

# Introducing kiwifruit water footprint into a traceability IT system

Penelope Baltzoi<sup>1</sup>, Konstantina Fotia<sup>1</sup>, Dimitris Salmas<sup>2</sup>, George Pachoulas<sup>2</sup>, Charalampos Karipidis<sup>1</sup>, Yannis L. Tsirogiannis<sup>1</sup> and Chrysostomos Stylios<sup>2,3</sup>

1 University of Ioannina, Department of Agriculture, University Campus of Arta, Arta, GR47100, Greece

2 University of Ioannina, Department of Informatics and Telecommunications, University Campus of Arta, Arta, GR47100, Greece

3 Industrial Systems Institute, Athena R.C. Platani, Patras, GR26504, Greece



<https://www.kiwiaware.eu/>

This research work is funded by the Operational Programme “Epirus” 2014-2020, under the project “Modern kiwi quality assessment system, traceability of kiwi product and intelligent supply chain management based on advanced IT applications ICT-Foodaware”, Co-financed by the European Regional Development Fund (ERDF) and national funds.



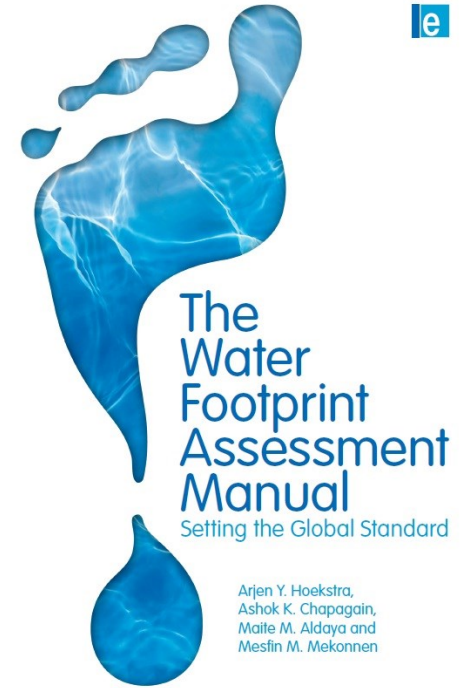
# Framework

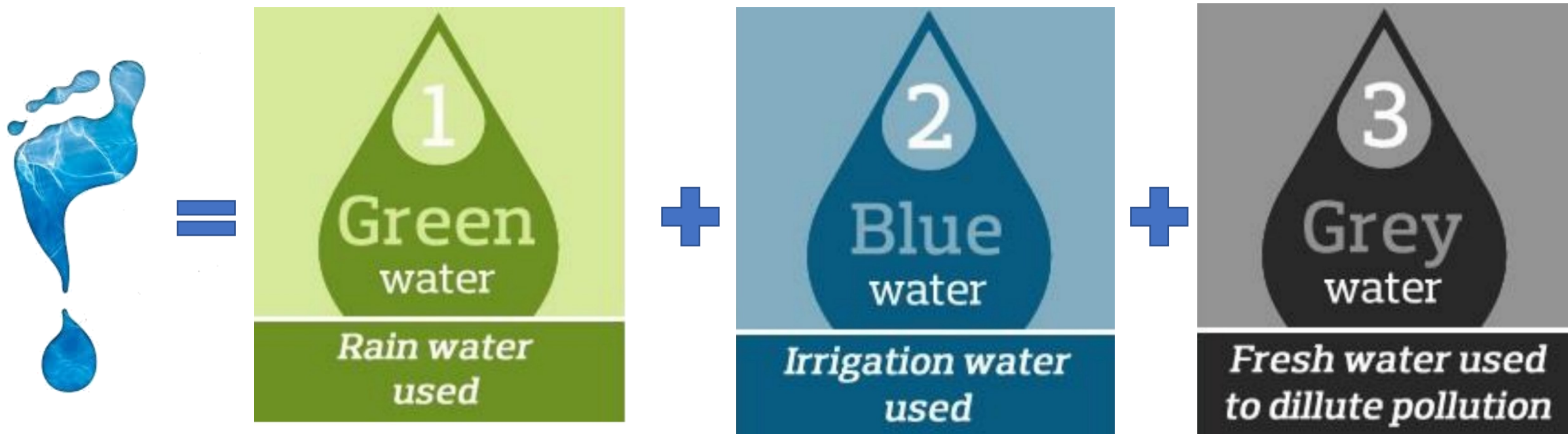
- **Water scarcity** is a major global risk
- **Agriculture** is the most significant water user in many countries
- Greek **kiwifruit** production is constantly growing, especially during the last decade.
  - *The **plain of Arta** is among the hotspots regarding kiwifruit culture in Greece.*
  - *The **irrigation water requirements** of the crop in that area are high, while **fertilisers** are usually provided to the crop via fertigation methods.*



