

Reward for effort by doing the boring stuff!

**Data Ag Coop –**



**Solution or amplifying problems**



## The opportunity

- Heroic Estimate \$120 a hectare (BCG RDV Vic State Govt Funded Study)
- With \$70 available to the farmer (In ideal perfect world!!)
- Great but most farmers I am talking to go – Yeah Right



# Connectivity



Table 2: Cost of poor mobile phone reception for farmers

Item	Value
Hours per week spent driving to make phone calls	2
Cost of time per hour (including on-costs)	\$50
Cost per year	\$5,200
Average farm hectares	3,000
Cost per hectare	\$2

Table 5: Cost to BCG of not being able to implement Office 365 due to poor internet service

Metric	Value
NPV per license over 3 years	\$2,961
Number of licenses at BCG	23
NPV for BCG over 3 years	\$68,114
Office 365 benefit as a proportion of turnover	1%
Office 365 benefit as proportion of theoretical 'profit'	8%

Table 6: Average benefits from internet connectivity through variable rate technology

Increase in gross margin per hectare from VRA	\$30
Increase in uptake of VRA with fast internet	10%
Average increase in gross margin/ha from faster internet	\$3



## Capability

- Scariest question I can think of any farmers asking any of us!!!
- how to invest \$100 000 to set themselves up so they can harvest the benefits of digital agriculture
- Can any of us identify someone who has capability to answer this question and provide independent thoughtful advice
- What role do Growers groups have. –What skills capabilities do we need and how do we acquire them



# Trust

## Requirements Governance

- Comply with potential **ethical/regulatory** issues, notably related to autonomous processes
- **Ownership of data, privacy and liability** aspects
- Ensure **security and trust**
- Provide business models for **viable exploitation** of the IoT-based solutions



# Key barriers

Lack of standards

Lack of leadership

Technology

Lack of a business case or clear  
value proposition

*“The business case isn’t there because someone hasn’t created one.”*





# BCG Data Coop

BCG is seeking to start a business that will allow growers to pool data in order to benefit their individual businesses. Allow BCG to obtain information and advice on a member-based business structure. How business models would fit with collective capturing, storing and utilisation of agricultural data for the benefit of growers.

What legal protection do growers need

What are some of the technical challenges





**Development and implementation of best bet business structure to allow Data Coop/collaboration to be established.**

**Approximately 50 growers invited to participate.**

**Focus on machine data sets from harvesters and tractors**

**Combined with environmental data sets such as weather, soil and soil moisture.**



# Creating a farmer data coop



**A data coop : enable farmers to collectively manage how value from their data is created and shared.**

**a mechanism to actively engage with other participants and build value across the agricultural industry.**

# Key requirements for market operation

## Data prosumers (farmers) need



- To receive benefits (in the form of on farm productivity gains) for sharing their data
- These benefits need to exceed the benefits that flow to those who do not contribute data
- Fine grained control over access arrangements for their data
- Clear and enforceable ownership arrangements for their data

## Service providers need



- To access public, private and club data goods as raw inputs to services they are developing
- To be able to cover costs of service provision through revenue for services or other mechanisms (e.g. government funding)
- Low transactions costs to find and access data

## Everybody needs

- Clearly defined rules of the game including:
  - data ownership, usage rights (licensing); and
  - how and what benefit flows and to whom
- Low transactions cost for sharing, discovering and accessing data and services in the market

## Users need



- To find and access data and services at the right price

## Market operators need



- To establish and cover the costs of operating a data market
- A way to measure market transactions (data and service offerings and consumption)



## The market operates in the context of:

- Co-existence and interaction of public, club, and private good type data and services offered by government, industry, research players
- Varying levels of motivation for participants to share different types of data to varying degree

# This first workshop was about understanding the value proposition of a farmer data coop delivered

## WORKSHOP I: 18 OCT

### *Questions that we sought to answer.*

- What are the benefits to farmers of creating a data coop?
- What data would be required to deliver those benefits?
- What are the barriers to creating a data coop?
- Who else could draw value from a data coop?
- What are some strategies that could deliver the benefits?
- What is the broad roadmap to pursuing these strategies?

