



Food and Agriculture
Organization of the
United Nations

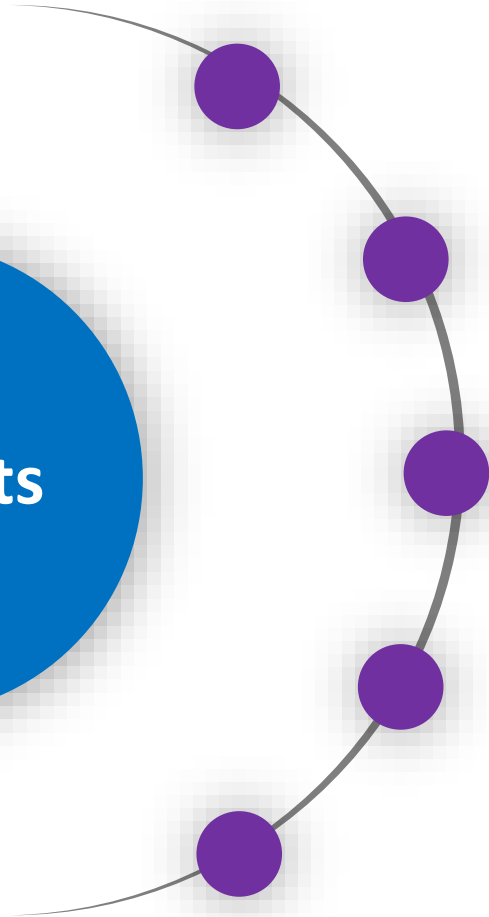
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Role and Potential of Potato in Global Food Security

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Challenges of global food security



CHALLENGES



I. Continuous increase of world population and its food demand

Food demand in the world will increase up to 50% by 2050

- ◆ The Global Food Crises Report released on 4 May informs that approximately 193 million people in 53 countries or territories experienced acute hunger in 2021 - an increase of nearly 40 million people compared with 2020.
- ◆ Feeding the expanding population nutritiously and sustainably will require substantial improvements to the global agrifood system.
- ◆ This system provides nutritious products to consumers while minimizing negative impact on environment.

Produce more and better foods with less inputs of resources and lower carbon footprint

- ◆ A key challenge is how to effectively produce more and better food with the same or less resources.
- ◆ Another effort is to strengthen food security through policies to improve accessibility to foods.



Regional conflicts and humanitarian hotspots



- ◆ With the intensification of the conflict between Russia and Ukraine, the export of a variety of agricultural products has been blocked, further endangering international food security.
- ◆ Under the circumstances of soaring fertilizer, fuel, feed and transportation costs and worrying planting prospects in the new season, the global grain market will face the "most serious impact" since the 1970s.
- ◆ The food security situation in the least developed countries or low-income food deficit countries is particularly grim.
- ◆ The shortage of fertilizer supply in European, America and Central Asian countries may continue until next year.
- ◆ Key cereal and high value commodity exporting countries are import dependent on fertilizer from the Russian Federation, with levels that vary from 20% to more than 70%.



COVID-19

The resources you need to navigate today's workplace.

IMPACT OF PANDEMIC ON THE GLOBAL FOOD SUPPLY CHAIN



- ◆ International transport downturn due to the pandemic and its prevention measures, supply chain disruption, transportation cost increase.
- ◆ In March 2022, the FAO Food Price Index reached its highest level (160 points) since 1990, and has now averaged 158.2 points in April 2022, but remains historically high.



CHALLENGES

III. Emerging impact of climate change

Change of suitable planting areas for crop production

- ◆ The increase of temperature has increased the yield of some crops in high latitudes, while reduced the yield of some crops (corn, wheat and barley) in low latitudes.
- ◆ India's wheat production decreased by 5.2% from 1981 to 2009. The production of major crops across the African continent, such as corn, wheat, sorghum and fruit, has decreased in recent years.

Direct threat to low-income countries and low-income groups

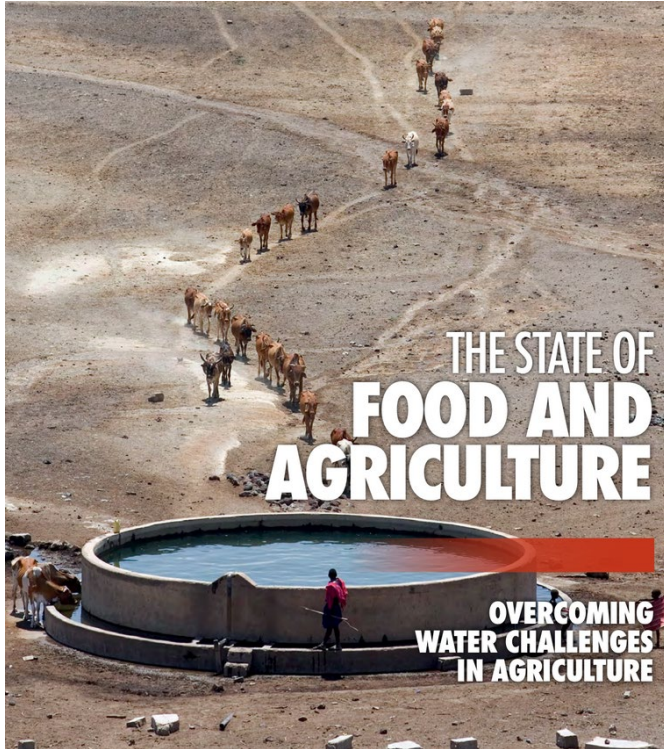
- ◆ Frequent climate change and extreme weather events, reduction of crop production or nutritious foods reduce the nutrient intake for low-income people, and then affect their nutritional status.
- ◆ In developed countries, poverty usually means the consumption of high calorie but low nutritional foods, resulting in poor diet, obesity and other related diseases.

Effect on social and economic stability

- ◆ IPBES estimated that climate change and land degradation will reduce global food production by 10%, and in some regions by 50% in 2050, which affect the socio-economic stability of arid areas.
- ◆ Reduction of grain production will increase prices and reduce food supply for low-income groups.



CHALLENGES



IV. Constraints of intensified resource and environment

Prominent water resource constraints

- ◆ There're 22 countries (mainly in North Africa, West Asia) are likely to suffer from water shortage in the future, 15 of them use more than 100% of the total renewable freshwater resources.
- ◆ It is estimated that agricultural water efficiency in Africa is lower than that of other continents, and its water resource utilization rate is only 3%.

Ecological environment degradation

- ◆ In the past 20 years, up to 24 million square kilometers of land in the world has been affected by the continuous decline in productivity, which is equivalent to the total land area of China, the United States and India.