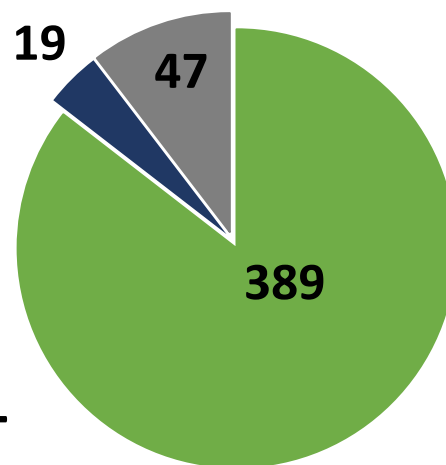
# Framework

- **Water Footprint (WF)** is an index that accounts for the amount of water used along a part or the full supply chain of a product
- WF could **connect water and cultivation inputs management of kiwifruit cultivation in a single index**
- An innovative **web application**, which includes **calculation of cultivation WF**, was developed and tested for the case of kiwifruit cultivation in the plain of Arta





**455 L kg<sup>-1</sup>**



**New Zealand**



home / the network / partners

## Partners

	Barilla	Italy
	Cetaqua	Spain
	Denkstatt	Austria
	EAWAG	Switzerland
	Ecoterrae	Spain
	EPAL – Empresa Portuguesa de Aguas Livres	Portugal
	FutureCamp Climate GmbH	Germany
	GRACE Communications Foundation	USA
	Join For Water	Belgium
	Sea Our Beauty Pty Ltd	Australia
	Smurfit Kappa Group	Ireland
	Soil&More	Netherlands
	Soil and Earth Sciences Group	New Zealand
	University of the Free State	South Africa
	Concha y Toro	Chile
	Yasin Knittex Ltd	Bangladesh

share this article: [Facebook](#) [Twitter](#) [Mail](#)






V.I.V.A. SUSTAINABLE WINE

TERRITORIO ARIA VIGNETO ACQUA


MINISTERO DELL'AMBIENTE E DELLA TUTELA DEL TERRITORIO E DEL MARE

www.viticulturasostenibile.org






barillagroup.com/en/good-planet




GOOD FOR THE PLANET




9,000

Almost 9,000 companies involved in sustainable agriculture projects




-30%

We have reduced greenhouse gas emissions by 30% per tonne of finished product, since 2010



-21%

We have reduced water consumption by 21% per tonne of finished product, since 2010



Responsible supply chains

# Description and main features of the application

- The web application is designed to handle data regarding the full range of cultivation practices of kiwifruit (pruning, irrigation, fertigation, plant protection, harvest etc.), along with data from soil analysis, weather conditions, fruit quality analysis and yield
- **The cultivation WF is calculated taking into account the green, blue and grey components of the index**
- The application provides to farmers, agriculturalists, processors, traders, consumers etc., traceability information regarding kiwifruit cropping practices as well as information regarding the WF of the fruits