## WORKSHOP II: JANUARY - FEBRUARY

### FINANCIAL MODEL

- Key sources of funding
  - Start up funding
  - Revenue streams
- Revenue model
  - Membership fees
  - Subscription fees
  - Fees for service
- Expenses
  - Staffing
  - Technology
  - Legal & Governance
  - Engagement
- Phasing
  - How many farmers over what time frame via what channels
  - What partners and when

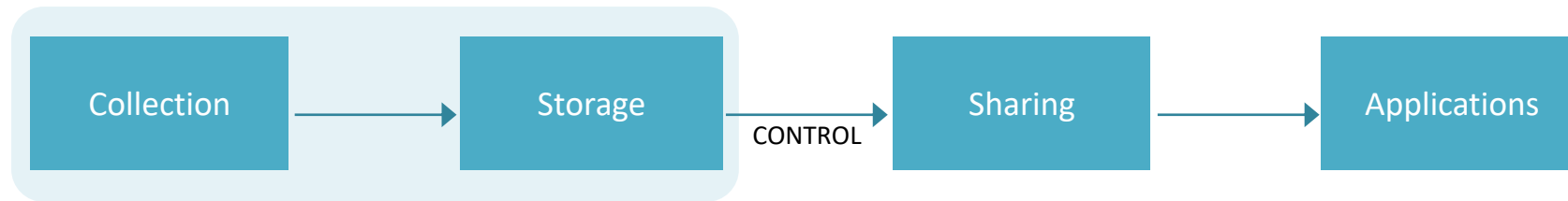
### LEGAL MODEL

- What are the coop objectives?
  - What is its purpose?
  - What are its boundaries?
- What is the coop structure?
  - Who are members?
  - Types of members?
  - Who are customers?
- Member requirements?
  - Contributing data?
  - Subscriptions & joining fees?
  - What happens if they leave?
  - How is privacy assured?
- Decision making rules?
  - Delegated authorities?
  - Simple majority decisions?
  - Special resolution decisions?

- And next steps

# Why create a farmer data coop?

What is the mission of a farmer data coop?  
“To promote better farming practices through data management & analysis” ...?



**A data coop is a way for farmers to exercise control over the data collected from them. It can deliver value to farmers as individuals, while also retaining the value of data in aggregate for the farming community.**

# A farmers' data market – under the hood

Markets bring together providers and consumers of data and services, facilitated by digital platforms that lower the transaction cost of interactions to discover, access and use data and services

1

Data providers - data holders can choose whether they engage with a market and offer data as private, club or public goods. Their willingness to offer data into the market is influenced by benefits they receive and costs and risks they bear.

2

Data providers - make decisions about if, how and with whom to share their data. Potential data providers' attitudes towards excludability, rivalrousness (or disbenefit of sharing) determines under what conditions the data is offered and to whom. Privacy and commercial confidentiality are major factors that may cause disbenefit in sharing arrangements. Collectively these factors determine data providers' 'willingness to accept' (WTA) – the minimum benefit they have to receive to share their data.

3

Types of economic goods - In data markets, three types of data goods co-exist, each of which exhibit different properties: private, public and club. Providers make a conscious (and institutionally conditioned) decision about how their data is treated in the market. In some cases, regulation may prevent data from being shared (e.g. privacy legislation) and in some cases data providers may not want to share data. Money or access to services may be offered as an incentive to share some private data with

4

Incentives and institutions - institutions set the 'rules of the game' that incentivize and set the conditions for conducive behaviours for data sharing and use in the market. These rules provide the necessary trust underpinning the market.

