A meta-analysis of recent foresight documents in support of the 5th SCAR Foresight Exercise

Stefano BISOFFI

Key messages

1. Trends and main drivers of change

The most relevant driving forces are demography (including urbanisation) and climate. Food systems are strongly affected by both.

1.1. Demography

The current world population projection of the UN for 2050 is 9.8 billion increasing at every update since 2002, thus casting some **doubts** of over-optimism at **forecasts on FSN** of the last couple of decades.

However large the figure may appear, the most critical aspect is not the absolute number but the **spatial distribution of population increase**: whereas Asia still has the highest share of world population until 2100, it is expected to peak and then decrease in the second half of the century. On the other hand, African population will increase more than linearly in the same period due to higher (although decreasing) fertility rates, young age structure and increasing life expectancy.

In general, the **highest population growth** is expected **in the poorest countries** of the world. As no reliable mechanism is in place to ensure an equitable distribution of wealth and food between and within countries, the attainment of **SDGs 1** (end poverty) and **2** (no hunger) will most certainly be **missed** in large part of Africa (and other LDC).

Demography and its geographical structure will fuel **migrations** and the related political tensions in the affluent countries of the world.

The **European population will further decrease** straining already suffering welfare systems (more retirees, more elderly needing assistance for long periods, less workers, less children to enter the workforce in coming decades). Inability to reverse the fertility trend (at present well below the replacement rate) and to integrate migrants appears as a conundrum with no solution.

1.2. Cities and the urbanisation trend

65-70% of the world population will live in cities by 2050, more or less the rate of present day Europe; however, the **highest rate of urbanisation** occurs in the **developing countries** where most of the new megalopolis are now located.

Cities may be **hubs of social, technological and economic innovation** but also areas of **degradation, food deserts, poor health** where growth is neither planned nor provided with basic infrastructures. It is not size that determines success of cities but how smart their organisation is.

In developing countries the attractivity of cities lies in broader **opportunities** to eke out a living, however precarious, with respect to rural areas. Another cause of urbanisation is the progressive **expulsion of farmers** from rural areas as a consequence of a transformation of agricultural systems towards "industrial" models and of large scale land acquisitions by companies and foreign states.

Europe is multifaceted: there is still a **trend towards the major cities**, especially among the younger generations in search of opportunities, but also a **re-ruralisation**

EUROPEAN UNION
Project co-funded by H2020 Programme under Grant Agreement n° 727486

towards areas with cheaper housing if commuting to cities is made possible by acceptable transportation systems.

The growing role of urban settlements as engines of societal development and harbours of wealth is **shifting power away from rural areas** also in matters regarding land management. Landscape planning in the area of influence of cities is increasingly decided by urban institutions rather than by rural dwellers.

1.3. Climate change

The **scientific convergence** on the anthropogenic causes of climate change and on the need to act immediately for a drastic change of development models is well established. The perspectives presented by the IPCC are indeed dramatic. However, **the clarity of the "diagnose" is nowhere matched by a "cure"** of adequate scale.

The U-turn that GHG net emissions should display now is not within sight. The most realistic forecast is that before the end of the century, the temperature increase with respect to pre-industrial years will **exceed 3°C or more**, not the 2°C (possibly 1.5°C) of the Paris Accord.

The main obstacle to any concerted action on climate appears to be a persistent (and growing) **inequality** between and within countries. The **emissions** of GHGs (when "imported" emissions are considered) are strictly **correlated to wealth** (of countries and of individuals), whereas the **negative consequences** of climate changes are to a large extent **inversely correlated**. The unwillingness of the rich to give up climate-impacting lifestyles and the aspiration of the poor to better standards of living appear an unsurmountable obstacle in the current international context.

1.4. Agriculture and food systems vs climate

Agriculture and food processing, distribution and use, are at present, on a world scale, a major **contributor** (around 25%) to **GHG emissions** through deforestation (not in Europe!), livestock production, cultivation and application of fertilisers (especially N). Whereas emissions from agriculture are mainly non-CO_2, energy-related CO_2 emissions dominate the processes beyond the farm gate.

The **potential of soils** as carbon sinks is **not exploited** due to the still dominant farming systems that reduce rather than increase the organic matter content. "Sustainable intensification" (i.e. more efficient use of conventional resources) is advocated by technology-oriented stakeholders and criticised by exponents of a more radical departure from "industrial" models towards the application of agroecological principles.

The former view is often accompanied by a **"feed the world" narrative** that is based on a rather simplistic goal of increasing global productivity, as though food could spread evenly throughout the world; whereas **access to food** is more **dependent on affordability than availability**. Agroecology (and the related but not coincident organic farming) are criticised by the technology-oriented as unable to produce sufficient quantities of staple food.

