wbcsd

case study

Syngenta: Assessing the robustness of a country's food security system through The Rice Bowl Index

Summary

Syngenta, one of the world's leading companies dedicated to the purpose of bringing plant potential to life, aims to help growers deliver greater food security to an increasingly crowded world in an environmentally sustainable way. That calls for a step change in productivity and resource efficiency – on both the world's 5 million large farms and its 450 million smallholdings. This will require a system-wide approach that links people, land and technology as the foundation for a sustainable production system.

RICE BOWL INDEX

The magnitude of the world's food security challenge is well documented. By 2050 the global population will exceed 9 billion people. In order to feed this population, it is estimated that global food production will need to increase by some 70 per cent. This is a tremendous challenge which is further exacerbated by existing constraints such as erratic climatic conditions, limited farmland availability, scarcity of natural resources as well as lack of infrastructure and finance.

This WBCSD case study highlights the Rice Bowl Index, an initiative conceived by Syngenta to facilitate positive productive dialogue, collaboration and action between governments, the private sector and other key stakeholders in the area of food security.

The Index assesses how robust a country's capacity is to address the challenges of food security. Its unique feature is that it captures the complexity of food security through a multi-dimensional approach and reduces this complexity into user-friendly charts and tables. These provide a platform for discussing potential action to address the challenges.

The Index consists of:

- A quantitative component which is a modular diagnostic platform examining the key enablers and disablers of food security, built on Frontier Strategy Group's MarketView© Platform;
- A qualitative component in the form of a white paper authored by Prof. Paul Teng, one of Asia's leading food security experts.

The Rice Bowl Index is the product of two years of planning and consultation with inter-governmental organizations, food and agriculture companies, non-governmental organizations, multi-disciplinary experts, academia, civil society groups and media.

Launched on the sidelines of the World Economic Forum East Asia Summit 2012 in Bangkok, the Index is an ongoing engagement platform with an initial focus on Asia Pacific.

Company context

Syngenta is one of the world's leading companies with more than 26,000 employees in over 90 countries dedicated to one purpose: Bringing plant potential to life. Through world-class science, global reach and commitment to its customers, Syngenta helps to increase crop productivity, protect the environment and improve health and quality of life.

The company aims to deliver integrated solutions that will transform the way crops are grown around the globe and to extend this contribution beyond yield.

Development context

In 1950 the world's population was just 2.5 billion people. In October 2011, the population reached 7 billion and by 2050 it will surpass 9 billion people. But while the population is increasing, the resources available to feed them are not. In 1950, a single hectare of land had to feed just 2 people, but by 2005 this requirement had doubled to 4 people needing to be fed from each hectare of available agricultural land. By 2030, that same hectare of land will need to feed more than 5 people.

As part of overall economic growth, agricultural growth has an important role to play in reducing and preventing under-nutrition through a number of channels. Its impact extends from increasing household ability to purchase and produce more nutritious food to economy-wide effects such as increasing government revenues to fund education, health, infrastructure, and nutrition-intervention programs. Furthermore, factors such as infrastructure, the status of women (including their educational level) and land distribution also contribute to how well agricultural growth translates into nutritional improvements.

Malnutrition is often associated with rural poverty. Poor farming households may largely rely on one single crop (e.g. rice) in their daily dietary consumption and may not have access to sources of proteins, essential vitamins and minerals. At the same time, poor health may further impact on their food utilization. But this nexus between poverty and malnutrition may also be translated to the cities. Urban poor live in slums and consequently living conditions may affect nutritional status in the form of malnutrition and poor health.

Also inherent in the food security challenge are the differences between large scale agriculture and smallholder agriculture, the latter of which dominates the Asian and African rural landscape. The International Food Policy Research Institute (IFPRI) has noted that smallholder farming technology is inadequate to meet the large productivity gains required to meet the increased food needs. The productivity gains required to meet the overall target have been estimated at 200% for smallholders in comparison to 20% for large farms.

