IAP Project

Food and Nutrition Security and Agriculture (FNSA)

The AASSA Status Report

Second Plenary Meeting, German National Science Academy Leopoldina, Halle, 2-5 April 2017

Outline

- Approach adopted by AASSA regarding FNSA
- Main land marks till now
- Status of FNSA as per IAP Ten Point Template
- Outline of future activities to complete the project

Division of Asia Pacific into Four Regions

In view of large and diverse geographical spread

- Region I: Australasia-Pacific Rim
- Region II: South East Asia
- Region III: South Asia
- Region IV: Central Asia+ Caucasian region

Schedule of Meetings

- **1st Meeting of all the 8 AASSA Experts from four regions of AASSA, 25-27 April 2016**; INSA, New Delhi, India;
- 2nd Meeting of all Experts of AASSA, 18-19 July 2016; KAST, Seoul, Korea;
- 3rd Meeting of all the AASSA Experts and GYA Young Scientists, 6-9 February 2017; INSA, New Delhi, India;
- **4th Meeting of all the experts, May-June 2017 ?;** KAST, Seoul, Korea; and
- **5th Meeting of the experts, 18-20 September 2017;** INSA, New Delhi, India

Present Status

- After deliberations during the last three meetings and subsequent interactions inputs have been received from all the Sub-Regions
- These broadly cover all the Sub-regions
- Recent efforts have also led to some dats and identification of S&T issues in the Central Asian Region
- The integration and synthesis of all data and information is under processing

Participation of Young Scientists in the Third AASSA FNSA Experts Meet

- The Young Scientist participation had been very fruitful
- For example Dr Dilfuza Egarberdieva, from Uzbekistan, presently in Germany has provided valuable input. She was requested to cover the entire Central Asia.
- Dr. Egarberdieva in consultation with Prof. D. Chamovitz has provided a good input on **Food and Nutrition Security and Agriculture in Central Asia**

Participation of Young Scientists in the Third AASSA FNSA Experts Meet

- Dr. A. Arunachalam, India has provided a nice detailed report on **South Asia**
- Dr. Monir Uddin Ahmed, Bangladesh has provided good input on **Agricultural Research Status in South Asia**
- Dr. Zhihui (Zofia) Li, had focused on **Food and Nutrition Security and Agriculture: Empirical methods and models in China**

Present Status as per Ten Point Template

Ten Point Template of IAP FNSA

1. What are key elements to cover in describing national/regional characteristics for FNSA?
2. What are major challenges/opportunities for FNSA and future projections for the region?
3. What are strengths and weaknesses of S&T at national/regional level?
4. What are the prospects for innovation to improve agriculture (e.g. next 25 years) – at the farm scale?
5. What are the prospects for increasing efficiency of food systems?
6. What are the public health and nutrition issues, particularly with regard to impact of dietary change on food demand and health?
7. What is the competition for arable land use?
8. What are other major environmental issues associated with FNSA – at the landscape scale?
9. What may be the impact of national/regional regulatory frameworks and other sectoral/inter-sectoral public policies on FNSA?
10. What are some of the implications for inter-regional/global levels?

1. What are key elements to cover in describing national/regional characteristics for FNSA?

- Asia-Australasia region is characterized by wide diversity in economic levels, food production, social and political stability, and varying degrees of application of advanced S&T in agriculture and nutritional fields.

Economic Disparity

Country	GDP 1960	GDP 2015
Afghanistan	59.8	594.3
Australia	1806.8	56311.0
Azerbaijan		5496.3
Bangladesh	88.7	1211.7
Bhutan		2656
Cambodia	111.3	1158.7
China	89.5	8027.7
Fiji	285.5	4960.5
India	83.8	1598.3
Indonesia		3346.5
Iran	191.7	
Iraq	231	4943.8
Israel	1229.2	35728.1
Japan	479	34523.7
Kazhakhstan		10510