Sustainable Development Goals of the 2030 Agenda





Contribution from potato to the world



I. Historical role

The agricultural civilization in the Andean mountains of South America

- ◆ Created the most brilliant Inca civilization among the three ancient civilizations in America.
- ◆ It is called "the flower of ancient Indian civilization".

Promoted the increase of population and broke the restriction of land area

- ◆ Break the limit that land can support the population and double the population
- ◆ Provide sufficient food to enhance the ability to resist diseases

Promoted the process of urbanization and driven the industrial revolution

- ◆ It has improved agricultural productivity and promoted the process of urbanization
- ◆ The rise of western industrial civilization has reshaped the world pattern





I. Historical role

Potato is the life-saving and staple food for civilians to save famine since the Qing Dynasty in China

- ◆ Famine continued frequently in Chinese history. Because of its barren tolerance and high yield potential, potato is an important food crop for people to survive in famine and disaster relief in the Chinese history, saving millions of people.

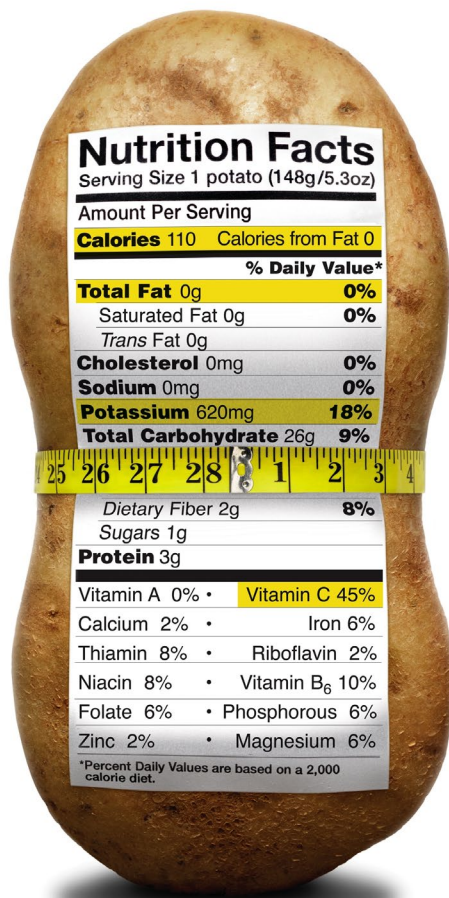
Valuable food in times of turmoil and war

- ◆ Historian William McNeil wrote "how potatoes change world history" in 1999, which highlight that potatoes were extremely important during the war.
- ◆ "Every war in Europe has promoted the increase of potato planting area from 1560 to World War II."
- ◆ Villagers in war-torn Europe have found one advantage of growing potatoes: it's hard to tax or take away.



●●●● II. Realistic contribution

Important food in the world



Acting as high-quality food with rich, comprehensive and balanced nutrition

- ◆ In addition to carbohydrates, it also contains high-quality protein, a variety of minerals, rich vitamins and trace elements.
- ◆ Potato has **very low fat**, low heat and high dietary fiber, and the fat content is only 0.1% ~ 1.1%.
- ◆ Potato is known as "perfect food" and "underground apple".

●●● II. Realistic contribution

Important food in the world



Supporting the growing global population

- ◆ In 2020, the global potato output was **359.07 million tons** (which was converted into grain accounting for 3.74% of the global grain according to **3.4:1** of edible dry matter).
- ◆ Potato, as the third largest food crop, will become one of the advantage crops in the global food security system when the yield of other cereal crops is close to the limit.

●●● II. Realistic contribution

About 2/3 of the world's population consumes potatoes as the **staple food**, nearly 50% of potatoes are used as household staple food or vegetables, and the average proportion of potato processing in developed countries is more than 40%.

Fresh potato in developing countries still accounts for the main potato consumption, but in China, India, Russia and other countries, the consumption of high value-added leisure and fast food is gradually increasing.

Consumption in Asian countries increased significantly, especially in while decreased in European and American. The potato consumption in China, India and Bangladesh accounted for more than 40% of the world.



●●●● II. Realistic contribution

Potato production tends to concentrate in Asia, Africa and Latin America



1) The global potato production pattern has gradually migrated from west to East and from developed to developing regions.

2) Asia and Africa are the regions with the fastest growth of potato production in the world, and North Africa, adjacent to Europe, has superior geographical advantages.

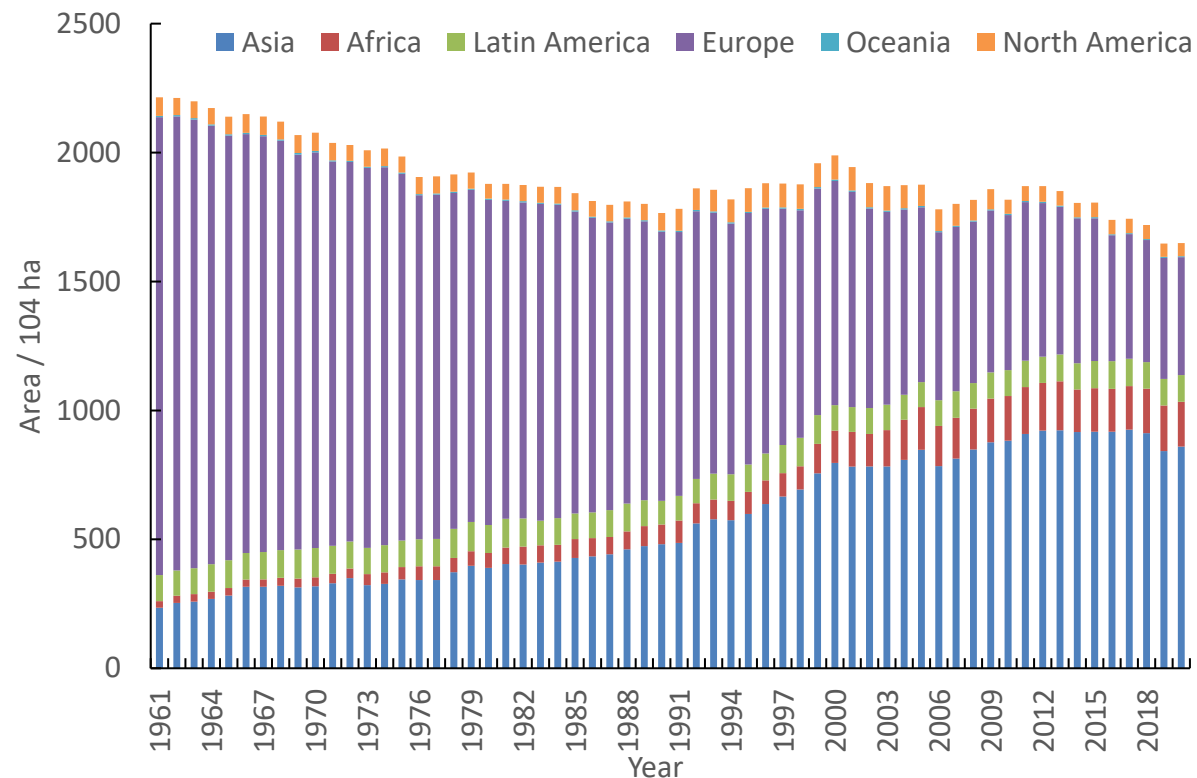


Fig.1 Changes in world potato planting area from 1961 to 2020

●●●● II. Realistic contribution

Potato production tends to concentrate in Asia, Africa and Latin America



3) The total potato production in **Asia, Africa and Latin America** increased from **32 million tons in 1961 to 226 million tons in 2020**, a total increase of more than **six times**, with an average annual growth rate of **3.37%**

4) The total potato production in other regions, including **Europe and North America**, decreased from **260 million tons in 1961 to 178 million tons in 2020**, with an average annual decrease of **0.64%**.