Food security is a multi-dimensional phenomenon. Considering how robust a country's capacity is to withstand and address the challenges of food security can be transformational to a country's economic, social and technological development. To therefore move from a mere assessment of the problem to a more solutions-focused understanding, the Rice Bowl Index uniquely captures in a simple form the drivers (enablers or disablers) which will affect a country's capacity to achieve or improve food security.

Rice Bowl Index

The Rice Bowl Index is a tool which assesses the robustness of a country's capacity to withstand and address the challenges of food security. It captures the complexity of food security through a multi-dimensional approach and reduces this complexity into user-friendly charts and tables. These provide a platform for discussing potential action to address the challenges.

The Rice Bowl Index consists of a quantitative and a qualitative component:

- The *quantitative* component is a modular diagnostic platform examining the key enablers and disablers of food security, built on Frontier Strategy Group's MarketView© Platform. The Rice Bowl Index defines these as Demand & Price; Environmental Factors; Farm-level Factors; and Policy and Trade. Each driver is a composite of different metrics and proxies for elements of food security including consumer price Index, cereal yield, arable land, infrastructure and water availability, all of which are easily measurable using credible and publicly available data.

- The *qualitative* component is a white paper[1] authored by Prof. Paul Teng, one of Asia's leading food security experts. It interprets the platform data and identifies areas which require increased attention in terms of:

    - The development of appropriate policy solutions;

    - Investment in technology and infrastructure to enhance agricultural productivity and sustainability;

    - The creation of economic opportunities for farmers and the communities in which they live and work.

The tool serves as a common language for different stakeholders to engage in purposeful dialogue in support of a solutions-focused approach to the food security discussion. In doing so, the goal is to identify some factors which lend to collaborative planning for action and helps facilitate the move from "talk" to "walk".

[1] The white paper can be downloaded at http://www.ricebowlindex.com

Methodology

The Rice Bowl Index takes a holistic view on the enabling and disabling factors of food security, integrating relevant publicly available datasets, providing analysis with a solutions-focused mindset and creating a means for catalyzing collaborations.

The enablers or disablers of food security are described as factors – each of which may influence the state of food security. These factors are quantified on the basis of publicly available data and grouped into four rubrics:

- Demand and Price
- Environmental Factors
- Farm-level Factors
- Policy and Trade

A rubric score of approximately 15 (the actual number is a percentage) is considered as a 'high score'. Adding the scores of all four rubrics will result in a country score, which reflects the robustness of the country's food security system. This information can then be used to inform country-level policy.

In designing the Rice Bowl Index it was considered imperative to be able to answer the following related questions:

- How robust is a country's food and agricultural system to address the food security challenge?
- Which are the areas that need to be a focus for intervention?

In addition to these two broad questions which the Rice Bowl Index seeks to answer at a disaggregated level, each rubric is also aimed at helping address some additional key questions which it is considered must be asked by a country when seeking to improve the robustness of its food security system.

The component rubric Demand and Price seeks to answer the question:

- How are food security needs in the country likely to evolve in terms of quantity, affordability, access?

The component rubric Environmental Factors seeks to answer the question:

- Does the environmental capacity in the country provide for long-term agricultural productivity and sustainability?

The component rubric Farm-level Factors seeks to answer the question:

- Do farmers have the capability and means to be productive over the longer term?

The component rubric Policy and Trade seeks to answer the question:

- Does the trade and policy environment encourage open markets, investment and innovation on an ongoing basis?

Schematically, the framework on which the Rice Bowl Index is constructed is shown in Figure 1 below. The four rubrics are then synthesized to help understand how robust a country's food security system is likely to be given the various enablers and disablers that may impact within the country.

Figure 1: Key enabling and disabling factors of food security

Application

To maximize the potential of Asia's agricultural sector to improve food security in the region and beyond, governments, the private sector and other stakeholders must embark on a multifaceted, integrated and collaborative strategy, that is broad in scope and which is fully adapted to these dynamic challenges.