Economic Disparity

Country	GDP, 1960	GDP, 2015
Republic of Korea	155.6	27221.5
Kyrgyz Republic		1103.2
Malaysia	234.8	9768.
Mongolia		3967.8
Myanmar		1161.5
Nepal	50.5	743.3
New Zealand	2312.9	37808.0
Pakistan	82.5	1434.7
Philippines	254.4	2904.2
Russian Federation		9092.6
Singapore	427.9	52888.7
Sri Lanka	142.5	3926.2
Tajikstan		925.5
Thailand	100.8	5814.8

Economic Disparity

Country	GDP, 1960	GDP, 1960
Turkey	507.9	9125.7
Turkmenistan		6672.5
Uzbekistan		2132.1
Vietnam		2111.1
World	445.8	10093.3

Wide Variations in GDP

Minimum: USD 594 (Afghanistan)
Maximum: USD 56,311 (Australia)

Ratio: 1 : 94.8

Status of Food and Nutrition Security

- About 793 million people are undernourished globally, down 167 million over the last decade, and 216 million less than in 1990–92.
- For the developing regions as a whole, the share of undernourished people in the total population has decreased from 23.3 percent in 1990–92 to 12.9 per cent.
- Some regions, such as Latin America, **the east and south-eastern regions of Asia**, **the Caucasus and Central Asia,** and the northern and western regions of Africa have made fast progress.

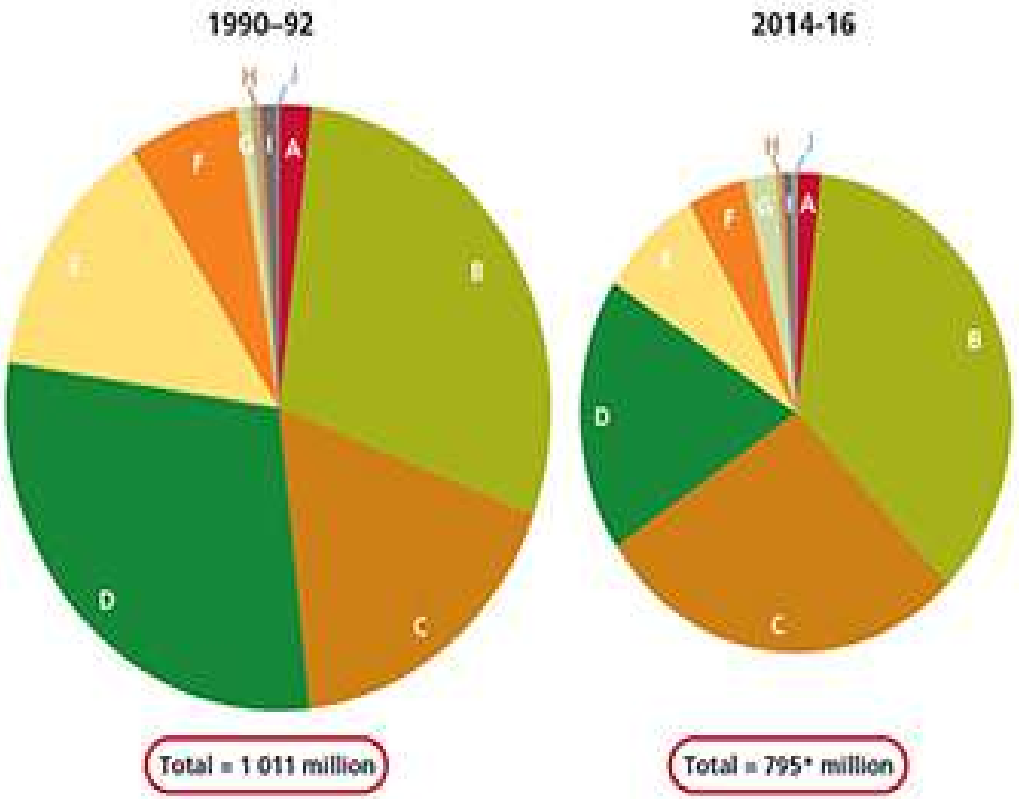
Status of Food and Nutrition Security

- Progress was also recorded in **southern Asia, Oceania,** the Caribbean and southern and eastern Africa, but at too slow a pace to reach the MDG 1c target of halving the proportion of the chronically undernourished.
- For the developing regions as a whole, the two indicators of MDG 1c – the prevalence of undernourishment and the proportion of underweight children under 5 years of age – have both declined.