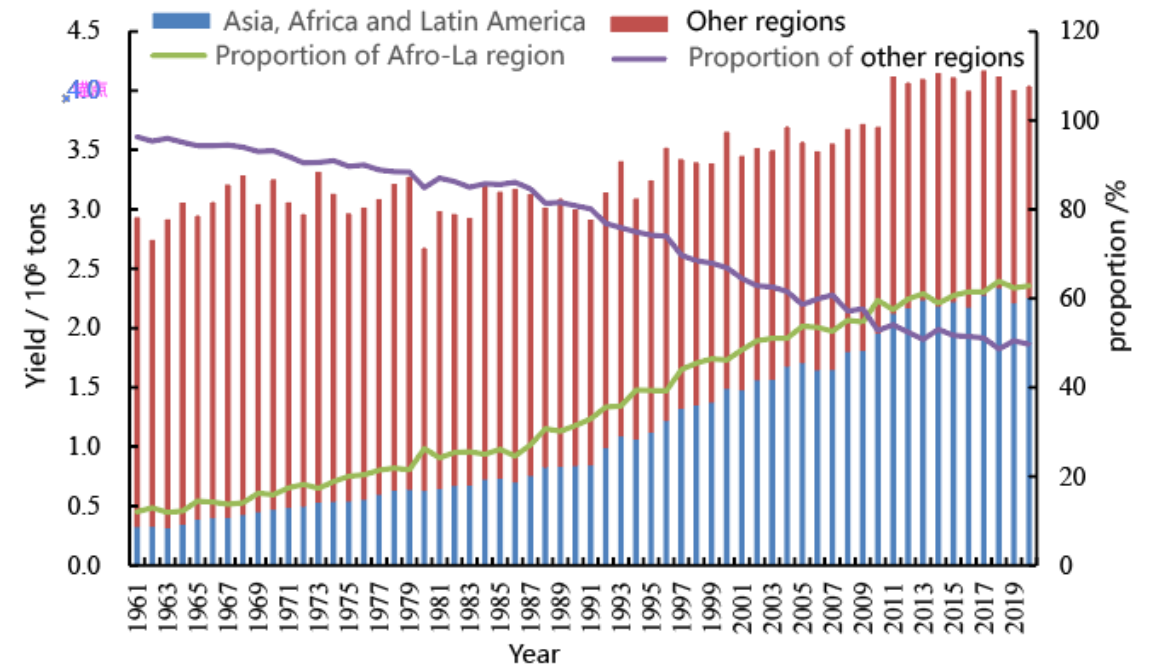


Fig. 2 Potato yield and regional proportion in Asia, Africa, Latin America and other regions from 1961 to 2020

Data sources : FAO database

●●●● II. Realistic contribution

The role of potato in the food industry in Asia, Africa and Latin America has been improved

The contribution of potato to food in Asia, Africa and Latin America is rising.

In Asia, Africa and Latin America, the contribution rate of potato in the four main grains (corn, rice, wheat and potato) has increased from 2.72% in 1961 to 3.53% in 2020.

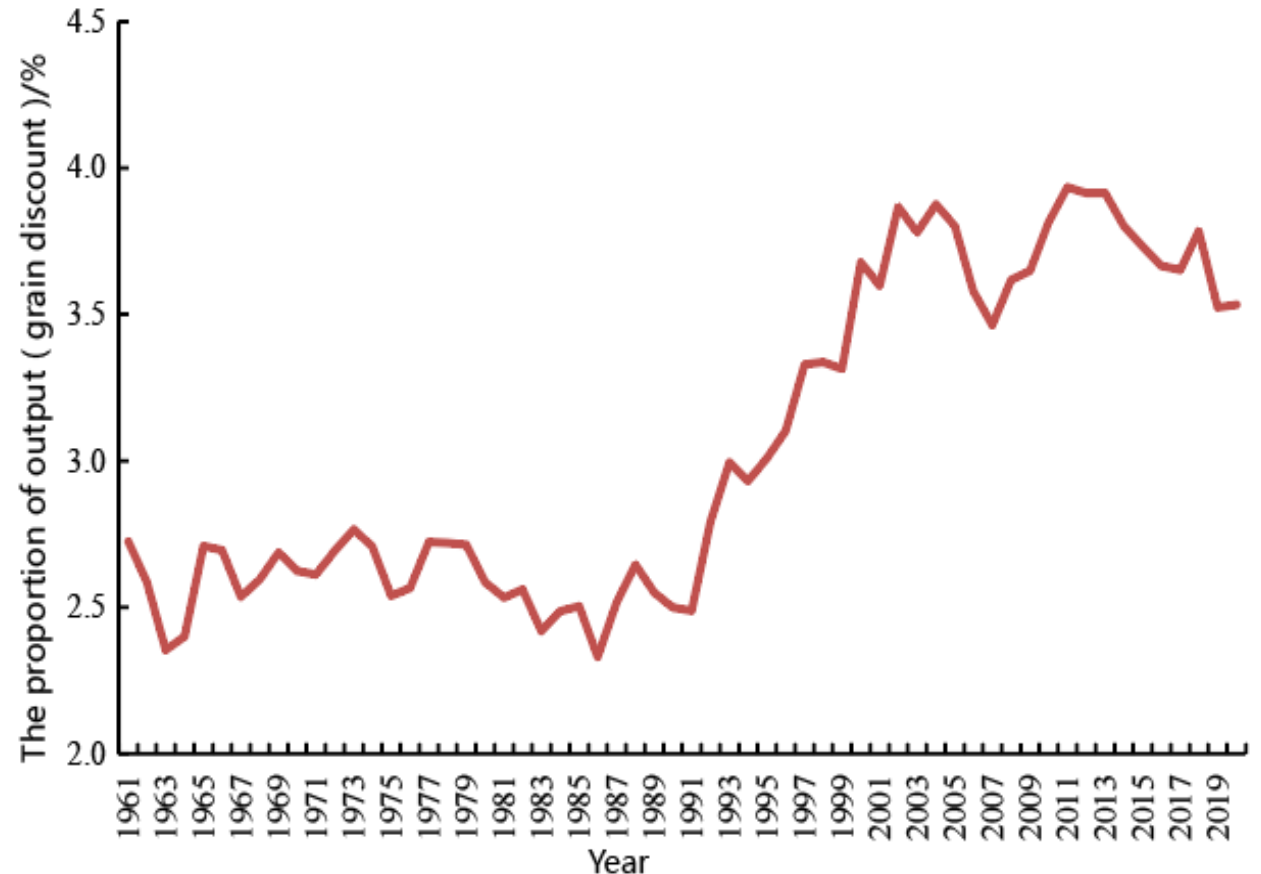


Fig.3 Contribution of potato to staple food in Asia, Africa and Latin America from 1961 to 2020

