

Asia and the cultivation of rice



<http://www.esa.int/>

Introduction

Rice is the seed of the grass species *Oryza sativa* (Asian rice) or *Oryza glaberrima* (African rice). As a cereal grain, it is the most widely consumed staple food for a large part of the world's human population, especially in Asia. It is the agricultural commodity with the third-highest worldwide production, after sugarcane and maize.




Rice as a staple food



Rice is the main source of food

Rice is one of the world's major staple foods that accounts for 15% of the world's total cultivated area. In Asia where 94% of the world's rice is produced, rice is the main source of food and a significant source of income. In Vietnam, rice cultivated area occupies 47% of agricultural land of the country.

General overview of rice



The traditional method for cultivating rice is flooding the fields while, or after, setting the young seedlings. This simple method requires sound planning and servicing of the water, damming and channeling, but reduces the growth of less robust weed and pest plants that have no submerged growth state, and deters vermin.

Section 1

Conditions for the growth of rice

Rice cultivation on wetland rice fields is thought to be responsible for 1.5% of the anthropogenic methane emissions. Rice requires slightly more water to produce than other grains. Rice production uses almost a third of Earth's fresh water.

- **Rainfall**

The rainfall is necessary for the growth of the plants.

- **Temperature**

Rice requires high temperature above 20 °C but not more than 35 to 40 °C. Optimum temperature is around 30 °C (Tmax) and 20 °C (Tmin).

- **Solar radiation**

The amount of solar radiation received during 45 days after harvest determines final crop output.

- **Atmospheric water vapor**

High water vapor content (in humid tropics) subjects unusual stress which favors the spread of fungal and bacterial diseases.

- **Wind**

Light wind transports CO₂ to the leaf canopy but strong wind cause severe damage and may lead to sterility (due to pollen dehydration, spikelet sterility, and abortive endosperms)



Section 2

Types of rice



Long Grain Brown Rice



Chinese Black Rice



Wehani Rice



Himalayan Red Rice



Brown Basmati Rice



Medium Grain Brown Rice



Sweet Brown Rice



Colusari Red Rice



Short Grain Brown Rice



Purple Thai Rice

Rice-growing areas

Today, the majority of all rice produced comes from China, India, Indonesia, Bangladesh, Vietnam, Thailand, Myanmar, Pakistan, Philippines, Korea and Japan. Asian farmers still account for 94% of the world's total rice production.

