Big data: Role of Public Organizations for a Proper Use of Agricultural Data

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Why are we talking about big data in agriculture?

The answer to this question lays at the convergence of two large trends. The first trend is that farming is getting more and more complex with multiple parameters to be considered such as the weather, market trends, soil fertility, pest management, farm labor, water and so on. And in this highly complex environment, farmers need to overcome the tri-fold challenge consisting of (1) producing enough nutritious food for increasing demographics, (2) cropping in a sustainable way, and (3) being profitable. The second trend is the advent of information and communication technologies in agriculture. The first trend calls for more data and the second trend generates more data.

But at the heart of this context befalls a more profound problem which is the knowledge gap existing in agriculture. For instance, there is no way to tell what is the outcome of cutting N fertilizer by a quarter on important outcomes such as yield, net return, GHG emissions or groundwater pollution. While in other industries this would not be acceptable, agriculture is an industry that has to cope with the wide diversity that is intrinsic to the natural environment. There is an inverse relationship between the knowledge we have about a system and the resources required to exploit it. Therefore, the less we know about a system, the more we need to exhaust its resources. The knowledge gap in agriculture has thus led to the current global agricultural crisis. It is believed that Big Data can increase knowledge in agriculture and help bridge the gap.

What is the Role of Public Organizations for a Proper Use of Agricultural Data?

In order to tap into the power of Big Data in agriculture a cycle needs to take shape where data is generated, rendered accessible to data scientists, processed (from data to knowledge) and knowledge been redistributed to farms, where data is generated. The key to the self-sustainability of this cycle is to create and demonstrate value in Big Data. Once value is there, stakeholders will have interest to feed, use and thus sustain this cycle. In my opinion public organisations have a role to play in assisting stakeholder in the value seeking process (e.g. research, start-ups, early adoption, grants…). Public organisations should also make sure that a workforce that can manage, analyse and manipulate large datasets is being trained. The question of standardisation is debatable (i.e. industry or government should set the standards?). However, there is a need to maintain standards to ensure that agricultural datasets follow "FAIR"—Findable, Accessible, Interoperable, and Reusable—principles.

In summary, public organisations may not need to act as service providers in the exploitation of Big Data, but they have a role to play in the emergence of a Big Data exploitation cycle that will help bridge the knowledge gap existing in agriculture.