Date sources : FAO database

●●●● II. Realistic contribution

Significant contribution to increasing income and reducing poverty

The contribution of potato output value in the main food in Asia, Africa and Latin America is increasing.

In Asia, Africa and Latin America, the contribution rate of potato output value increased from 6.8% in 1961 to 10.3% in 2019.

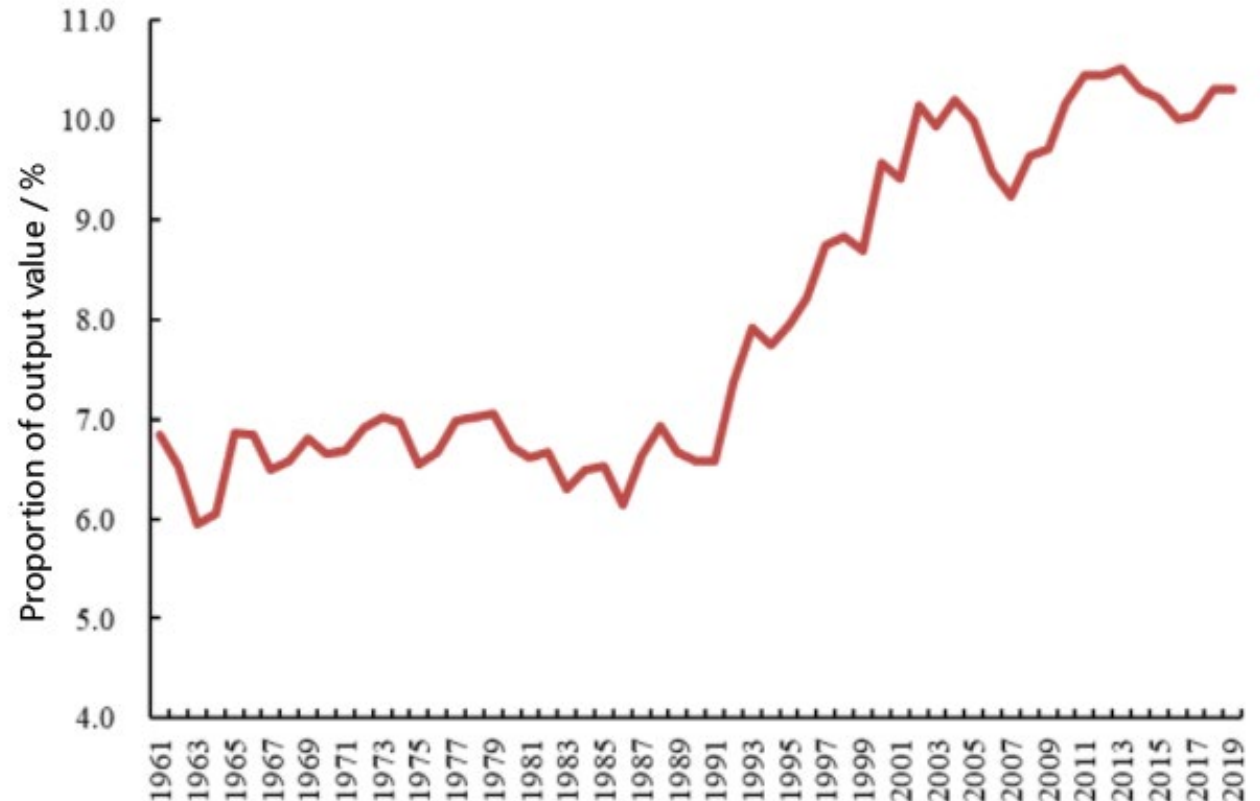
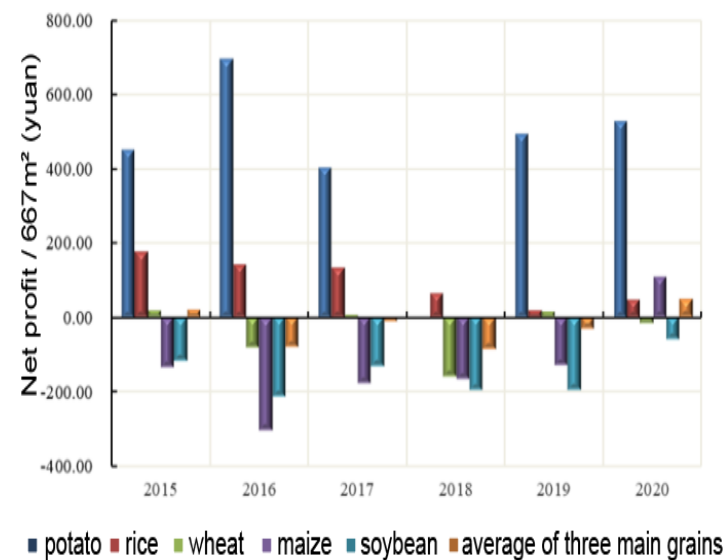
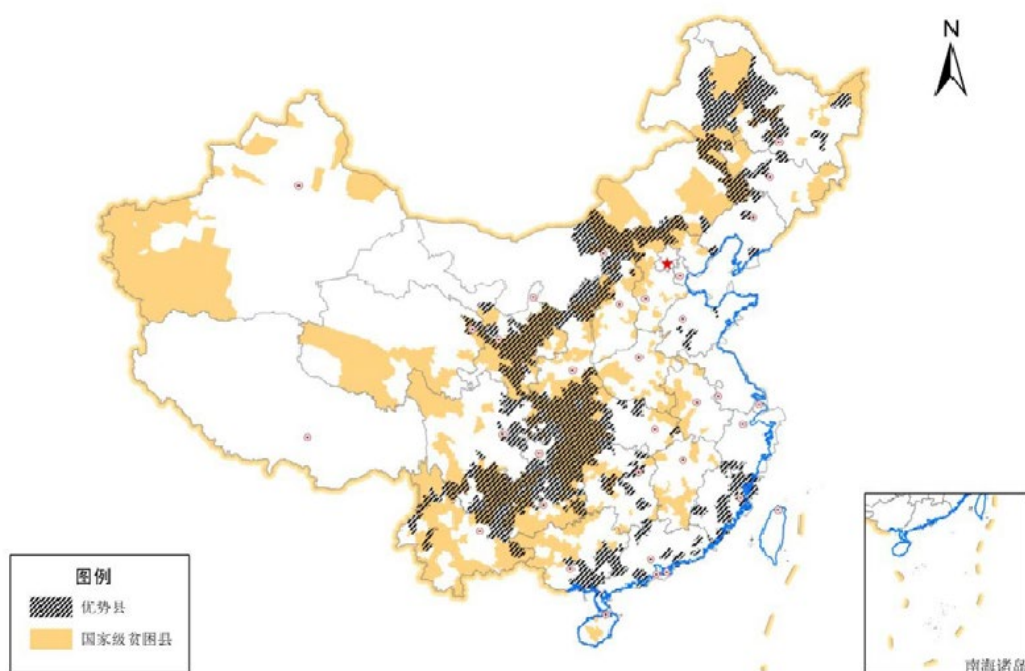