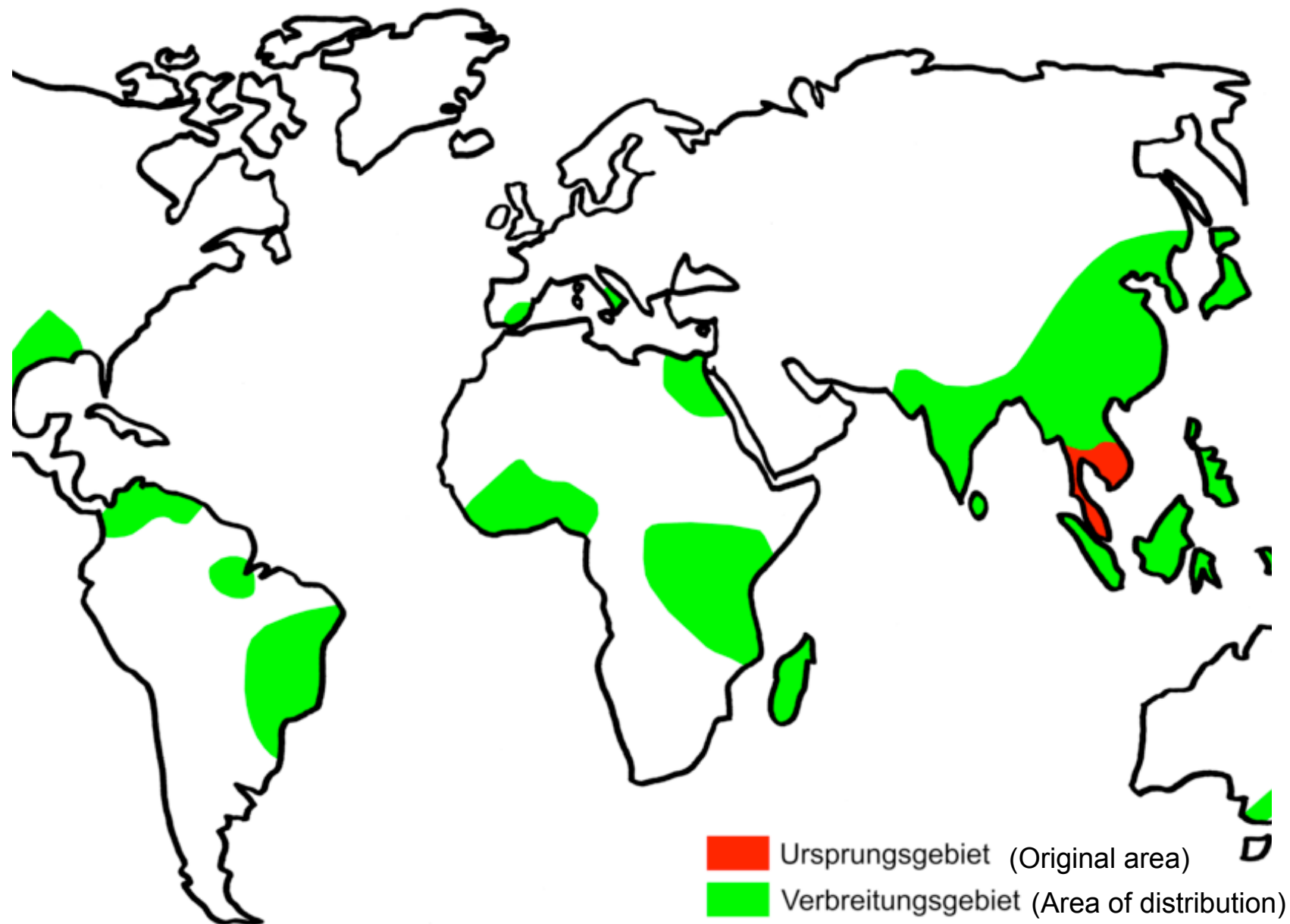


Section 1

Further rice growing areas

Some 80% of EU rice production takes place in Italy and Spain, with a further 12% in Greece and Portugal. The remainder is in four other countries: France, Romania, Bulgaria, and Hungary. Outside the EU, rice is also grown in the Russian Federation (120,000 ha in the Krasnodar region and 50,000 ha in the far east region of Vladivostok) as well as in Ukraine (25,000 ha).

Also in North-, South America, Africa and Australia is rice produced, mostly around wet areas.



Satellites watching rice fields

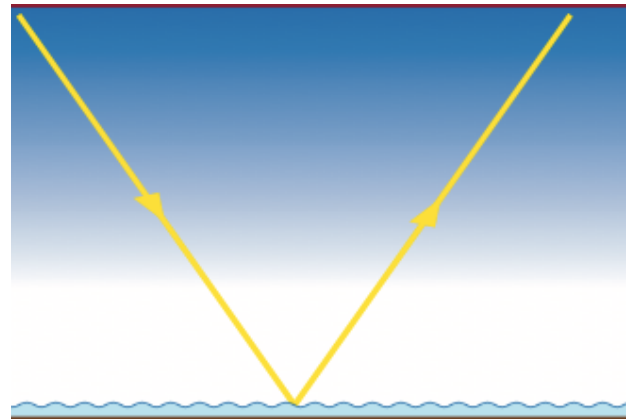
Not all radar sensors make use of the earth resistance by the reflected sunlight, they also use their own signals. The strength with which the returning signal comes back, depends on the type of soil. By registering these strength differences, the radar can make an image of the relief.