Status of Food and Nutrition Security

- Economic growth is a key success factor for reducing undernourishment, but it has to be inclusive and provide opportunities for improving the livelihoods of the poor. Enhancing the productivity and incomes of smallholder family farmers is key to progress.

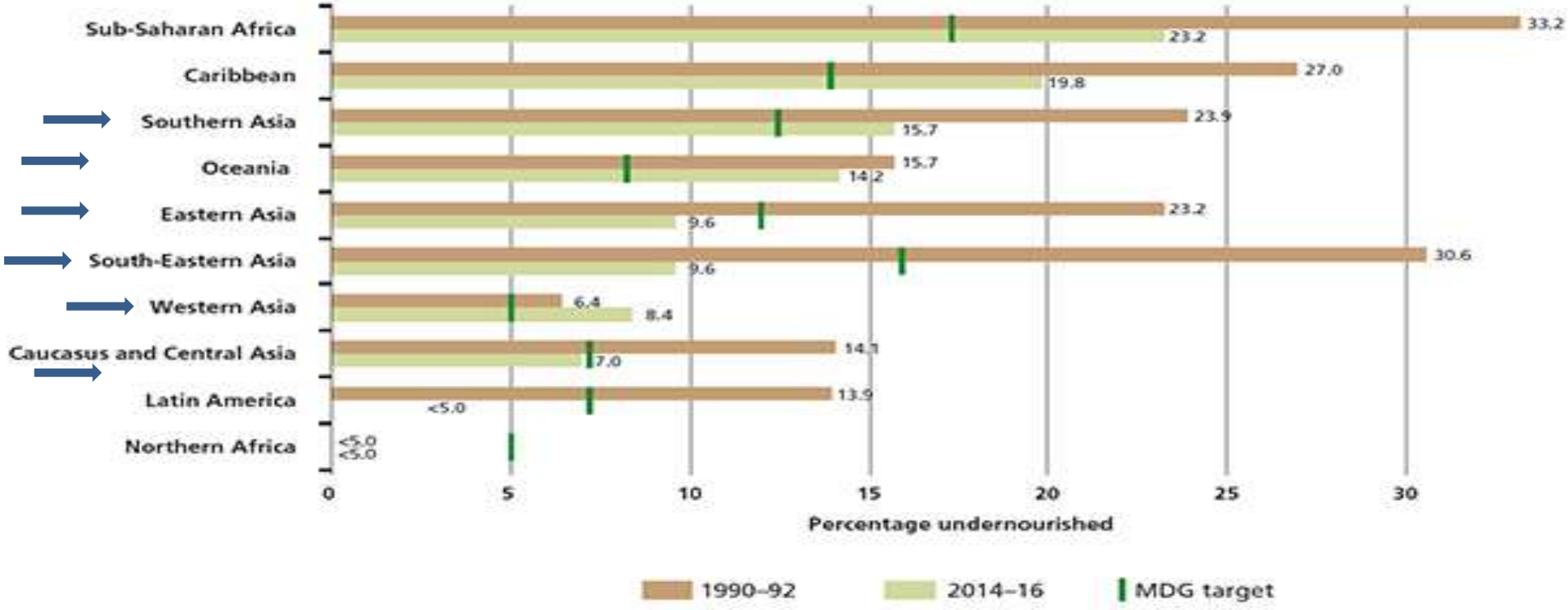
The numbers and shares of undernourished people by region, 1990–92 and 2014–16