Fig.4 Contribution rate of potato to main grain output value in Asia, Africa and Latin America from 1961 to 2019

●●●● II. Realistic contribution

Significant contribution to increasing income and reducing poverty

- ◆ In China, the spatial distribution of potato is highly coincident with the former poor areas, and the benefit is higher than other crops. It is regarded as the preferred crop for increasing income and reducing poverty.
- ◆ In recent years, the average net profit of potato in China is above 920 dollars/hectare, which is much higher than that of other crops, and has a comparative advantage in economic benefits.



●●● II. Realistic contribution

Remarkable contributions to resource conservation and environmental friendliness

- ◆ We face the **challenges** of discordant between people and land in Asia, Africa and Latin America, the increasing shortage of water resources and the difficulty of expanding effective irrigation area.
- ◆ Promoting potato industry can **alleviate** the contradiction between the shortage of cultivated land and water resources to a considerable extent, expand food sources, and improve the coefficient of ensuring global food security.





Potential of global potato production

●●● I. Wide ecological adaptability

- ◆ Potato is resistant to drought, cold, barren with wide adaptability. The soil and climate conditions in most parts of the world can meet its growth conditions. It has been in a position not competing with wheat, rice and corn for **land, fertilizer and water**, which have the natural ecological advantage of drought resistance.
- ◆ **The global potato is concentrated in "three regions and two belts", accounting for more than 70% of the global planting area.**
 - alpine area, lowland tropical area and temperate area
 - 23 ° - 34 ° N and 44 ° - 58 ° N

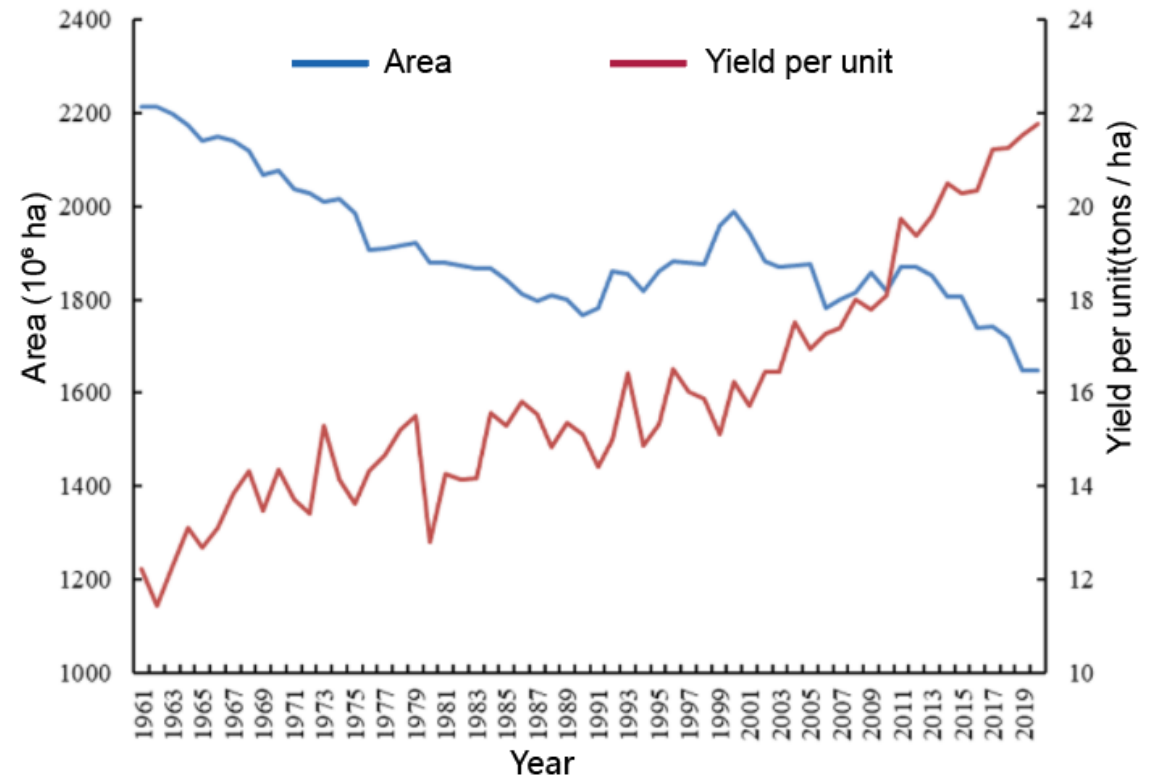


II. Yield increase driving production



Global potato area decreased by 17% from 2000 to 2020, but the total production increased by 11.25%.

The increase of potato production was mainly driven by the increase of per unit yield. The yield increased from 16.2 tons / ha to 21.8 tons / ha, with an increase of 34.18%.