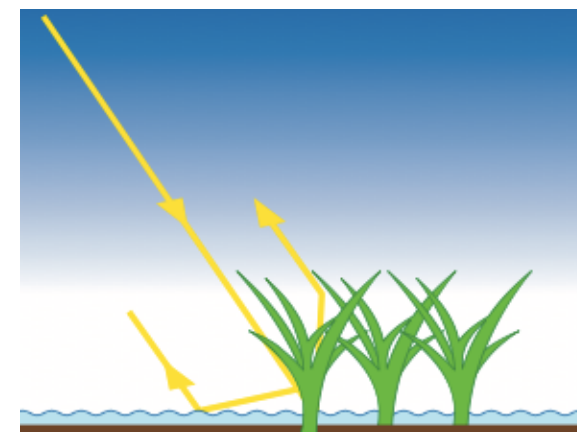
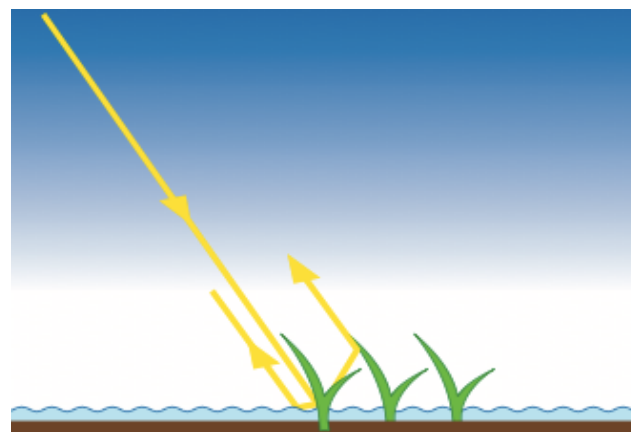
How the rice growth can be measured by using a radio signal

The signals from the satellites are sent to the earth. It depends on how far the growth of the plants has progressed, if the signals, which are coming back to the satellites, are strong or weak.

If there are no plants, the signal comes back very weakly



When the plants get bigger, the signal gets stronger and stronger.



Two types of sensors used to measure rice growth

- **optical remote sensor**

- true color images
- it depends on the weather
(you cannot see the rice, if there are clouds)
- reason: The sunlight gets reflected by the ground,
and goes to the satellite.

But if there are clouds,

the sunlight is stopped by the clouds

and it can't travel any further.

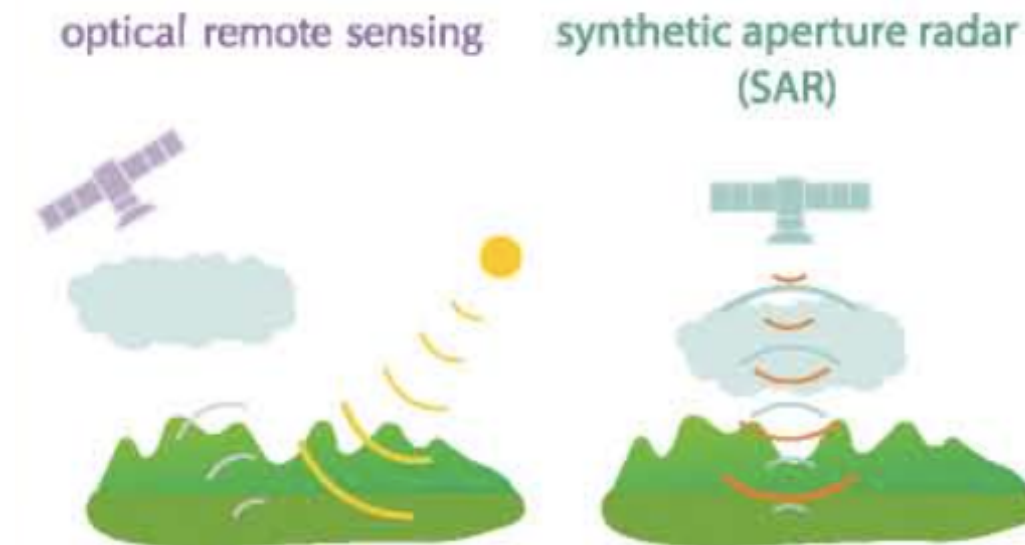
- **microwave remote sensor / synthetic aperture radar (SAR)**

