A decision-support tool for the design of food & nutrition security programming

Bridging concept and practice in the Food System approach

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Why a decision-support tool?

Food & nutrition security (FNS) is an important policy goal for national governments in Low- and Middle-Income Countries (LMIC). Government policy makers, donors and other key actors are confronted with the complexity of factors that influence FNS. These factors originate from different levels, from macro-economy and national policy, to a diversity of local actors. This complexity creates risks and challenges that policy interventions do not reach their goals.

A Food System approach is increasingly used as a framework to understand and shape transformative action to achieve FNS (UNEP, 2016; GLOPAN, 2016; HLPE, 2017; FAO, 2017). Drawing from the UN Secretary General's Zero Hunger Challenge, a food system is defined as a system that 'embraces all elements (environment, people, inputs, processes, infrastructure, institutions, et cetera) and activities that relate to the production, processing, distribution, preparation, and consumption of food and the outputs of these activities, including socioeconomic and environmental outcomes.'

In recent years, more attention has been drawn to consumer preferences, urban-rural linkages, and the environmental and socio-economic effects of agricultural production and food supply chains. However, translating scientific insights on food systems into effective FNS interventions remains a challenge. The objective of this decision-support tool is to translate these insights into actionable recommendations for FNS programming.

Description of the decision-support tool

The decision-support tool uses theoretical insights from systems thinking literature (Meadows, 1999; Maani & Cavana, 2007; Nguyen & Bosch, 2013) and tacit knowledge of key informants through expert and policy workshops. It combines these types of knowledge through practical steps to focus, prioritise and strategise FNS interventions and policies that can bring about transformative change in food systems. It aims to base intervention programming on insights into the underlying dynamics (e.g. feedback loops, causal processes) of food systems and societal challenges.

Moreover, it uses system thinking to focus interventions on typical system behaviours (called archetypes) and on leverage points for bringing about transformative change. The stepwise approach leads towards identifying which actors are able to influence and direct this transformation. Taking the different steps helps to match the broader FNS objectives and the context-specific dynamics and relationships in food systems.

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Figure 1. Food Systems Decision-Support Tool

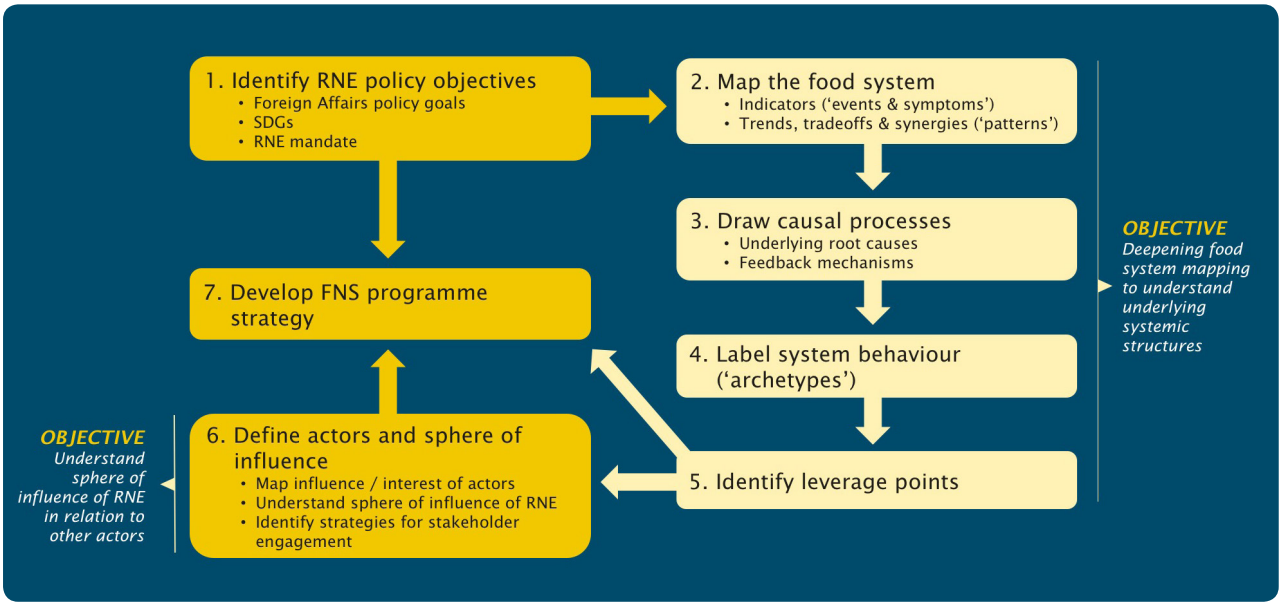

Figure 1 presents the schematic flow of the various steps which can be taken iteratively. The tool can be applied under the following conditions:

- Availability of good data and/or expert knowledge are required.
- Application requires skills in systems thinking and experience in analysing systems behaviour.
- Application encourages involvement of policy makers, key experts and consultants/researchers to facilitate the blending of knowledge types and co-create insights and recommendations for interventions.