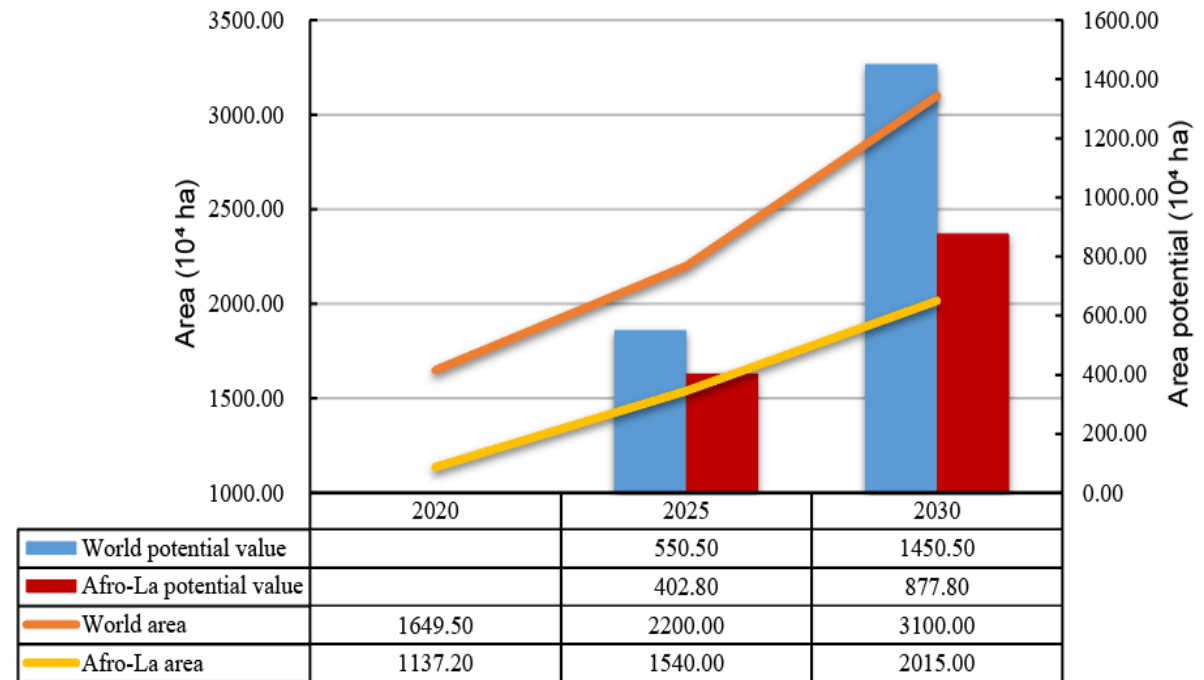
Change of potato area and yield from 1961 to 2020 in the world

Data sources: FAO database

III. Potential to expand areas over 14.5 million ha

Area—the basic factor for potato production improvement

- ◆ Take the sum of the largest potato harvest areas in various regions over the years as the global potato target area in 2030 and restore it to the level of 31 million hectares, of which the area of Asia, Africa and Latin America exceeds 20 million hectares, accounting for about 65% of the world.
- ◆ **From 2020 to 2030, the global potato area has an expansion potential of more than 14.5 million hectares, including about 9 million hectares in Asia, Africa and Latin America.**



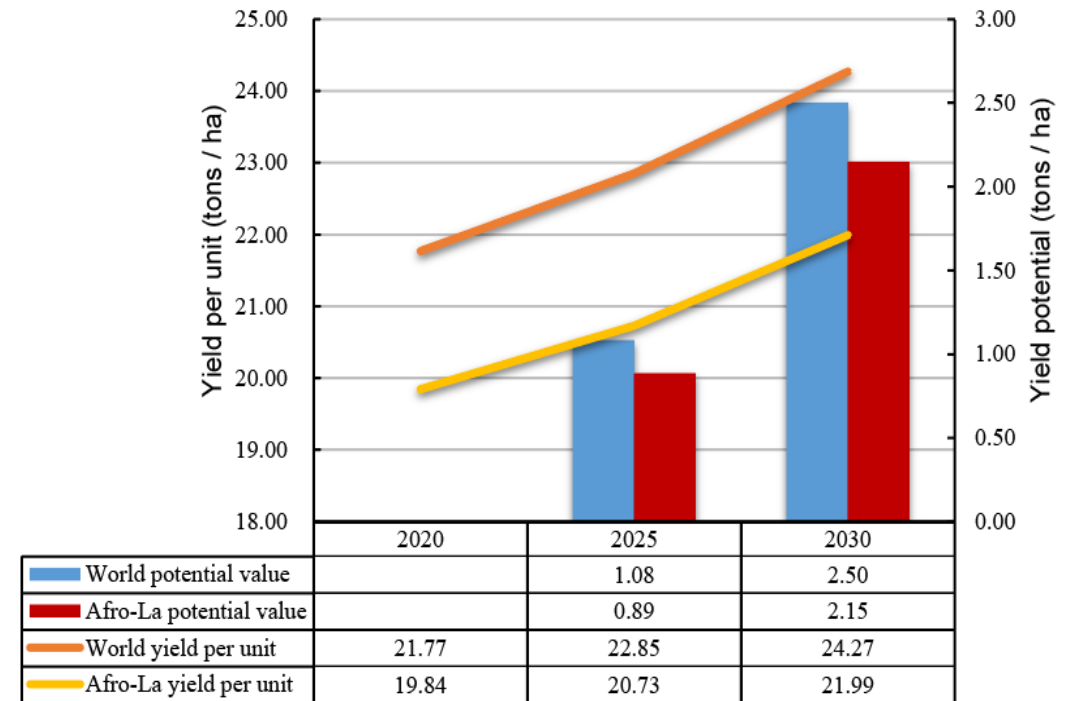
Potato area prediction in world and Asia-Africa-Latin America

Data sources: FAO database

III. Yield increase potential is 2.5 tons / ha

Yield-the key factor for potato production improvement

- ◆ By 2025, the global potato yield will reach nearly 23 tons / ha according to the grey model, while it's 21 tons/ha in Asia, Africa and Latin America.
- ◆ By 2030, the global potato yield will reach 24.3 tons / ha, while it's 22 tons /ha in Asia, Africa and Latin America.
- ◆ From 2020 to 2030, the global potato yield improvement potential is 2.5 tons, while it's 2.15 tons in Asia, Africa and Latin America.