5



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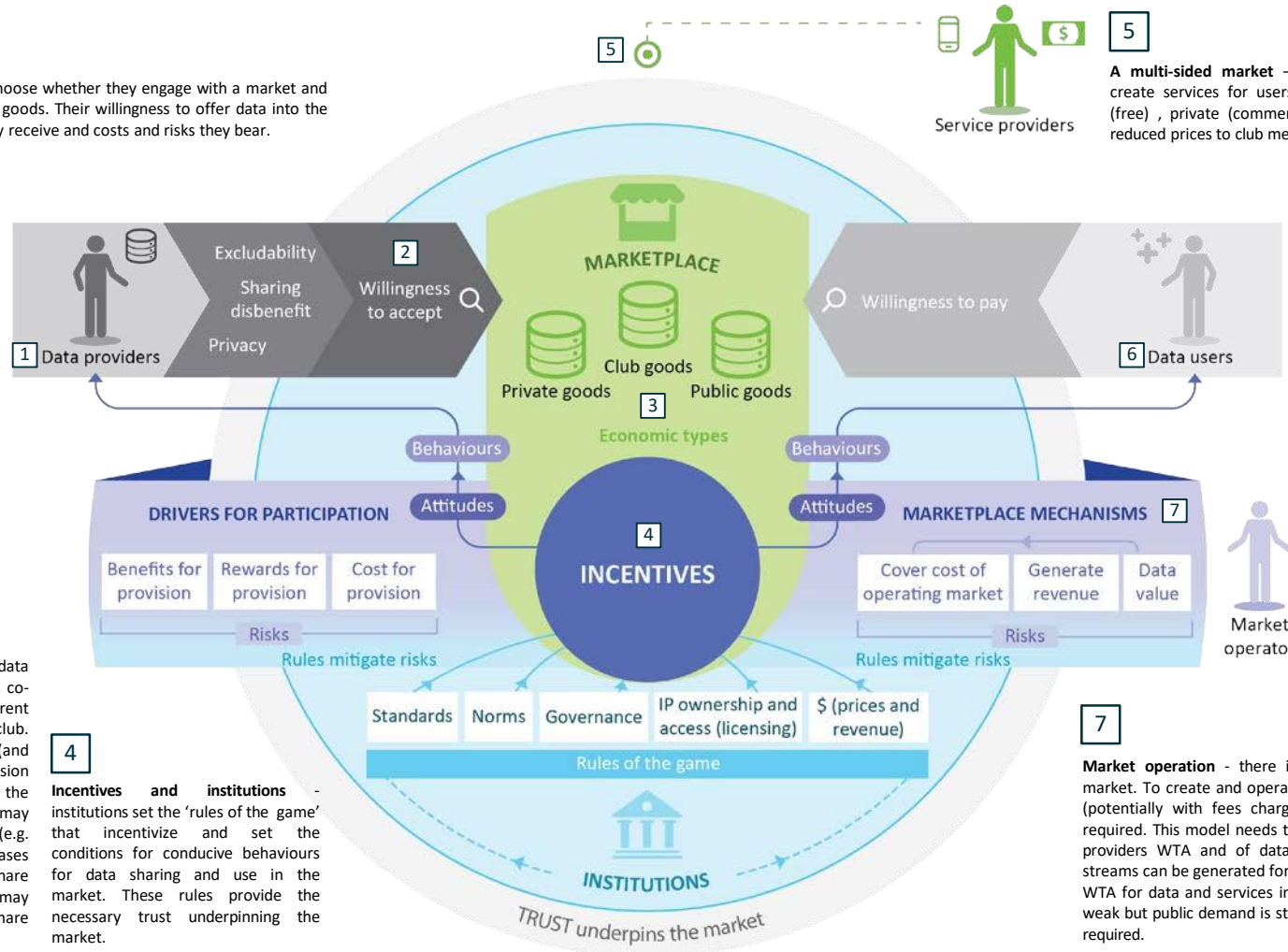
A multi-sided market – service providers access data and create services for users. Services may be offered as public (free), private (commercial) or club (offered for free or at reduced prices to club members e.g. data providers) services.

6

Data and service users – users engage in the market to find and access data and services that meet their needs. Users' demand for data and services can be described as their 'willingness to pay' (WTP) – the maximum amount they are willing to pay to get access.

7

Market operation - there is a cost to establish and run the market. To create and operate a viable market, a revenue model (potentially with fees charged for data and service access) is required. This model needs to factor in an understanding of data providers WTA and of data and service users' WTP. Revenue streams can be generated for platforms if total WTP exceeds total WTA for data and services in the market. Where private WTP is weak but public demand is strong, then other funding models are required.





# What are the potential benefits that data could deliver and that farmers care about?

The starting point for a data coop is delivering immediate value to farmers. The following are the key direct benefits that farmers believe data could deliver to them.



## BETTER INPUTS

- Cheaper, tailored insurance
- Simpler technology
- Cheaper, flexible bank credit
- Cheaper, better equipment
- Just in time supplies
- Cheaper, flexible lease terms

## BETTER DECISIONS

- When to sow on my farm
- Which seed variety
- Which fertilizer recipe
- When to fertilize my crops
- When to treat for weeds
- How resistant are varieties

## ADDED VALUE

- Premium product price
- Localised research
- Greater market demand

Farmers tend to focus on managing risk, as the factors driving revenues and input costs are often out of their direct control (eg. product prices and supply bottlenecks). In terms of ranking the potential benefits, decision support tools were therefore considered the highest priority.



# What data is needed to deliver the benefits that farmers most value?

'Critical data' (★) will enable aggregated analysis that provides immediate value.  
 'Important data' (✓) will add detail and more value to analysis.



	Variety	Yield	Location	Time/date	Rainfall	Farming Method	Soil Type	Nutrient Program	Disease	Pests	Extreme weather
Which variety provides greater yield?	★	★	★	★	✓	✓	✓				✓
What is the best time to sow for my conditions?	★	★	★	★	✓	✓					✓
What is the optimum nutrient mix to drive greater yield?	✓	★	★	★	✓		✓	★			
How much fungicide to apply and when?	✓		★	★					★		
How much pesticide to apply and when?	✓		★	★						★	
Can I manage frost and heat stress in real-time?	✓		★	★							★
How resistant are my crops?	★		★	★		✓			★	★	★

# How is data collected and where is it stored?

This suggests that accessing data from farm management software could initially be the simplest way to aggregate data. Question is how many farmers use one of the four key platforms?

