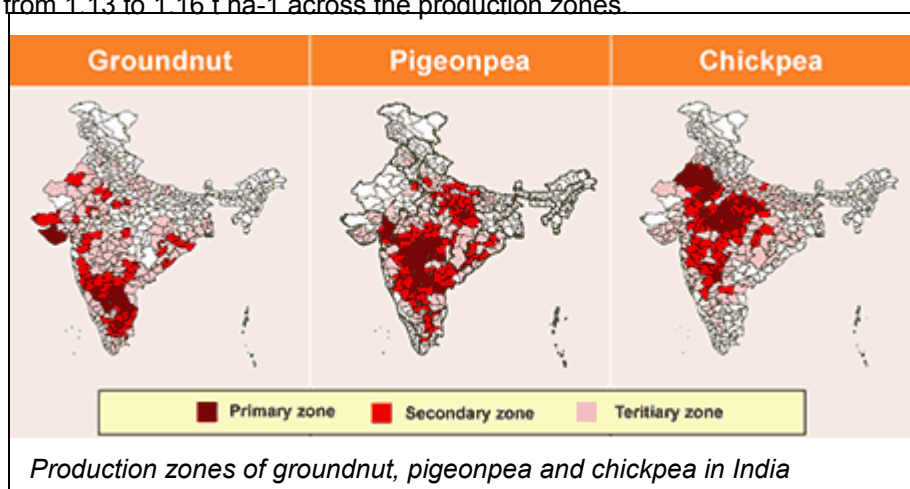


### 3. Leaping over the legume yield gap

By 2025, India's population is expected to grow to 1.4 billion. Food production in India must increase by about five million tons (Mt) annually for the next 25 years to ensure food and nutritional security. The rainfed areas, which cover almost 70% of the total area under agriculture, would have a greater share in meeting the future food needs of the country, especially those of food legumes. All the three ICRISAT mandate legumes (groundnut, pigeonpea and chickpea) are major sources of protein for the Indian population.

Using simulation modeling and reviews of past experimental data, we assessed the potential rainfed yields and yield gaps of ICRISAT's mandate crops.

Groundnut is mostly grown in the low to medium rainfall environment. It is grown on 7.53 million ha (M ha) with a total production of 8.63 M t. Average productivity is 1.15 t ha<sup>-1</sup>, and ranges from 1.13 to 1.16 t ha<sup>-1</sup> across the production zones.



Pigeonpea is grown on 3.36 M ha with a total production of 2.31 M t. Average productivity is 0.69 t ha<sup>-1</sup>, ranging from 0.60 ha<sup>-1</sup> in the primary zone to 0.80 t ha<sup>-1</sup> in the tertiary zone. It is mostly grown as an intercrop with cereals and other legumes.

Chickpea is grown on 7.28 M ha. The mean yield for the primary zone is 0.84 t ha<sup>-1</sup>, which decreases to 0.73 t ha<sup>-1</sup> in the tertiary zone. Most of the chickpea is grown during the post-rainy season on stored soil moisture with one pre-sowing irrigation, especially in northern and central India, where the rainfall during the rainy season is low to high.

Large yield gaps exist between the farmers' current yields and the potential yields for each crop. These yield gaps on average ranged from 1.0 to 1.63 t ha<sup>-1</sup> for groundnut, 0.91 to 1.01 t ha<sup>-1</sup> for pigeonpea, and 0.8 to 1.07 t ha<sup>-1</sup> for chickpea, indicating that the yields of these legumes could be increased by 2.0 to 2.6 times. Based upon the current cultivated area under each crop, these yield gaps translate into estimated additional production of 6.6 to 10.8 M t of groundnut, 3.1 to 3.4 M t of pigeonpea, and 5.8 to 7.8 M t of chickpea in the country.

Using supplemental irrigation from the rainwater harvesting and groundwater recharging technologies possible in these areas, the production could be even higher.

For more information contact [p.singh@cgiar.org](mailto:p.singh@cgiar.org)