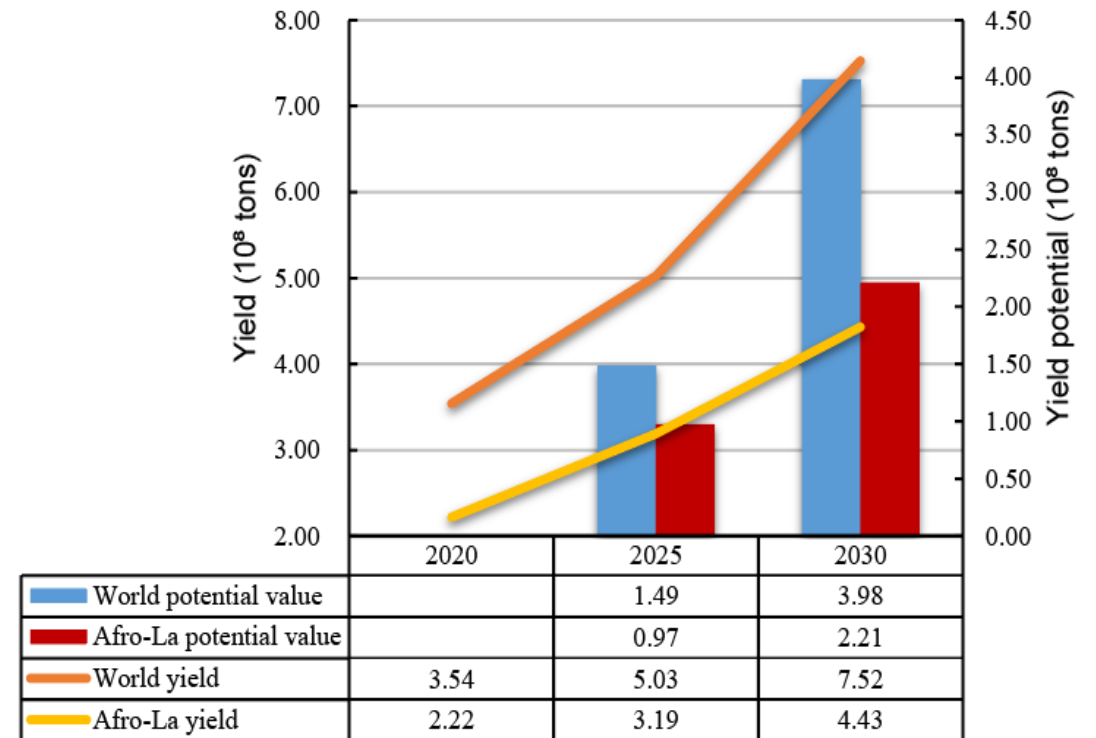


Potato yield prediction in world and Asia-Africa-Latin America

III. Total production has the potential to double

Considering area and yield, the world production has the potential to double in the next 10 years

- ◆ By 2025, the global potato production will reach 500 million tons with an increase of 42.1%, of which the production of Asia, Africa and Latin America will reach 320 million tons with an increase of 45.5%, accounting for 64% of the world.
- ◆ By 2030, the total production will reach 750 million tons with an increase of 112%, of which the production of Asia, Africa and Latin America will exceed 440 million tons with an increase of 100%, accounting for about 59% of the world.
- ◆ From 2020 to 2030, the total global potato production has an increase potential of 400 million tons, including 220 million tons in Asia, Africa and Latin America



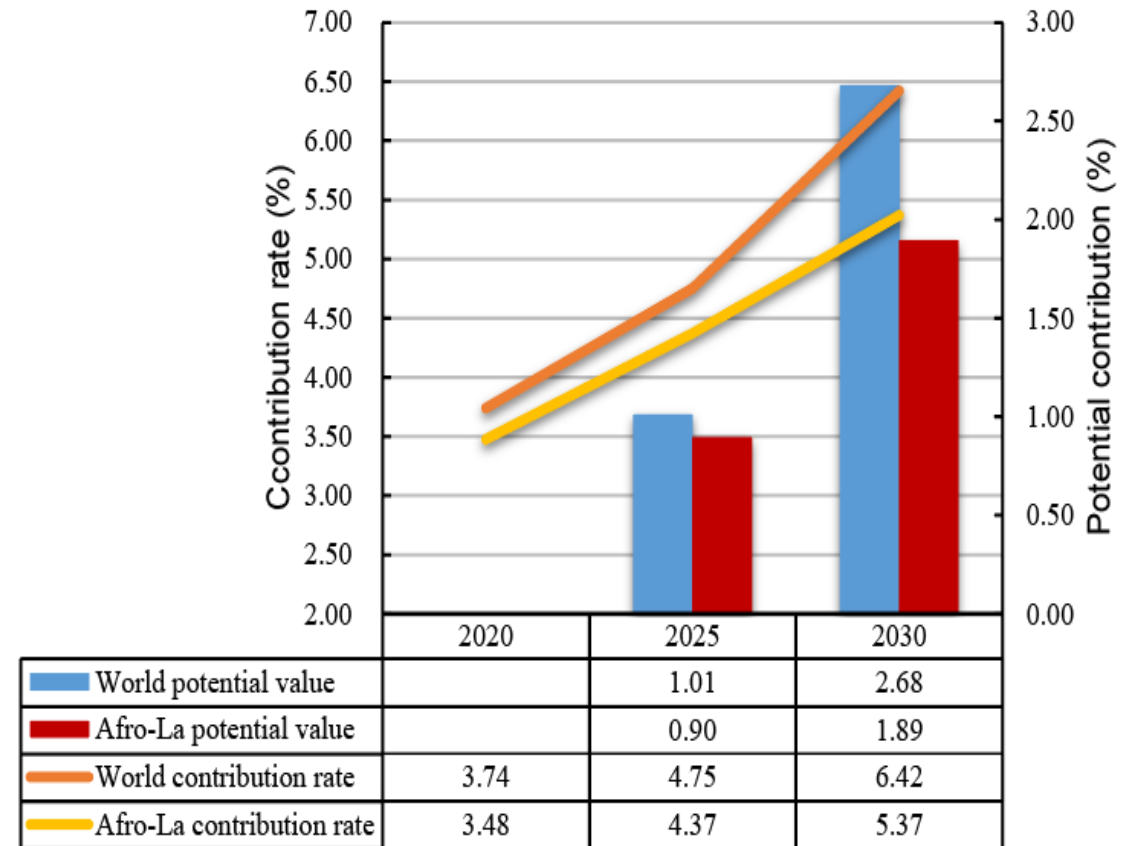
Potato production prediction in world and Asia-Africa-Latin America

Data sources: FAO database

III. Yield increase potential is 2.5 tons / ha

The contribution of potato to food security will continue to increase in the future

- ◆ It is estimated that from 2020 to 2030, the contribution rate of potato to the global food will increase from 3.74% to 6.42% with an increase of 2.68 percentage points.
- ◆ The contribution rate of potato to food in Asia, Africa and Latin America increased from 3.48% to 5.37% with an increase of nearly 2 percentage points.
- ◆ In the future, the supporting role of potato in global and regional food security will be further improved.



Data sources: FAO database



Strategies for promoting potato development

●●●● I. Improving potato food supply capacity and establishing the agile and sustainable agrifood system

To provide potato food to the expanding population in a nutritious and sustainable way

- ◆ We need to greatly improve the global, regional and national potato agrifood system, provide decent employment and livelihood for producers and each partner in the food chain, and provide nutritious potato products for consumers.

Implement the urban food agenda and support global, regional, national and subnational institutions

- ◆ We need inclusive policies, plans and actions to build resilient and sustainable agrifood systems, improve livelihoods and employment opportunities in rural and urban areas and fight against hunger and all forms of malnutrition.