## FARM MGT SOFTWARE

- 4 key platforms (plus 10 smaller ones)
  1. Back Paddock
  2. AG World
  3. PAM
  4. Production Cost
- Farm management software can store a range of data, though not all farmers will collect all types of data – for example:
  - **Variety**
  - **Yield**
  - **Location**
  - **Time/date**
  - Rainfall
  - Sowing/germination date
  - Nutrition program
  - Chemical use log
  - Financials

## LABS

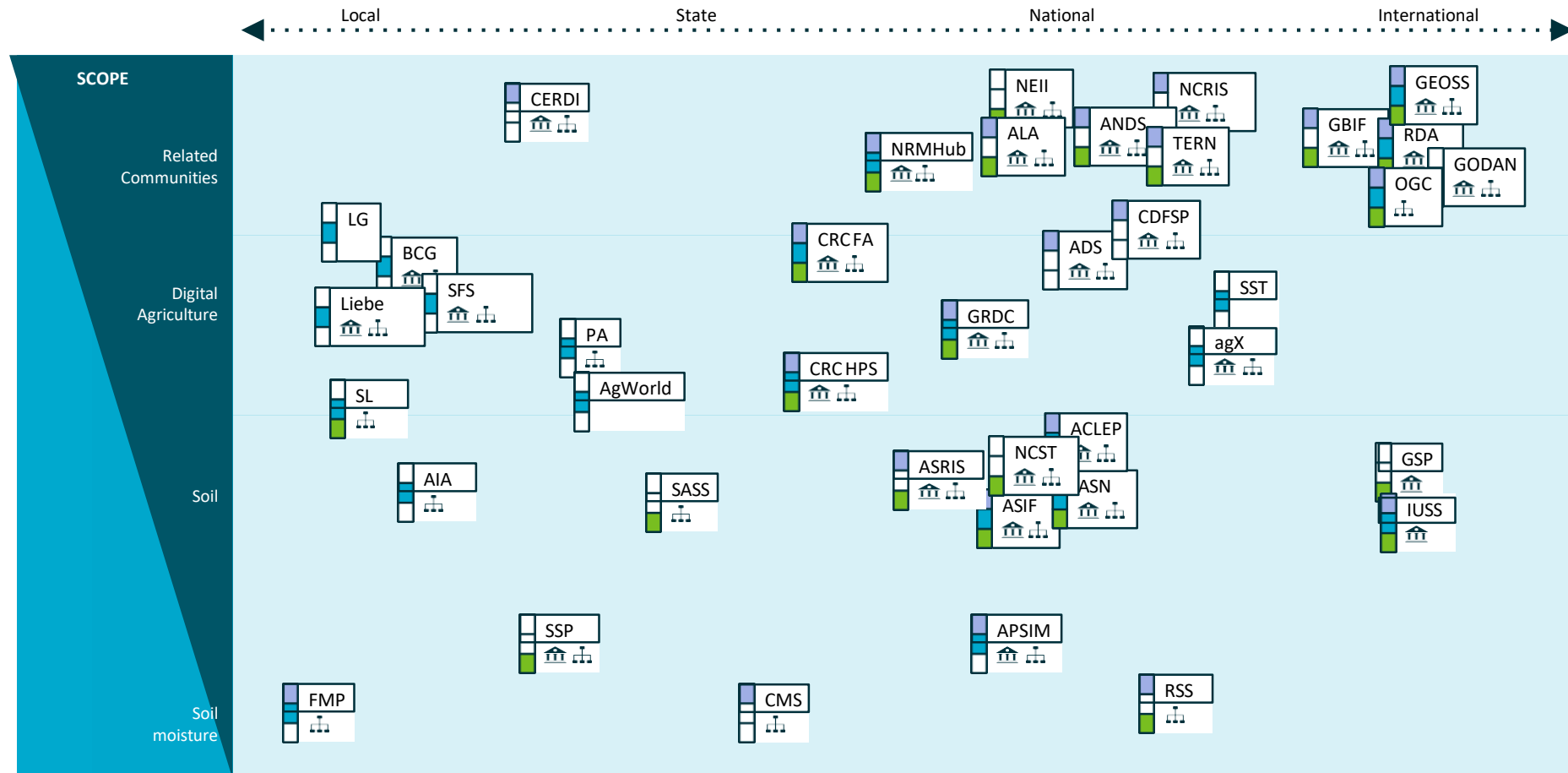
- Pests and disease
- Soil moisture
- Grain quality