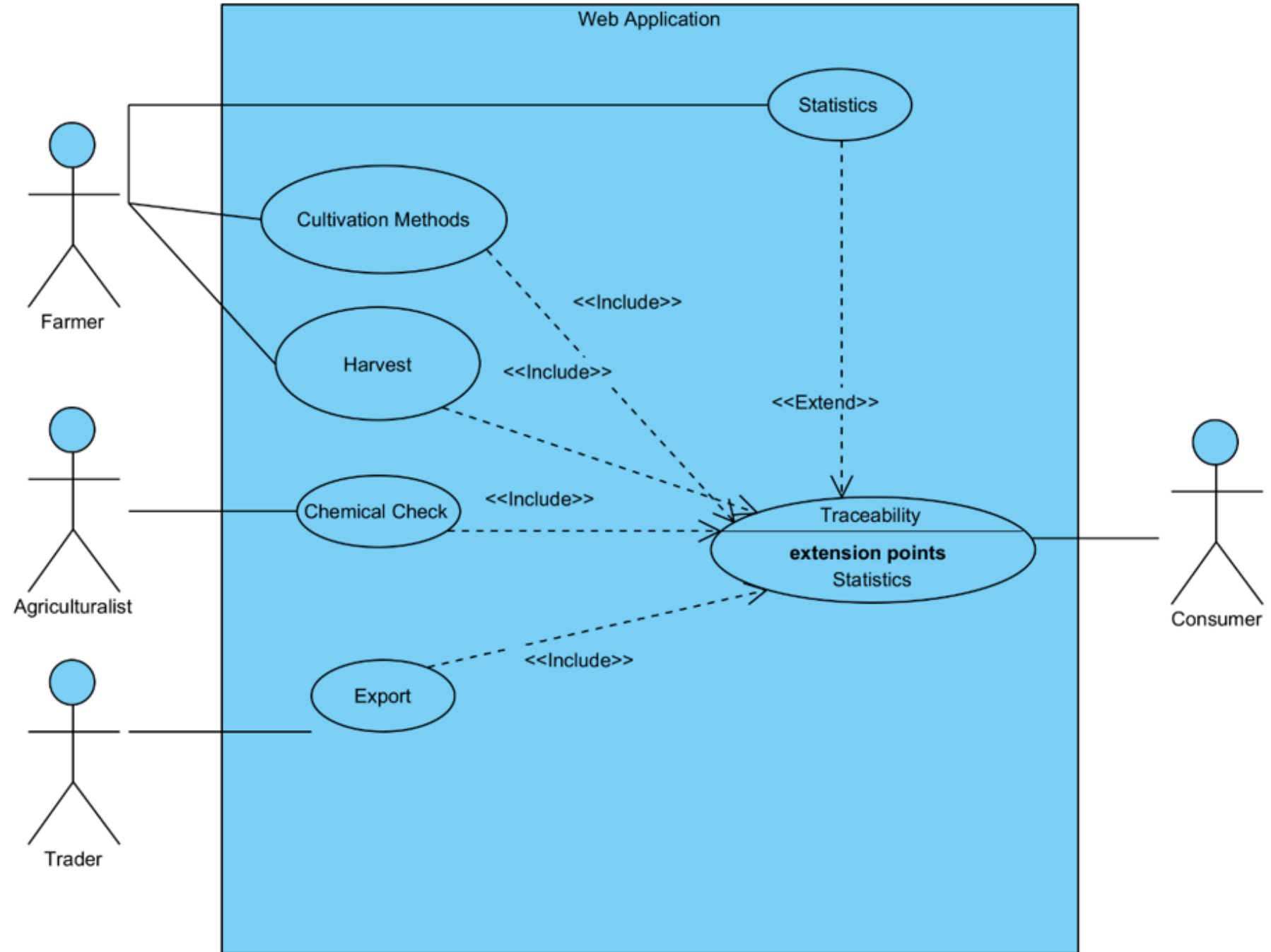
# Description and main features of the application

The application is consisted by two main components:

1. the data gathering part used for the traceability of kiwi and
2. the data mining used for generating various statistics regarding the kiwifruit and the farms

# Description and main features of the application

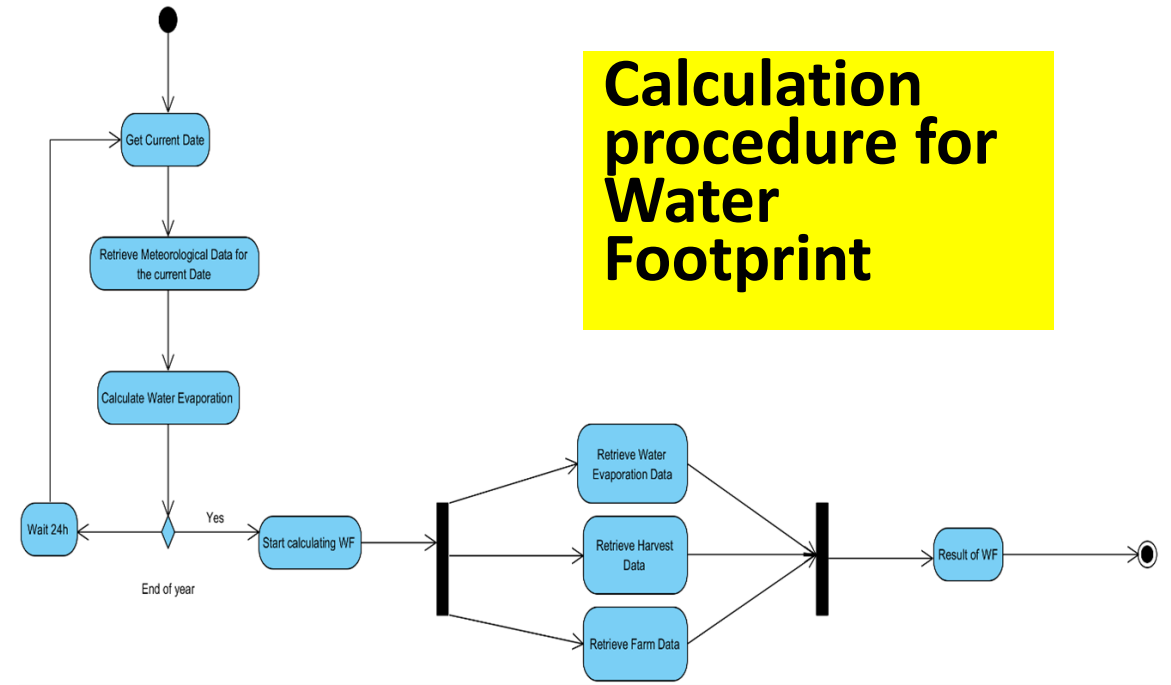
**Data gathering  
and  
dissemination  
flow chart**