- color composite (false color) images
- the sensor waves (microwaves) go through the clouds
- reason: The sunlight is not needed to create an image.

Microwaves are sent to earth

and back to the satellite.

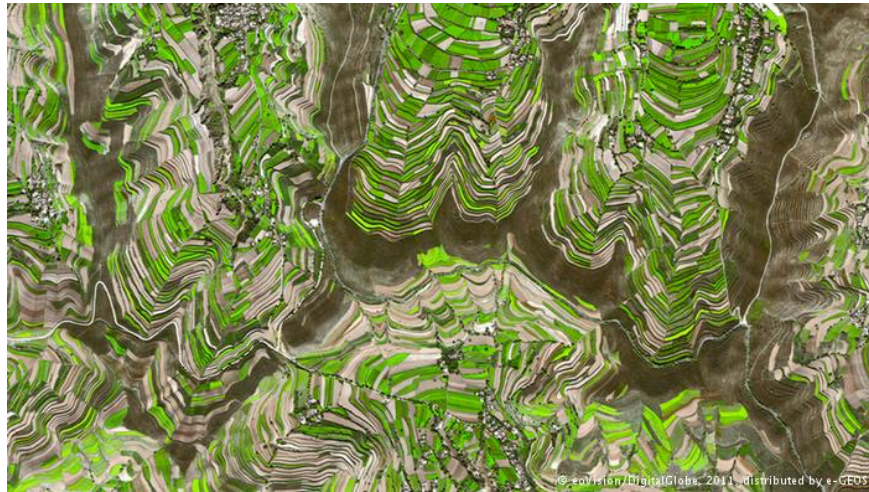
Clouds are no obstacle.