## OTHER SOURCES

- Open data – for example:
- BOM
  - Twitter/Google

- Proprietary data – for example:
- Chemical suppliers
  - Seed suppliers
  - BCG rainfall data
  - Agronomist observations
  - AgriPath benchmarking
  - Smart farming machines
  - Farm installed sensors

# Ecosystem Map



**Key**


**Sector**

- Research (Purple bar)
- Industry (Blue bar)
- Government (Green bar)

**Nature of the initiative**

- Institutional structure (Building icon)
- Technology platform (Network icon)

There is a large number of inter-related data projects and initiatives in the digital agriculture space. To contextualise the National Soil Data Project and the soil data community building activity, an 'ecosystem map' was produced. This provides a mapping of known, relevant activities in terms of geographic and thematic scale (horizontal and vertical axes) and an indication of nature of participants - research industry, government.



# What are the key barriers to gathering data and delivering value to farmers?

There is a trade-off between motivation and ability. The harder it is for a farmer to share data, the more motivated they must be.

## MOTIVATION – Farmers need to be willing to share their data

### ENGAGING INSIGHTS

“We don’t have the skills to use data collected in a compelling way - if the coop could enable this, that would be of value”

### PRIVACY & SECURITY

“We want to know that our data isn’t going to be sold and used against us – that we can control how and when it is shared”

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## ABILITY – It must be easy for farmers to engage

### EASE OF SHARING DATA

“We don’t have a common interface between our systems – it would need to be easy to upload and share our data”

### EASE OF ACCESSING ANALYSIS

“We have enough IT systems already – it must be simple to access and understand the recommendations from data analysis”

# What are potential strategies for engaging farmers?

Developing tools to deliver initial decision support benefits can be achieved without relying on external data or service providers.

## MOTIVATION – Farmers need to be willing to share their data

### ENGAGING INSIGHTS

- Build farmer understanding of benefits:
- Reference group & word-of-mouth
  - Business development activities
  - Encourage agronomists to participate

### PRIVACY & SECURITY

- Address farmer concerns through:
- Clarity around scope & purpose of project
  - Rules around data sharing – who & how
  - Communication of tech & legal constraints


## ABILITY – It must be easy for farmers to engage

### EASE OF SHARING DATA

- Ideally, farmers agree to share, and data is transferred directly from FMS to BCG/coop
- Alternatively, upload via simple interface or pre-formatted excel spreadsheet

### EASE OF ACCESSING ANALYSIS

- Benchmark reports – need to be relevant and simple to consume (even hard copy)
- Decision driven analysis – question driven tools that provide relevant responses



# So what is the value proposition for a data coop?

While the expression of this value proposition is a little bland, the objective is clarity. We can always add a dash of bling once there is clear agreement.



**“We enable valuable insights from farmer data”**

*This implies that:*

- Farmers can share their data – there are mechanisms to gather farmer data
- Farmers can control their data – both at the individual and aggregate level
- Farmers can access valuable insights – there are tools for analysis and delivery

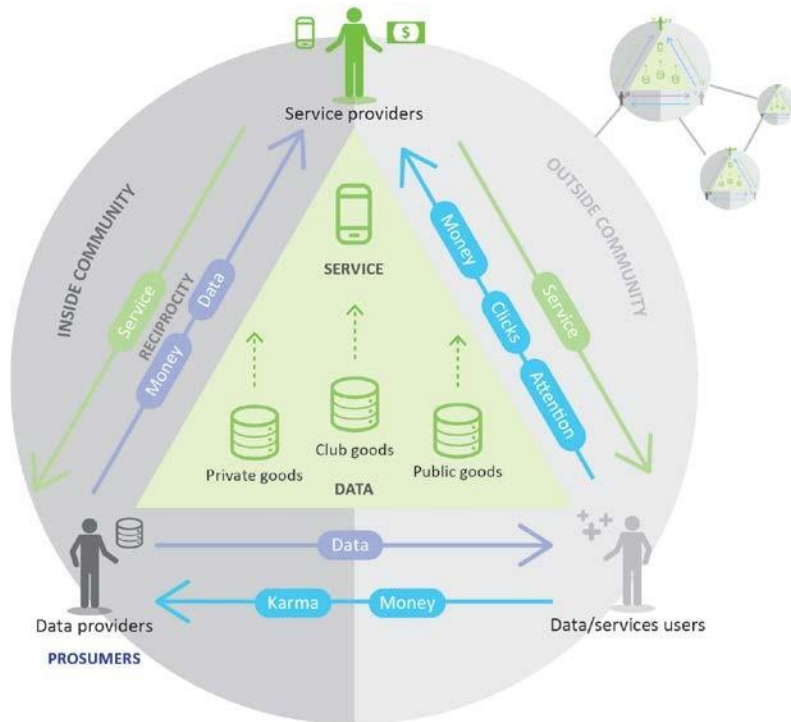
Scoping the role of the data coop in enabling these capabilities and how it leverages existing technology and external expertise is to be undertaken through to the next workshop.