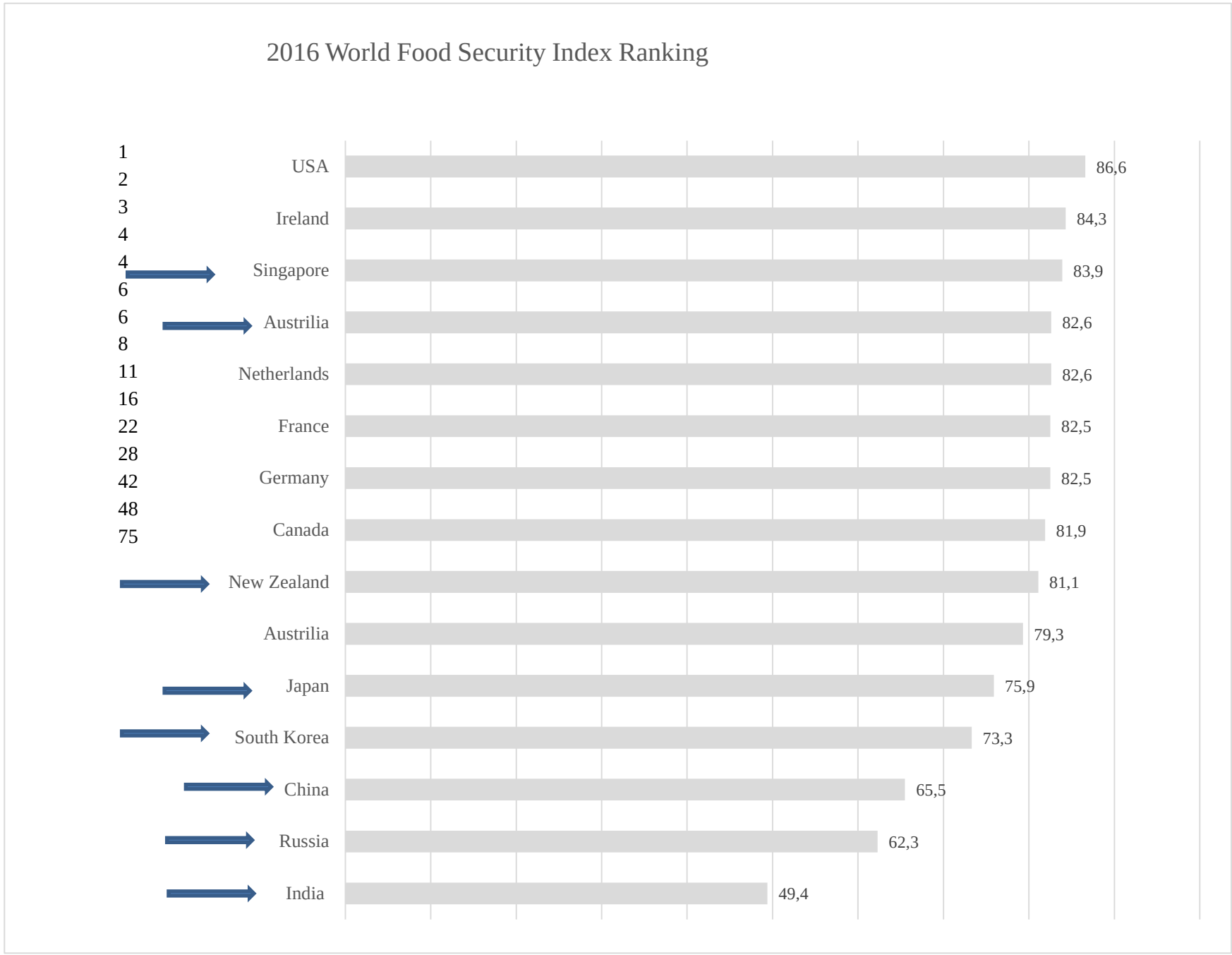


	Number (millions)		Regional share (%)	
	1990–92	2014–16	1990–92	2014–16
A Developed regions	20	15	2.0	1.8
B Southern Asia	291	281	28.8	35.4
C Sub-Saharan Africa	176	220	17.4	27.7
D Eastern Asia	295	145	29.2	18.3
E South-Eastern Asia	138	61	13.6	7.6
F Latin America and the Caribbean	66	34	6.5	4.3
G Western Asia	8	19	0.8	2.4
H Northern Africa	6	4	0.6	0.5
I Caucasus and Central Asia	10	6	0.9	0.7
J Oceania	1	1	0.1	0.2
Total	1 011	795*	100	100