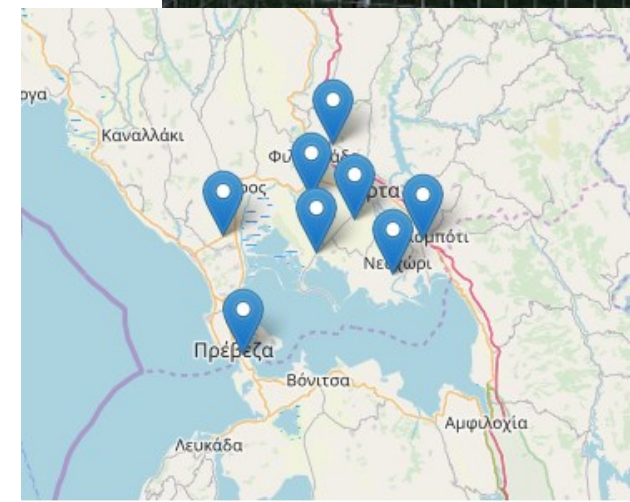


- **On a daily basis, calculates and stores the crop evapotranspiration (ET<sub>c</sub>) and effective rain** to the database by using data from local agro-meteorological stations
- **Cultivation inputs and yield data are entered by the user**
- At the end of the year, the system **calculates the green, blue and grey components of the WF** according to the methodology proposed by WFN

Description  
and main  
features of  
the  
application



# Description and main features of the application



**Calculation  
procedure for  
Water  
Footprint**



Blue Crop Water Use  
( $CWU_{blue}$ )

min

Crop water need, Efficient  
irrigation



Yield



Green Crop Water Use  
( $CWU_{green}$ )

min

Crop water need,  
Efficient rainfall



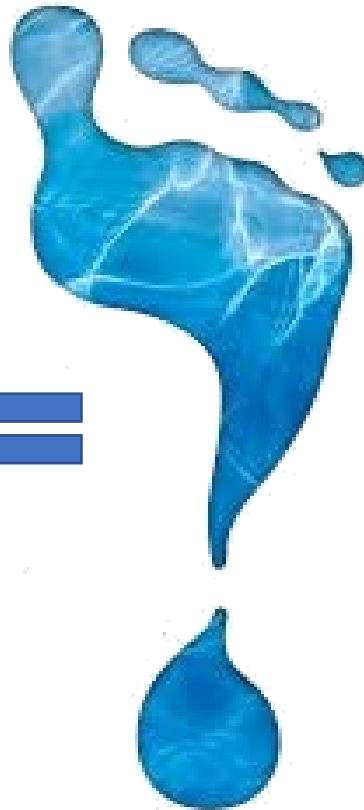
Yield



Volume of fertilisers and  
plant protection inputs



Yield



# Results regarding kiwifruit Water Footprint

During the test period of the application, it was found that the average cultivation WF of kiwifruit in orchards supervised by Kolios Fruit S.A. in the Arta plain is equal to  $335,47 \text{ m}^3 \text{ tn}^{-1}$

The application will be soon available to anyone interested through the project's website: <https://www.kiwiaware.eu/>



**Food** **Aware**

# Introducing kiwifruit water footprint into a traceability IT system



<https://www.kiwiaware.eu/>

This research work is funded by the Operational Programme “Epirus” 2014-2020, under the project “Modern kiwi quality assessment system, traceability of kiwi product and intelligent supply chain management based on advanced IT applications ICT-Foodaware”, Co-financed by the European Regional Development Fund (ERDF) and national funds.

Penelope Baltzoi<sup>1</sup>, Konstantina Fotia<sup>1</sup>, Dimitris Salmas<sup>2</sup>, George Pachoulas<sup>2</sup>, Charalampos Karipidis<sup>1</sup>, Yannis L. Tsirogiannis<sup>1</sup> and Chrysostomos Stylios<sup>2,3</sup>

1 University of Ioannina, Department of Agriculture, University Campus of Arta, Arta, GR47100, Greece

2 University of Ioannina, Department of Informatics and Telecommunications, University Campus of Arta, Arta, GR47100, Greece

3 Industrial Systems Institute, Athena R.C. Platani, Patras, GR26504, Greece