- Benefits need not be confined to farmers – the coop can enable insights for non-farmers
- Data need not be confined to farmer data – adding other data sources can broaden the potential insights

The coop doesn't have to rely on farmer data exclusively nor must it confine its services to farmers. This raises questions about how other industry participants could benefit from farmer data and how this would impact on the scope of the data coop - the services it provides, and who are its members, customers and partners?

# A multi-sided farmers' data market

## Data and services use & exchange value



**Data provider <-> data User**

Users access data for dollars or 'karma' flow back to providers.

**Data provider <-> service provider**

Data providers 'trade data for services' or pay for (potentially subsidised) services in return for their data. There may be an element of reciprocity in the data trading, with service providers also receiving revenue from service fees.

**Service provider <-> service user**

Service users pay for and/or return benefit to service provider in the form of their attention/usage. Services are provided for profit or free with costs covered through other means (government funding, cross subsidies by other services)

### Multi-sided markets for service provision

Two-sided markets facilitate the interaction between two types of participants (providers and users) engaged in mutually beneficial exchange of one type of good (i.e. data in the context of this report). Multi-sided markets are platforms that facilitate exchange between data providers, users and value adding service providers. In a data market, service providers are able to access data and create services for data-service users.

Enabling value adding service providers – to access data and develop services that deliver value back to farmers is the primary goal of the market place. Value adds may be private, research or government actors developing free, paid for or discounted services to specific users (e.g. those contributing data).

Data is a key raw material for services. Service providers access data from providers via the marketplace. Data may be public private or club goods. Service providers may need to pay for access to individual's private goods or collective (club) goods. Service providers may also offer free or discounted services to those providing data.

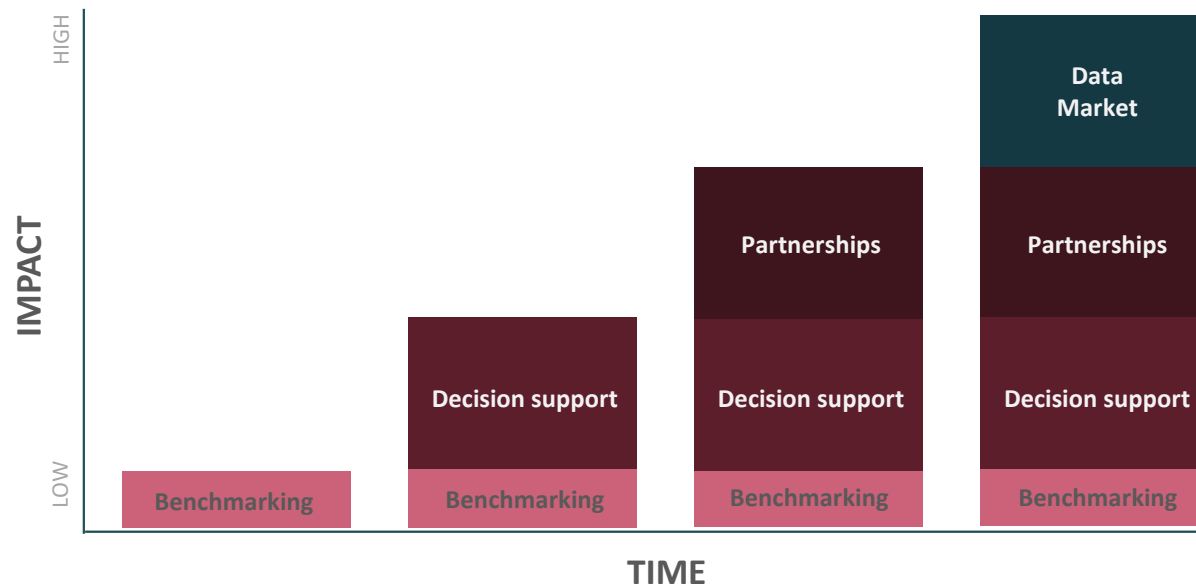
Services – a wide diversity of services could be offered ranging from basic access services (e.g. services enabling users to find and download data – typically part of the market platform) to 'value add' service e.g. weather crop yield forecasting drawing together multiple sources of data. Services could be offered for free (public goods) for fee (private goods) and can draw on and use all types of data goods Service may be digital or analogue (e.g. agronomy advisory services based on access to data and digital services).