Regions B, D and E are of concern to us in AASSA

Undernourishment trends: progress made in almost all regions, but at very different rates




2016 World Food Security Index Ranking
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Canada
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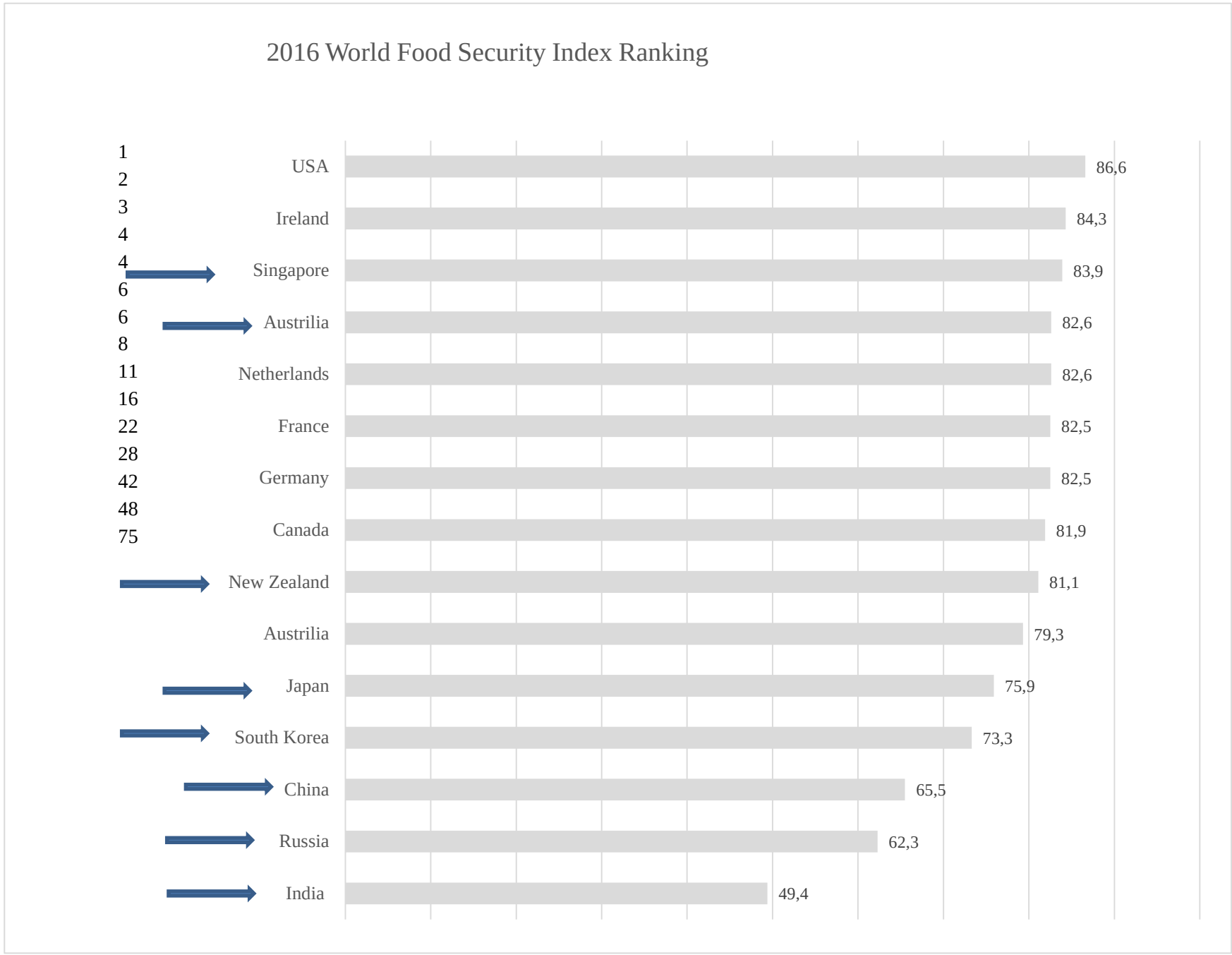
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Some interesting facts from Sub-Region IV

