel is determined in the irrigation area.

GEÇİCİ TAHAKKUK İŞLEMLERİ

Yıl	T.C. / Vergi No.	Gerçek Kipi	Tuzel Kipi	Bölge Türü	Bk. Tutarı (₺)	Ceza (₺)	İndirim (₺)	Son Tutar (₺)	Son Ödeme Tarihi	İşlem
2018	50098591628	Nutret Ozgorsas		Nispetiye	0,00	0,00	0,00	0,00	31/12/2018	
2018	43000993112	Mehmet Uslu		Hüyüktepe	37,44	6,74	0,00	44,18	31/12/2018	
2018	88152116690	Fatih Kuyucu		Pamuk	92,92	9,28		102,20	31/12/2018	
2018	8483297134	Abdülmuhsin Akman		Pamuk	230,30	23,03	92,12	115,15	31/12/2018	
2018	35402248378	Fatih Ege		Hüyüktepe	168,00	16,80	0,00	184,80	31/12/2018	
2018	14162953636	Mehmet Kuyucu		Pamuk	277,34	27,73	55,47	248,60	31/12/2018	
2018	18713804204	Bosun Bilgin		Bosancik	255,00	25,50	0,00	280,50	31/12/2018	
2018	56773515720	Mehmet Fahri Tunç		Hüyüktepe	948,48	94,85	0,00	1043,33	31/12/2018	
2018	29380449992	Mehmet Sarıgül		Zeytinlik Arapçay	475,80	0,00	0,00	475,80	31/12/2018	
2018	12790002426	Reşit Aslan		Pamuk	896,70	89,67	58,89	858,14	31/12/2018	
2018	61021364428	Özcan Arslan		Hüyüktepe	209,97	20,99		230,96	31/12/2018	

- Accrual and collection transactions realized as a result of the measurement are accounted through the Accounting System

ANA BÜTÇE İŞLEMLERİ

Devralan Kuruluş	Yıl	Gelir Bütçesi Kanunı Dayanak	Gider Bütçesi Kanunı Dayanak	İşlem
DEMİRTAŞ SULAMA BİRLİĞİ	2019	6172	6172	
AKBUK SULAMA BİRLİĞİ	2019	6172	6172	
AKÇAY SOL SAHİL SULAMA BİRLİĞİ	2019	6172 sayılı kanun	6172 sayılı kanun	

- WUAs' Budgets are prepared according to the «Budget Accounting Guide».
- Budgets can be sent to the Regional Directorates via «SUTEM» for approval.
- The ratio of budget items to budget is controlled at the approval submission stage, users are warned in case of contradiction and budgets cannot be sent for approval.
- Regional Directorates can return the budget on a pen basis or in full.
- Water User Associations whose budget is not approved cannot carry out any accounting transactions on SUTEM.

MAINTENANCE

TESİS MUAYENE DURUMU

Filtre PDF EXCEL

Bölge	Tesis Ad	Dönem	Durum
3. Bölge Müdürlüğü	AFŞAR	2018	Yok
3. Bölge Müdürlüğü	AHİLER	2018	Yok

ÜRETİM SONUÇLARI VERİ GİRİŞİ

Dönem: 2018
Muayene: ORTAK TESİSLERİ 2018 YILI MUAYENE RAPORU
Çetvel: Çetvel 3 (Kanalet ve Borulu Sistemlerde Onarım)

+ Yeni Kalem Ekle PDF EXCEL

Onarım Yapılacak Yer	Ünvan	Çetvel	Çetvel Adı	Çetvel Birim	Çetvel Birim Adı	Çetvel Birim Adı	Çetvel Birim Adı	Çetvel Birim Adı	Durum	Sil
DSİ'ce Yapılacak İşler	DSİ									
Yedek Kanal									Düzenle	Sil
Tersiyer Kanal									Düzenle	Sil
Tersiyer Kanal									Düzenle	Sil
Tersiyer Kanal									Düzenle	Sil
Tersiyer Kanal									Düzenle	Sil
Toplam: 285,00										

Periodical inspection of the structures can be monitored through the system

Records of programmed and actual work items are entered through the system

Production results reports can also be received through the system

- WUOs can provide information to water users by using e-mail or short message services by the communication infrastructure.

MESAJ GÖNDER

Bildirim Tipi : Elektronik Posta ve Kısa Mesaj

Gönderilecek Grup : Su kullanıcıları

Gönderilecek Kişi(ler) : Kişi Seçiniz...

Elektronik Posta Kısa Mesaj

Mesaj :

Karakter: 0/160

Sayı : 2018/32 İçerik :
Konu : Bütçe 2019 Yılına ait bütçe Sitem üzerinden hazırlanıp onayınıza sunulduğu hususunda durumu bilgilerinize, gereğini takdirlerinize arz ederiz.
Evrak Tarihi : 22.11.2018 12:12
Kime : Dsi/5. Bölge Müdürlüğü
Açıklama :

T.C.
ORMAN VE SU İŞLERİ BAKANLIĞI
Devlet Su İşleri Genel Müdürlüğü ESKİŞEHİR SULAMA BİRLİĞİ

Sayı : 2018/32 22.11.2018
Konu : Bütçe

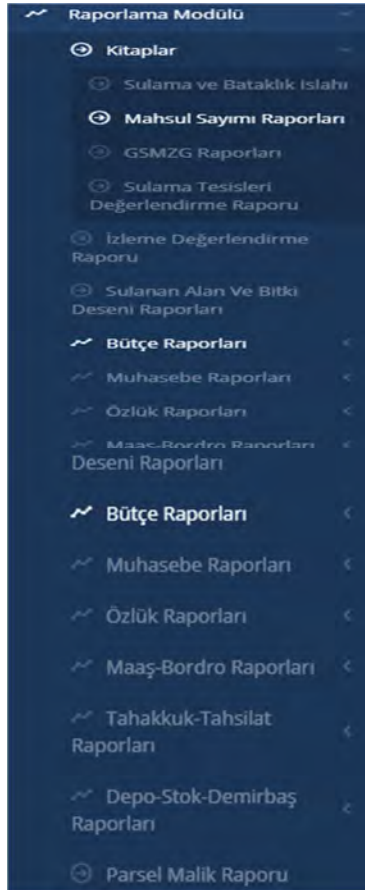
Dsi 5. Bölge Müdürlüğü

2019 Yılına ait bütçe Sitem üzerinden hazırlanıp onayınıza sunulduğu hususunda durumu bilgilerinize, gereğini takdirlerinize arz ederiz.

ESKİŞEHİR SULAMA BİRLİĞİ BAŞKANI

- WUOs can prepare, archive and make correspondence between documents with this system in electronic environment.

STRONG REPORTING FOR O&M DEPT



The books published annually will be prepared by the system.

- Budget Reports,
- Irrigation Area and Plant Pattern Reports,
- Accounting, Personal, Accrual Collections and so on.

DEVELOPMENT NEED OF SUTEM

- ❑ WUA legislation amendment while the software process was going on, necessitated changes in the software that were not foreseen in the ToR.
- ❑ **"SUTEM Software Development and Data Analysis"** under the second component of the **Turkey Irrigation Modernization Project (TIMP)**, carried with the World Bank finance, was tendered in order to meet those needs.
- ❑ The contract was signed with NODA Informatics Ltd. on 14.07.2021. The duration of the work is 730 days in total.
- ❑ SUTEM Program Implementation Training will be done after the progress in the software.
- ❑ **After this process SUTEM will be used functionally and widely.**

Thank you ...

aseren@dsi.gov.tr



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3-10 October 2022, Adelaide, Australia



ICID-CIB