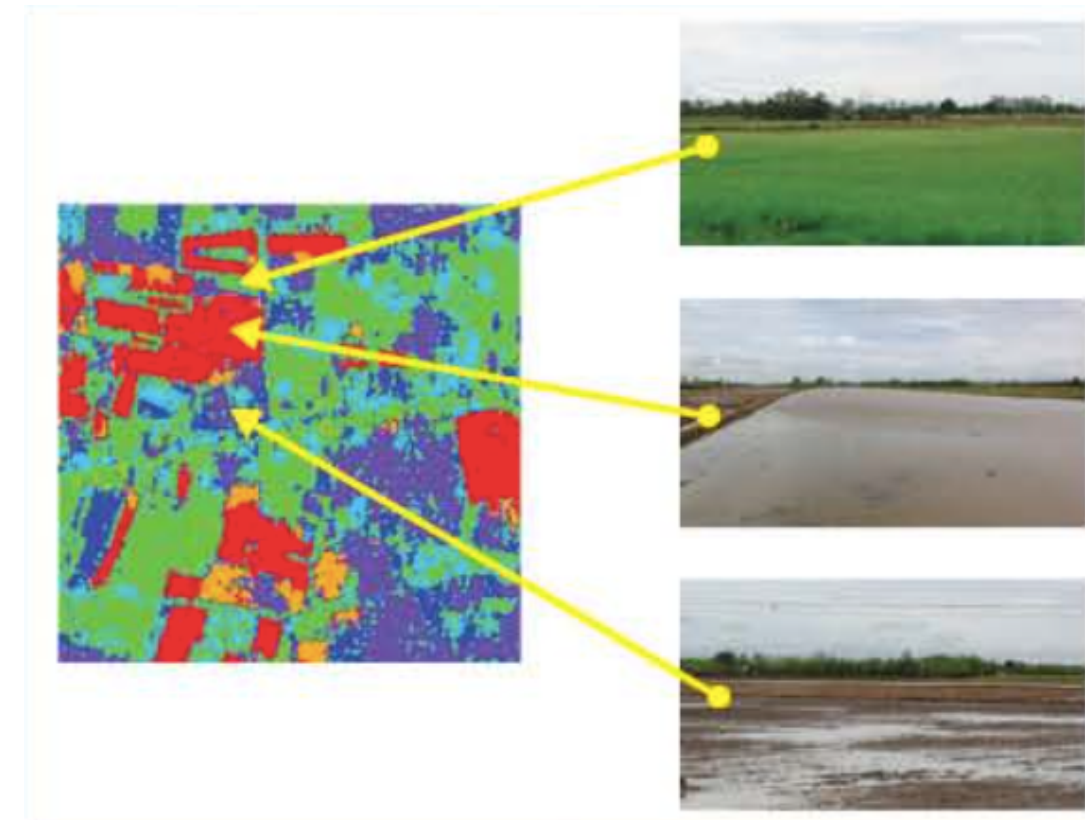
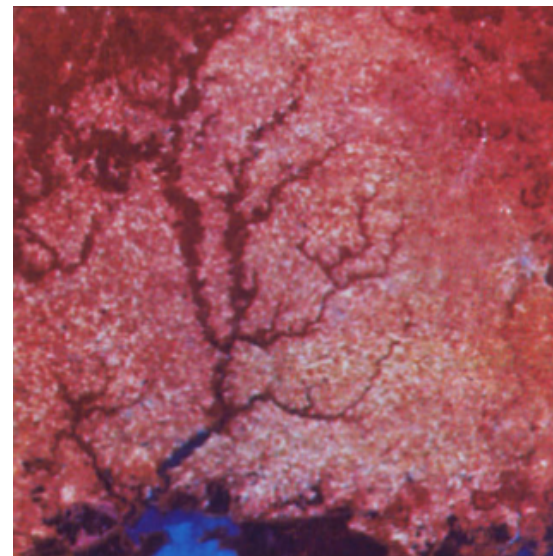
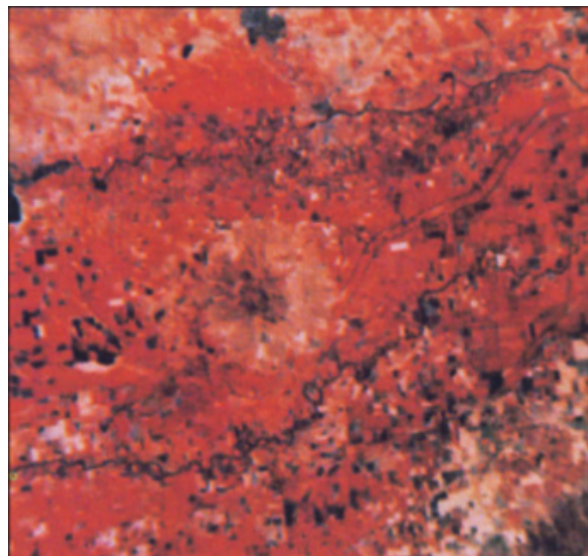
Section 3




Satellite images of rice fields

- true color image of rice fields of China:



- color composite images of the landscape of California:



	Full developed rice
	Flooded rice
	Soil covered partially with water before rice flooding