●●●● II. Building up efficient and sustainable agrifood systems and partnerships

Support governments in building efficient, inclusive, resilient and sustainable agrifood systems.

- ◆ FAO works closely with governments (Members) and key players, such as the private sector, academia, civil society, regional economic community organizations and platforms that integrate sustainability into the three dimensions (social, economic and environmental) of global, regional, national and indigenous food systems.

Actions calling for Hand in Hand partnerships among members, private sector, farmers' organizations and R&D partners.

- ◆ Research must be strengthened and networks must be developed to improve productivity and value chain. Transform existing knowledge and science into products, improve the performance of agrifood systems and solve problems in different potato value chains are needed.

●●●● III. Promoteing to support variety improvement and technological innovation

Strengthen the research, development and application of potato breeding and planting technology.

- ◆ Increase support for potato genetic improvement and shorten breeding circle for new potato varieties. Virus-free seed potato system should be scaled up.

Promote the development of potato processing industry.

- ◆ Support policies for potato diversified processing, encourage enterprises to develop potato related functional foods and snack foods.

Invest in trade and agribusiness related to the potato sustainable value chain.

- ◆ Provide technical assistance to support countries and regions to achieve the sustainable development goal by potato industry.



IV. Diversify potato products to meet consumption demands

Accelerating the development of potato staple food and other deep-processing products

- ◆ Scientific research departments and leading enterprises of various countries cooperate to enrich the types of potato processed products and improve the quality of potato products, so as to adapt to the change of consumers' consumption habits and meet the diversified needs of consumers.

Extending the potato industry chain

- ◆ Through the cooperation between scientific research enterprises, continuously improve the potato processing and conversion rate, promote the production of diversified potato products, and promote the healthy, stable and sustainable development of the potato industry.

Promoting potato nutrition knowledge

- ◆ Guide people's eating habits and consumption concept through advertising, news and media publicity, enrich people's choice of staple food, and promote the consumption of diversified potato products.



V. Taking actions to reduce food losses and waste and strengthening normative work on food safety and quality

Promote early maturing potatoes to improve the productivity and increase the farmers' income

- ◆ In Asian, African and Latin American countries, we need promote new varieties and high-quality seed potatoes with good market sales, so as to improve the production efficiency and the living standard of small farmers.

Achieve sustainable development goals and make progress in responsible consumption

- ◆ Encouraging and promoting dialogue among the private sector, academia, policymakers and civil society on food losses and waste.

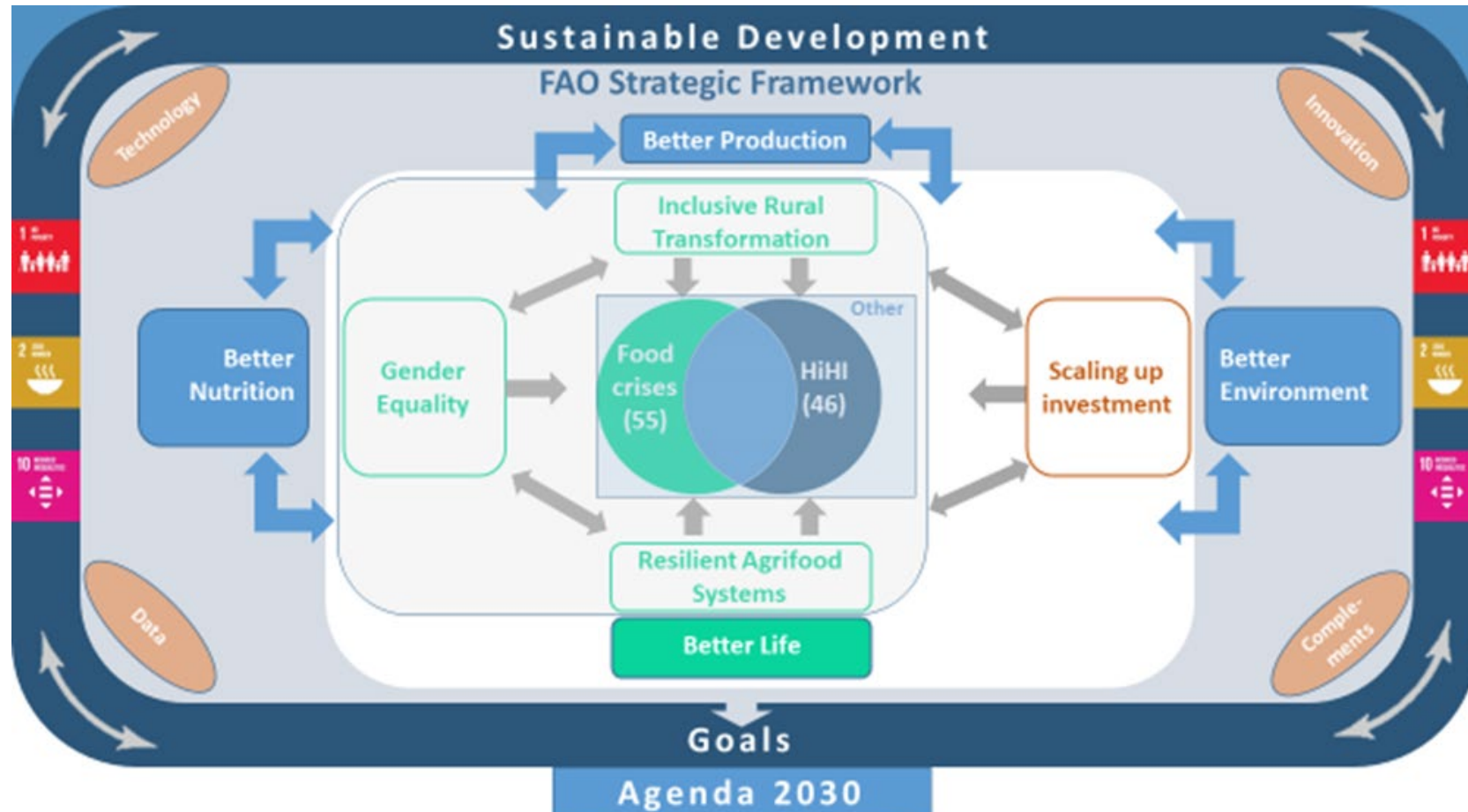
Contribute to the governance of the global agrifood system

- ◆ Providing a framework within which countries own and lead regulatory systems, policies and public services related to food safety and quality.



FAO NEW STRATEGIC FRAMEWORK 2022-31

The FAO Ministerial Conference in 2021 endorsed the Strategic Framework 2022 – 31, which aims to support the achievement of the 2030 Agenda through the transformation to MORE, efficient, inclusive, resilient and sustainable agrifood systems for better production, better nutrition, a better environment and a better life, leaving no one behind.



Thank you!