- Unsurprisingly**, malnutrition is greatest in those countries with under-developed agricultural exports and GDP**. Great strides have been made over the past decade.
- For example, Turkey has achieved its goal of halving the number of undernourished people in its population and has been identified by the Food and Agriculture Organization of the United Nations as one of the 79 developing countries that achieved their hunger target – reducing the prevalence of undernourishment and the proportion of underweight children under 5 years of age.

2. What are major challenges/opportunities for FNSA and future projections for the region?

Governmental Interventions to solve problem of high level of malnutrition in Children:

As an example India and other South Asian countries have active programmes focused on children and mothers from pre-natal stage onwards, including medical assistance, financial support and help in improving living conditions including sanitation.

Obesity related issues:

Improving standards of living have led to human health related problems like obesity. The problem is prevalent in all Sub-regions to different extents. These are solvable by improving food habits and bringing appropriate exercises in the daily routine and proper guidance by medical experts.

2. What are major challenges/opportunities for FNSA and future projections for the region?

Contd.

- Growing application of results of advance S&T in agricultural production, avoiding wastage during harvesting, storage and distribution can play a major role in improving the situation
- The addition of new sources of foods, including land and water based is necessary.

3. What are strengths and weaknesses of S&T at national/regional level?

- AASSA Region covers some of the economically and scientifically most advanced nations such as Australia, New Zealand, Japan, Republic of Korea and Israel.
- There are fourteen middle level countries with GDP of above USD 1500. However, many of these have high quality S&T base like China and India

4. What are the prospects for innovation to improve agriculture (e.g. next 25 years) – at the farm scale?

- Asia-Australasian region has enormous potential of introducing innovations in the field of agriculture and food S&T, because of a vast infrastructure in terms of national R&D labs and high quality Universities with well known leaders and quality young students
- National governments and international bodies like world bank have been providing financial and infrastructure related support

4. What are the prospects for innovation to improve agriculture (e.g. next 25 years) – at the farm scale? *Contd.*

- There is a great scope for bilateral and multi lateral collaborations for improving agriculture
- Different sub-regions require different types of expertise and inputs
- Apex international bodies like IAP can play a crucial role in nucleating major projects in well-defined areas
- IAP can play a crucial role in generating collaborative projects between different Regional Networks

4. What are the prospects for innovation to improve agriculture (e.g. next 25 years) – at the farm scale?

- The present exercise should lead to identifying impediments to raising food yields.
- Attempts may be made to prioritize extensions, education and R&D needs in different sub-regions
- These efforts can lead to sustainably increasing food production

5. What are the prospects for increasing efficiency of food systems?

- Advances in life sciences at molecular level are expected to have a strong positive impact, both in agriculture and animal sciences including fisheries.
- Genetic improvements of plants and animals using conventional genetics and molecular based methods including genetic engineering have high potential.
- There is a need to collect and categorize wild populations of important plant species and combining these with modern molecular breeding technologies. These gene pools have potential of generating strains with higher nutritional value, increased resistance to pests and increased yields with lower inputs.

5. What are the prospects for increasing efficiency of food systems? *Contd.*

- It is expected that developments in materials science and technology including those on advance sensors and control systems will play a growing role in different sectors of agriculture
- The growing use of Information Technology including robotics will lead to improvements in efficiency of all aspects of agriculture, food and nutrition sciences
- Precision agriculture and robotics have several applications
- Social science expertise is quit important in improving extension services

6. What are the public health and nutrition issues, particularly with regard to impact of dietary change on food demand and health?

- Modern life needs a dynamic system meeting changing demands of a wide variety of healthy diets based on agricultural sources (food grains, vegetables, fruits, pulses, condiments) as well as animal based products such as meats including fishes, milk and milk products.
- Commercially available food products are required to meet globally acceptable standards in terms of nutritional values and contaminants

6. What are the public health and nutrition issues, particularly with regard to impact of dietary change on food demand and health?