Tracking transactions - given the range of exchange transactions and benefit flows between providers in public, club and private goods space, there is a need to track provision and consumption.



# How then to build a data coop's capabilities?

Note that the relative impact of each phase is not modeled here as this is beyond the scope of this analysis. The objective is to illustrate how capabilities can incrementally grow by building upon the previous phases of development.



- 1. Yield benchmarking** - delivering immediate benefits based on data that is most easily collected and collated
- 2. Decision support** – growing the data set with more granularity and by source to expand value delivered
- 3. Partnerships** – sharing the growing data sets with others in exchange for value
- 4. Data market** – creation of open data market where data and value can be exchanged



# What are the key assumptions underpinning the pilot project that are to be tested?

The pilot “Benchmarking” project is proposed as a way to both test the key assumptions and to lay the foundations upon which a data coop can then be built.

## MOTIVATION

### YIELD BENCHMARKING OFFERS ENOUGH IMMEDIATE VALUE

Need farmers to want to engage with pilot by overcoming their concerns and offering immediate payback. Assumption is that Yield Benchmarking offers enough incentive and Privacy & Security issues can be addressed.

## RISKS

## ABILITY

### FARM MANAGEMENT SYSTEMS CAN SIMPLIFY SHARING

Need to be able to access data in a efficient, effective and sustainable way. Assumption is that data will be able to be collected from the providers of Farm Management Systems directly subject to farmer’s authorisation.

## ENGAGEMENT

### CRITICAL MASS OF FARMERS TO DELIVER VALUE

Need a large enough initial data set to offer value through benchmarking. Assumption is that BCG’s engagement strategy will attract participation from 40-50 farmers – and this will be sufficient to access network effects.