The Rice Bowl Index was applied to 14 countries across Asia-Pacific. In the white paper, the results are presented on a country basis over a period of four years split along the four main dimensions of the Rice Bowl Index (the actual platform produces results over a 15 year period but for simplicity only four years are presented).

Analyzing the Rice Bowl Index allows the user to identify common trends and gaps (e.g. yield gap, access to suitable credit facilities, access to market etc.), which in turn may serve as the starting point for a solutions-focused dialogue. Some countries may already have experiential or analytical knowledge on what has to be addressed in order to achieve food security. The added value of the Rice Bowl Index is that it addresses the issue in an unbiased, data-driven manner, with results that may either confirm or challenge preconceived notions. Moreover, it points to some 'low hanging fruit' where targeted action could yield significant improvement of the broader system.

The example of Myanmar

The trends analysis suggests that Farm-level Factors like cereal yield, available arable land, short-term household credit per capita and unit labor cost are important in driving overall levels of food security preparedness.

The overall Rice Bowl Index score for Myanmar over the time series 2001-2011 ranged from 33% to 40% in comparison with New Zealand, which had the corresponding low and high of 59% and 70% respectively. New Zealand's food security preparedness during this period was therefore roughly double that of Myanmar.

Drilling down into the detailed trends shows that during this period, the New Zealand highest cereal yield was 7.02 t/ha compared to the 3.6 t/ha Myanmar. Increasing cereal yield would therefore be an opportunity for Myanmar to improve its overall capacity to achieve and enhance food security. A multi-stakeholder dialogue should then be encouraged which focuses on how this yield gap can be narrowed.

Conclusions

By moving from the 'talking' stage to working towards a solutions-focused dialogue, the Rice Bowl Index has generated a great amount of interest and activity. It has also successfully highlighted the importance of a system-wide integrated approach in managing the key enabling and disabling factors of food security. Furthermore, the initiative has raised the understanding that, due to the multidimensional complexities of food security, improvements must be made in a sustainable manner for long-term advancements in food security.

Based on an analysis of the outputs of the Rice Bowl Index, the following conclusions can be drawn:

- In countries where agriculture contributes substantially to gross domestic product, farm-level factors have the greatest impact when considering how robust the food security system might be. This reflects a larger segment of the population being directly dependent on the production off the farm or the income generated from it.
- Farm-level factors fluctuate more than other factors irrespective of the overall stability and robustness of the food security system. This could point to a need to

improve the overall contribution of farm-level factors to food security robustness while recognizing that year to year fluctuation is inevitable.

- It is difficult to discern a direct causal relationship between farm-level factors and demand and price. It is important to recognize the complex interplay of access to markets, price transparency, the level of trade, government intervention in markets on overall system robustness
- Price volatility results in increased impact of price and demand on the robustness of a country's food security system. Stability of price and production is very important in considering a country's capacity to achieve food security.
- The policy and trade environment within a country has a longer-term impact on the overall stability of a country's food security system. A more stable and predictable policy environment, supported by free and open markets improves the overall robustness of the food security system.

- Environmental factors impact system robustness over an extended period and although change is generally gradual, extreme weather shocks can have immediate impact. It is important to avoid policy myopia on environmental factors because the opportunity for improving performance is substantial, while any intervention is likely to require significant time to manifest in positive change. It is essential that available resources are used in a sustainable manner.
- A country's capacity to address food security challenges is likely to be more robust where there is more balance between the four rubrics, suggesting that a focus on all contributing components is necessary to achieve a stable, robust food system.
- Population growth and urbanization present direct and indirect challenges to a country's capacity to address food security challenges as it also impacts the demand for and price of food.

It is anticipated that the Rice Bowl Index will contribute by providing a platform to identify aspects of food security which lend themselves to joint action between various governmental and non-governmental stakeholders to address. It will therefore provide focus to the ongoing dialogue and hopefully the right impulse to shift the dialogue from discussing the extent of the problem to forging the solutions needed to address the food security challenge: Translating complexity into an opportunity for action.

More information

Click on www.ricebowlindex.com to read more about the Rice Bowl Index.