Conclusion

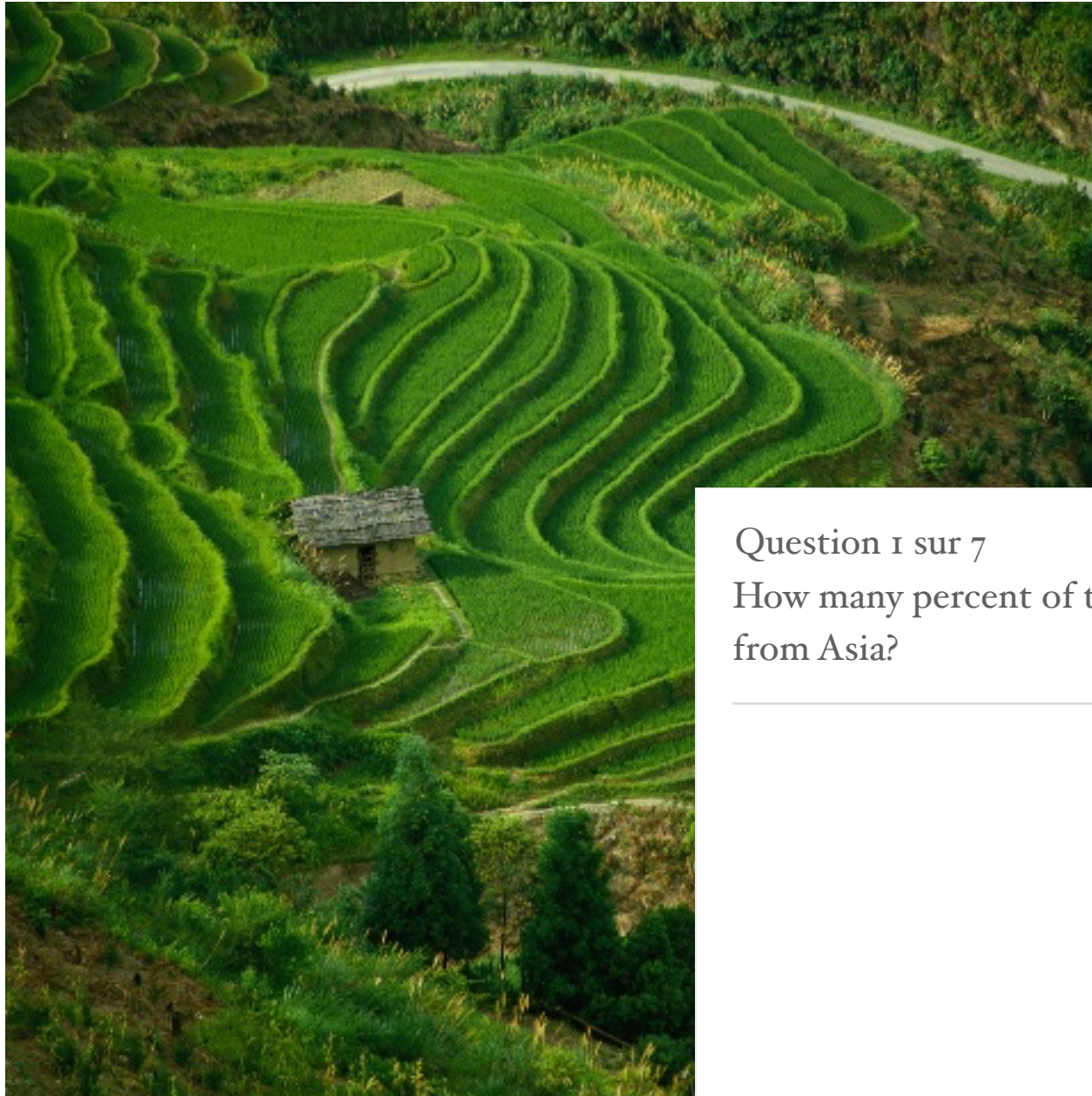
The radar response to rice fields at different growing stages during the crop cycle can be distinguished in three main growing stages, namely sowing-transplanting (surface scattering), growing (surface- volume scattering) and flowering (volume scattering).





Quiz

Question 1



Question 1 sur 7

How many percent of the world's rice production comes from Asia?

- ☐ A. 15%
- ☒ B. 94%
- ☐ C. 47%
- ☐ D. 81%



Répondre