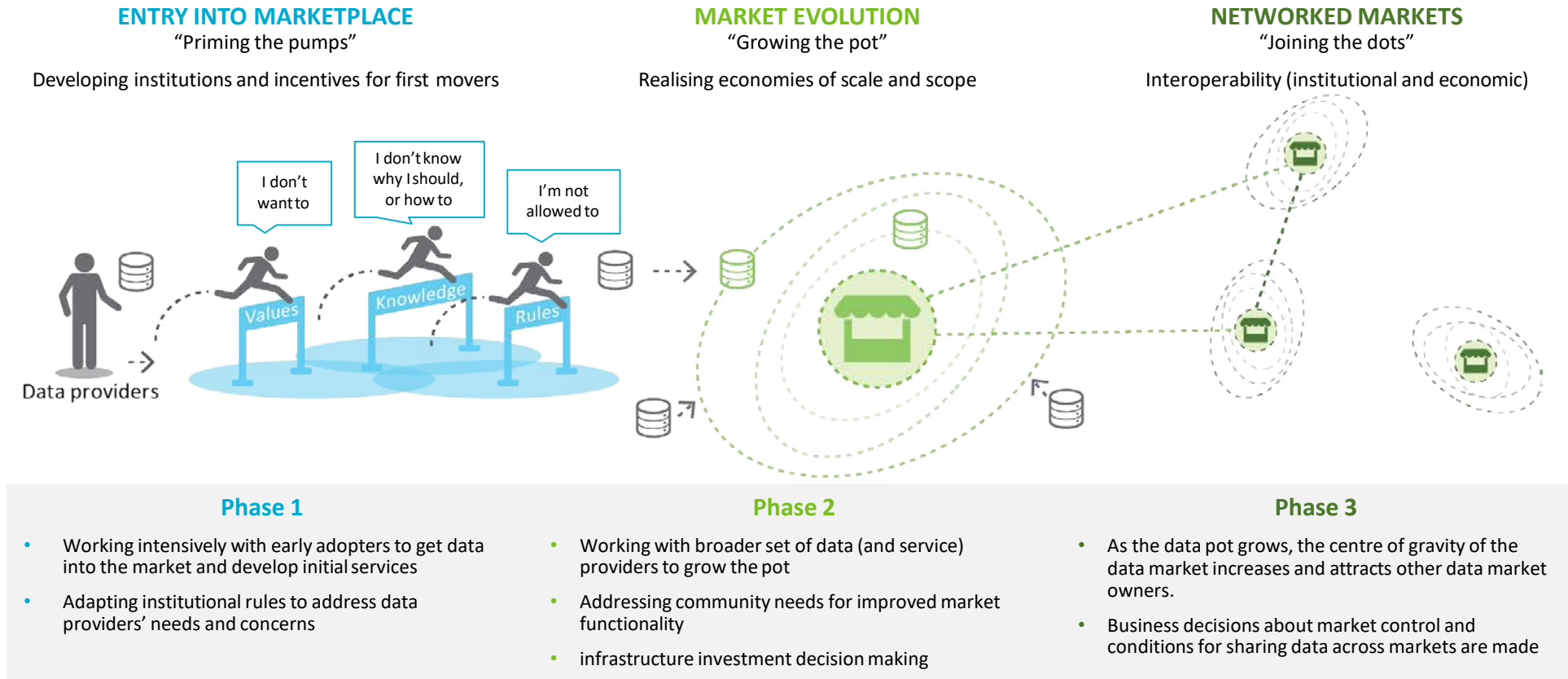
# Market evolution

## Three phases of establishment, growth and interconnection

A broad pattern of market evolution is hypothesized based on other work and anecdotal evidence. Market evolution can be characterised as three phases:

- **Priming the pump** - establishing the market institutions and incentives to drive participation;
- growing the (data and services) pot** - evolving institutions and exploiting economies of scale and scope to establish conditions to form critical mass of data

providers, service providers and users; and **networked market** where data markets merge or interconnect. As the market progresses through these phases, and the pot of data and services grows, the rules of the game will need to be adjusted to reflect the changing nature of incentives.



# Data cooperative

## Principles

One of the key challenge in building a data cooperative will be around data governance, that is, decisions about access to and use of individual farmer contributed data, for what purpose and under what terms. The role and value add of a cooperative in brokering and managing farmers' collective data as opposed to each individual farmer managing their own data interests will need to be explored.

Cooperative principles developed by the International Co-operative Alliance are provided on this page<sup>1</sup>. These principles relate to the overall operation of a cooperative of any type. They are presented here to stimulate thinking about how these principles might be applied to governance of data as a shared resource.

### 1. Open and Voluntary Membership

Membership in a cooperative is open to all persons who can reasonably use its services and stand willing to accept the responsibilities of membership, regardless of race, religion, gender, or economic circumstances.

### 2. Democratic Member Control

Cooperatives are democratic organizations controlled by their members, who actively participate in setting policies and making decisions. Elected representatives (directors/trustees) are elected from among the membership and are accountable to the membership. In primary cooperatives, members have equal voting rights (one member, one vote); cooperatives at other levels are organized in a democratic manner.

### 3. Members' Economic Participation

Members contribute equitably to, and democratically control, the capital of their cooperative. At least part of that capital remains the common property of the cooperative. Members allocate surpluses for any or all of the following purposes: developing the cooperative; setting up reserves; benefiting members in proportion to their transactions with the cooperative; and supporting other activities approved by the membership.

### 4. Autonomy and Independence

Cooperatives are autonomous, self-help organizations controlled by their members. If they enter into agreements with other organizations, including governments, or raise capital from external sources, they do so on terms that ensure democratic control as well as their unique identity.

### 5. Education, Training, and Information

Education and training for members, elected representatives (directors/trustees), CEOs, and employees help them effectively contribute to the development of their cooperatives. Communications about the nature and benefits of cooperatives, particularly with the general public and opinion leaders, helps boost cooperative understanding.

### 6. Cooperation Among Cooperatives

By working together through local, national, regional, and international structures, cooperatives improve services, bolster local economies, and deal more effectively with social and community needs.

### 7. Concern for Community

Cooperatives work for the sustainable development of their communities through policies supported by the membership.

1 – Source the International Co-operative Alliance <https://ica.coop/en/whats-co-op/co-operative-identity-values-principles>



# Summary – Workshop Findings & Recommendations



## Key Findings

- 1) Pilot and Launch – BCG can test the concept of a data coop with data collected from farmers and without committing to a specific technological solution. This incremental approach enables farmers to retain maximum control and flexibility while building a valuable data set.
- 2) Partnerships & Data Market – once a data coop has been established, farmers would be well positioned to share their data with other participants – both to support activities for the public good and for commercial purposes.

## Key Recommendations

Ahead of next workshop, the following areas are to be scoped:

- 1) Legal – a draft MOU that meets the needs of farmers, BCG and participating 3<sup>rd</sup> parties
- 2) Technology – a solution that offers the flexibility to build upon or migrate to another option
- 3) Engagement – a plan for engaging with potential farmer participants in the pilot program and to gather support from aligned parties (eg. agronomists)
- 4) Financial – a financial model that identifies the key variables that will underpin the economic sustainability of a data coop