1.5. Diets

A hot debate is focusing on diets with increasing convergence of opinions in the medical as well as ecological sectors that a **sharp reduction** (to 1/3 or less) of current consumption of **Animal Source Food** (especially red meat and processed meat) would be beneficial to health (less NCDs) and the environment (less GHGs). An improved diet would also foresee reduced consumption of highly processed food and beverages, often high in calories and poor in nutrients, thus conducing to obesity and related diseases.

However, the **consumption of meat** is **increasing in parallel with wealth**; the consumption of cheap junk food and beverages is mounting and the big food conglomerates support the trend. National governments have little space for manoeuvre or do not want to use it for fear of unpopularity. More than was the case with tobacco, a change of diets is not within sight, unless a bottom-up, consumer-driven, change of eating habits occurs.

The economic and occupational **weight of the livestock industry** (production and transformation of ASF) also exerts a powerful influence on sectoral policies and the persisting (in Europe: EC and MS) fragmentation of competences does not favour coherent approaches to policy development between agriculture, health, environment etc.

2. The dimensions of the future

Foresight studies often define possible future landscapes on a two-(rarely multi-) dimensional space in which divergent developments would drive the changes. Here are some of the recurrent "dimensions":

2.1 Multilateralism and global governance

Strength vs weakness of **global governance mechanisms** determines the possibility of reaching a broad consensus on priorities and, more importantly on actions. Multilateralism (the wish to seek global solutions though concertation and dialogue worldwide) is based on trust and on the conviction that global problems cannot be addressed individually by any of the almost 200 states of the world.

The effectiveness of global governance mechanisms is always considered an **essential component of desirable future scenarios**; fragmentation and a nationalistic attitude (my country first!) in international relationships as conducive to a turbulent, polarised and unstable world and limited or negative material progress.

2.2 Individual and societal attitudes

Also the individual or collective attitude is often considered as a factor that may drive development in contrasting directions. As for development the attitudes are on the one hand the pursue of material growth in a linear economy context ***vs*** an environmentally conscious society in a circular economy; as for the way civil society is organised the contrasting attitudes are of a top-down, centralised and elitist approach ***vs*** a bottom-up participative, decentralised and inclusive approach. Positive scenarios are linked with the second option of both attitudes.

2.3 The attitude towards climate change

Proactivity or reactivity to changes are another frequent dimension of scenario development. The two directions of mitigation (actions to prevent/limit changes) and adaptation are often treated separately. Scenarios are characterised by willingness to engage and invest in climate-friendly initiatives or a laissez-faire attitude, a continuation of "business as usual" under the influence of short term economic interests and a natural resistance to change. The **BaU approach** is invariably leading to **environmental or social collapse or both**.

2.4 Technology

Technology in all its forms (genetics, ICT and big data, mechanics and robotics, nanotechnology, artificial intelligence) is another key dimension of the future. Technology is seen by some as a **driver of prosperity** and the only way to material and social

progress; this positivist vision is prevalent in the scientific community and in the industry.

But part of society considers **technology as a threat**. Distrust in science and technological advancements is mounting and this is due in part to the **evidence of misuse** (or unintended consequences) of technologies of the past (e.g. the environmental damages produced by the "green revolution") and in part to the anticipation of **possible negative consequences** (e.g. unemployment, loss of control on data).

What is felt as a necessity is an **open dialogue within society** on science and technology and their applications. Social innovation is mostly obscured by technological innovation.

2.5 Public vs private

There is probably a need for a clearer **distinction between private interests and public missions** as far as policies and research are concerned.

Public research funding in the agricultural and food sectors is decreasing (with few exceptions) and research agendas are increasingly dictated by the private sector under the assumption that industrial competitiveness benefits society.

The **control** on food systems is shifting **from public to private** (e.g. with private certification schemes). It is necessary to reconsider this views and direct research financed with public money primarily at protecting **safety, health, citizens' rights, the environment and the public goods in general**.

At the crossing of technological approaches with industrial interests is the vexed question of "bio-fortification" of staple food, of "personalised nutrition", of 3D printed food. Proper education and facilitation of access to a balanced and varied diet would probably be more beneficial. Increased consumption of fruit, vegetables, pulses, nuts and seeds should not give way to technological fixes.

Paradoxically, **fruit and vegetables** are consumed in Europe far below recommended level, but constitute the largest share of **food waste**.

2.6 Inequality

Income and wealth inequality is perceived as a **threat** to sustainable development as it destabilises societies. It is not only richness that is concentrated in smaller and smaller elites, but also their overwhelming **influence** on economic and political decisions, on consumption models, behaviours. No real change of direction can be expected that would threaten current social systems.

2.7 Lock-ins against transitions

Several **lock-in factors** hampering transitions to sustainable food systems have been described with regard to a possible development of agroecological systems, but some are of general application to any conceivable deviation from current models: **a)** Path dependency (on previous investments); **b)** Silo structure of science and administration; **c)** Short term planning framework of policy makers; **d)** Concentration of power in the food chain (away from farmers and consumers).