What is your idea?

Food systems are self-organizing, emergent, complex, and fast-evolving systems. Nobody designs them. Yet it becomes clear that **being able to influence food systems' outcomes is now becoming critically urgent, not only for the health and nutritional status of the World population** (2 billion people are suffering from vitamin and micronutrient deficiency while another 2 billons are overweight)**, but also for the future sustainability of the whole planet** (food systems are estimated to contribute 20-30% of the current GHG emission and to be amongst the major drivers of biodiversity and natural resource degradation). In effect, most experts agree that our food systems are "in crisis".

One of the critical issue is the current inability to understand and comprehend the dynamics and drivers of those complex systems. The conventional datasets and metrics that researchers are using offer a too narrow and too static window to comprehend food systems dynamics. Current metrics and their associated indicators are usually generated by national statistic offices, meaning that they are not collected with a frequency that allows to capture and reflect the dynamic of the processes at work, nor cover all the types of information needed. While these data offer a jumping off point for understanding macro level trends, they lack "resolution" into system dynamics. On the other hand, although more appropriate data can be collected through surveys and household level investigations, these instruments lack the scope and scale necessarily to get the "big picture".

To link those two levels (global and local) in a dynamic way, we need to do things differently and to think and look outside the conventional toolboxes which we have been using so far. We need to consider food systems at a holistic level yet recognizing that many of the push and pull and drivers affecting the dynamics of those systems operate at lower and/or across scales.

In this Inspire proposal we aim at testing this idea. We start from **the premise that all food systems are connected, directly or indirectly, at the global scale but that at the same time, the local structures of those food systems and their drivers of change, which are key elements in the dynamics of those systems, are poorly understood**. We aim to better understand these cross-scale connections.

To comprehend those, we argue that other "less conventional" types of datasets (such as social media network data and retailer transaction information) are needed that would allow us to get a more appropriate, more responsive and more at-scale insight into the dynamic of food systems. We are interested in the explanatory power of big data. **Our hypothesis is that those unconventional datasets coupled with national/global statistical data, can offer new insights into food system dynamics and their drivers**.

We have therefore partnered with Logyca, an enterprise specializing in logistics which manage all the barcode information in the Colombian supermarket system, and with the University of Wyoming which has been pioneering some of the most cutting edge applied research on social media analytics in relation to consumer choice, in order to develop a new picture of food systems.

How will you pilot it?

The analysis we propose will rely on three categories of data spanning from sub-national/national to regional and global scales -thus capturing the cross-scale dynamics we are interested in: at the global

scale, statistical datasets such as those made available by UN Comtrade (trade data), FAO stats (food production and basic use), WHO (health and nutrition information as well as their GEMS/Food consumption database), and UNHabitat (Global Urban Indicators database) will be used. To account for and integrate how people feel about and use food (one of the assumed key drivers of food systems), we will look to readily available Twitter data. Finally, to understand what people buy, we will use the barcode data and corresponding transactions information. With these data, we integrate across global trends, regional sentiment regarding food, and individual purchases.

The ambition is to explore and mine this new combination of multi-source datasets in order to 'dive' into food systems. While the global data is relatively static, the "tweets" and barcode data represent some of the highest velocity and most dynamic consumption-related data available. This exercise is about identify one or possibly a combination of those multi-source datasets and to test whether our hypothesis is correct: that they can bring remarkable and useful insights into current cross-scale food system dynamics and help identify some of the entry point for interventions around food systems drivers. We expect that this analysis will open up a new and totally unexplored domain of big data applications in relation to food system with some extremely important implications in terms of policies related to nutrition, health and environmental sustainability.

Our implementation is structured in three consecutive phases, beginning with an analytic overview of each dimension of data. This will be followed by a technical workshop where project partners will evaluate what each data source offers and how this relates to or brings insight into food system drivers. Finally, all the data will be pooled together and an appropriate analytical framework developed to understand the relationship between the different datasets and the aforementioned drivers.

As an output of this effort, we aim at developing an approach that will allow stakeholders to explore different food system characteristics and potential correlations across scales. The results of the analysis will be made widely available to the public through existing channels, including the Big Data platform and A4NH websites, in order to allow potential users from both public and private domains to test and explore further the concept in relation to their own needs. **The direct expected outcome of this work will be a better understanding of the relationship between global trends, consumption patterns, and food systems drivers, and the identification of direct entry points for interventions and policies at subnational, national and global levels, potentially touching billions of people.**

The budget will cover the following: two visiting researchers for one year (one hosted by University of Wyoming, the other by CIAT); travel costs and logistics for one meeting to be convened in Cali, Colombia; full membership at the GS1 level in the Logyca foundation; costs of data dissemination and open access publications, and travel costs to present the results at one international forum.

Much more remains to be explored. If successful, we will use this work as a **proof of concept** to widen even further the analysis, team up with more global partners, and explore how linkages between production, trade, consumption and individual behaviors change at different scales and simultaneously in different places, given the interactions of slow (climate change, demography) and faster trends (e.g., associations between the global nutrition transition and pandemic obesity).