

Area per Person on a Global Basis

Total surface area of the earth is

$$4\pi r_e^2 = 11.57 \times (6371 \text{ km})^2 = 5.101 \times 10^8 \text{ km}^2 .$$

Area per person

$$= 5.101 \times 10^8 \text{ km}^2 / 6.6 \times 10^9 = 0.077 \text{ km}^2$$

This area can be pictured as a square of length

$$\sqrt{0.077 \text{ km}^2} = 0.28 \text{ km} = 280 \text{ m}.$$

Since Earth is 70.8% water and 29.2% land, you have only 0.023 km^2 of land upon which to grow most of your food.

Although only 4.7% of Earth's land supports permanent crops, 13.3% is considerable arable. (Source: CIA Fact-Book) So, your arable land is only 0.0030 km^2 This area can be pictured as a square of length

$$\sqrt{0.0030 \text{ km}^2} = 0.055 \text{ km} = 55 \text{ m}.$$

You also have 0.055 km^2 of water, most of which is deep ocean. It can provide water and some food.

Your total area must provide all of your water, food and energy. All of your waste stays in your area. You are also responsible for the small volume of atmosphere above your area.