Methods used for each step can range from light to comprehensive, tailored to the needs, knowledge gaps and resources available.

STEP 1 Identify FNS (policy) goals

Output: definition of geographical and/or functional boundaries of the food system under consideration

The first step is to connect general policy goals and mandates of the policy maker or implementer to bounded food systems. This will guide the focus, and thus the geographical and/or functional boundaries, of the food system analysis. For example, the mandate and/or policy goal may be restricted to a geographical area or a specific dimension of the food system (e.g. private sector development, child nutrition or sustainable agricultural development). The policy maker or implementer (e.g. Dutch embassies) may want to consider the policy goals of their key partners (e.g. the Government of the host country) as well at this stage to identify overlapping policy goals that can inform the boundaries of the food system intervention.

STEP 2 Map in the food system

Output: Overview of FNS indicators, food system activities, drivers, trends and interactions (synergies & trade-offs)

This step includes gathering information on the FNS outcomes, the food provisioning activities and processes, and the socio-economic and environmental drivers and outcomes of the food system (Berkum et al, 2018). The mapping includes the assessment of key indicators, as well as understanding (historical) trends, and synergies and trade-offs of outcomes. The food system framework: i) provides a checklist of topics to be addressed; ii) draws attention to the vulnerabilities of the food system; and iii) identifies the most limiting factors to achieving FNS. Depending on data availability and knowledge gaps, this step may consist of a light document review and use of expert knowledge to more comprehensive approaches such as scoping studies and surveys to gather the essential data.

Causal diagrams are drawn to highlight the key processes and feedback loops within the food system that result in particular FNS outcomes. Causal diagrams can be drawn manually in a participatory manner using expert knowledge, or based on more advanced modelling approaches such as Causal Loop Diagrams or

STEP 3 Draw causal processes

Output: Insight in root causes that shape the food system processes and FNS outcomes

Bayesian modelling techniques (e.g. agent-based modelling, fuzzy cognitive mapping). Causal diagrams depict which factors influence what and whether a change in one factor affects a change in another factor in a similar (positive) or opposite (negative) direction. Attention is given to feedback loops and whether these result in reinforcing or balancing dynamics that influence food system behaviour.

STEP 4 Label system behaviour

Output: Insight in system behaviour that perpetuates the FNS issue at hand

Literature on system dynamics distinguishes core types of system behaviour that are common patterns across any system, also called 'archetypes'. To change the food system outcomes (e.g. improved FNS), one needs to break the systemic pattern of feedback loops that results in undesirable outcomes. The archetypes are a useful tool to identify patterns in the food system that sustain a systemic problem. Understanding these dynamics will give insights into potential actions to bring about systemic change (leverage points, step 5).

STEP 5 Identify leverage points

Output: Identification of leverage points, where focussed efforts can trigger systemic change

Once the systemic problems have been defined, leverage points are identified to change problematic system behaviour. A leverage point is understood as a place in a complex system where a small shift in one factor or process can produce big changes in the food system. Leverage points can include the improvement of information flows, strengthening or weakening of particular feedback mechanisms, or introducing new incentives to influence actor behaviour. Leverage points can be formulated at different levels of effectiveness, following the logic of Meadows (1999). The leverage points further down the list (Table 1. Effectiveness of leverage points according to Meadows) are assumed to be more effective in achieving transformative change.

Table 1. Effectiveness of leverage points according to Meadows

	Intervention	Leverage type
1	Change observable numbers (constants, parameters)	Change in events
2	Change (material) stocks and flows	Change in trends
3	Adjust delays in causal loops relative to the rate of system change	
4	Regulate negative feedback loops to allow things to adjust to goals faster	Change in systemic structure
5	Change the rules of the system (e.g. incentives, constraints)	
6	Improve the information flows (adding feedback loops)	
7	Drive positive feedback loops to allow things to grow faster	
8	Allow diversity within the system for self-organisation and innovation	
9	Change the goals of the system	Change in mental models sustaining the system
10	Change the mindset and paradigm out of which the system arises	

STEP 6 Define spheres of influence

Output: Insight into the spheres of influence of different key players to activate the leverage points

Understanding the system dynamics is not yet sufficient to define actions. Understanding the dynamics of power and influence of actors is equally required to inform policies and FNS programming. A stakeholder analysis provides insight into the interests, mandates, relationships and power levels of different actors. Understanding the stakeholders' arena, and who can activate leverage points, can inform strategies for engagement with different actors in order to determine the sphere of influence of the policy maker or implementer (e.g. Dutch embassies).

STEP 7 Define FNS programme strategy

Output: Prioritisation of strategic interventions to improve FNS at scale

The final step is a matchmaking process where policy goals, leverage points, sphere of influence, and policy instruments are put together to inform the FNS programming. Interventions are being formulated for specific leverage points that are within the policy goals as well as sphere of influence of the policy maker or implementer. Prioritisation can be done based on a qualitative assessment of costs vs expected systemic change in the short and long term.

For further information

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