Contd.

- There is a need for establishing testing laboratory systems accredited by organizations recognized globally.
- Public health systems of different sub-regions need to collaborate with each other strongly to deal with recurring threats like bird flu.

7. What is the competition for arable land use?

- Arable land is fundamental for production of food items
- Land is also in great demand for industrial and commercial development, particularly in the developing societies.
- Urbanization, though provides solution to several development related issues, but demands a lot of land, putting pressure on arable land
- Infrastructure development projects like new expressways, roads, new rail tracks also need land.
- With economic development at grass root level, rural habitation with acceptable sanitary and health care facilities also put pressure on arable land.

7. What is the competition for arable land use? *Contd.*

- In China computer based analytical models have been developed to analyse these issues
- Therefore, agriculture S&T has a challenge to meet diverse demands of a variety food items for growing populations from diminishing arable land area
- As discussed above all round development from genetic pool to advance agriculture practices like precision farming together with adequate fertilization and pest control and low loss harvesting technology are required to be continuously improved through R&D.

8. What are other major environmental issues associated with FNSA – at the landscape scale?

- Green house gas emission is associated with large number of animals involved in agriculture
- The waterlogging in paddy fields is also a sources of methane, but extensive measurements in India established that paddy related methane emission is rather low.
- Australia and New Zealand are particularly engaged in R&D programmes aimed at lowering green house gas emissions from animals
- Extreme weather conditions, like drought and excessive rains are being related to global warming and these conditions have negative impact on agricultural productivity.

8. What are other major environmental issues associated with FNSA – at the landscape scale?

Contd.

- These extreme events affect the ecological system, increasing water borne diseases like malaria, dengue and cholera
- Fisheries are also known to be affected by these environmental issues
- Therefore, continuous efforts are needed on establishing climate resilient agriculture

9. What may be the impact of national/regional regulatory frameworks and other sectoral/inter-sectoral public policies on FNSA?

- National and Regional Regulatory Frameworks impact on free trade of agricultural products; also often there are problems related to sharing of river waters
- In AASSA region there are blocks like APEC (Asia-Pacific Economic Cooperation), ASEAN (The Association of South East Asian Nations), and SAARC (South Asian Association for Regional Cooperation)
- These are good for economic development of different regions but also lead to trade related barriers.

9. What may be the impact of national/regional regulatory frameworks and other sectoral/inter-sectoral public policies on FNSA?

Contd.

- Sharing of river waters also can give rise to problems. For example, sharing of Indus river water between India and Pakistan; and sharing of Ganges water between India Bangladesh (now nearly solved) are problems, which come in focus from time ti time.
- With in the same country different states have disputes on river water; for example, issue regarding sharing of Cavery river water between Karnataka and Tamil Nadu States also leads to social unrest.
- Fishing rights issue between neighbouring countries also lead to problems.

10. What are some of the implications for inter-regional/global levels?

- Trade and pricing of commodities like wheat, rice, sugar, pulses
- Trade between commodity surplus and commodity importing nations

General Observations

- The foregoing presentation is an overview
- Detailed write-ups with a lot of data have been received from all Sub-regions and compiled
- Two compilations: (i) Upto Second FNSA meeting; and (ii) Between Second meeting till present times have been prepared and are available in electronic form.
- Additional references and data have also been collected

Acknowledgements for Important Contributions

- Numerous interactions with Professor Volker ter Meulen, Co-Chair, IAP for Science and Chief architect of FNSA
- All the Expert members of AASSA FNSA Team
- All young Scientist participants of the recent Third FNSA Meeting
- KAST Team that brought out a Status Report
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Prof. Mooha Lee, Executive Director, AASSA

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धन्यवाद
Dhanyavad
Vielen Dank
Спасибо
감사합니다!
Merci
谢谢
ধন্যবাদ
ありがとうございます。
धन्यवाद
Arigatogozaimasu
Thank You