



Putting nature and people at the centre of food system transformation

Training

The Economics of Ecosystems and Biodiversity
for Agriculture and Food
Operational Guidelines for business



**CAPITALS
COALITION**



Module 3

Chapter 3.1

**Introduction & Module 3
Learning objectives**



**CAPITALS
COALITION**

Module 3

Stage 3 Measure and Value : how to start measuring and valuing your impacts and dependencies on the capitals?

Structure

- Introduction & Module 3 learning objectives
- Your business case
- HOW -Measure & Value stage: Measure impact drivers and/or dependencies
- HOW - Measure & Value stage: Measure changes in the state of capitals
- HOW - Measure & Value stage: Value impacts and/or dependencies
- Summary of lessons learned



Overall course learning objective

By the end of the course, you will:

- Understand how the capitals approach provides direction for better **business decision-making**.
- Be familiarized with how to assess **business risks and opportunities** based on natural, social, human capital.
- Have a basic understanding on how to assess, **measure and value your impacts and dependencies** on nature and people across operations and **value-chains**.
- Be familiarized with the process of a **capitals assessment** and be equipped with the tools to start an assessment in your company.
- Be inspired to **drive change** within your organization, by sharing data, setting targets and **transforming business actions**.



Learning objective module 3

By the end of this module, you will:

- Be introduced to the Guidelines third stage: **Measure & Value (HOW)?**
- Understand how to map impacts and dependencies across a **value-chain.**
- Understand how to **use indicators to measure** impacts drivers, dependencies, and how to **value the consequences** of the changes in the capitals.
- Gain inspiration** from businesses that have measured and valued their impacts and dependencies on the capitals





Module 3

Chapter 3.2

Your business case



CAPITALS
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User Template



Your business case

5 Measure impact drivers and/or dependencies

Outputs that you should achieve from this step:

- ◆ Map of activities of the value chain against impacts drivers and/or dependencies
- ◆ A list of indicators for each prioritized impact driver and/or dependency associated with the chosen business activities, in accordance with the chosen organizational focus and value-chain boundary
- ◆ Available data and data gaps identified

Your business case

6 Measure changes in the state of capital

Outputs that you should achieve from this step:

- ◆ A list of the changes in capitals that are material to your business, in relation to your impacts and/or dependencies, based on your chosen organization focus and value chain boundary. These changes should be expressed through qualitative or quantitative data.
- ◆ Likelihood-weighted estimates of the attribution of change, where relevant (In particular relevant for dependency assessments).

Your business case

7 Value impacts and/or dependencies

Outputs that you should achieve from this step:

- ◆ A completed valuation (whether qualitative, quantitative, or monetary, or a mix of all three) of costs and benefits.
- ◆ Documentation of all key assumptions, data sources, limitations, methods used, and resulting values.



Module 3

Chapter 3.3

**Measure & Value
stage: Measure impact
drivers and/or dependencies**



**CAPITALS
COALITION**



Measure and Value Stage

How?

What is the Measure and Value Stage?

The Measure and Value Stage introduces how impacts and/or dependencies can be measured and valued.

MEASURE AND VALUE STAGE: How?

Step 05

HOW can your **impact drivers and dependencies** be measured?

Step 06

WHAT are the **change in the state and trends of capitals** related to your business impacts and/or dependencies?

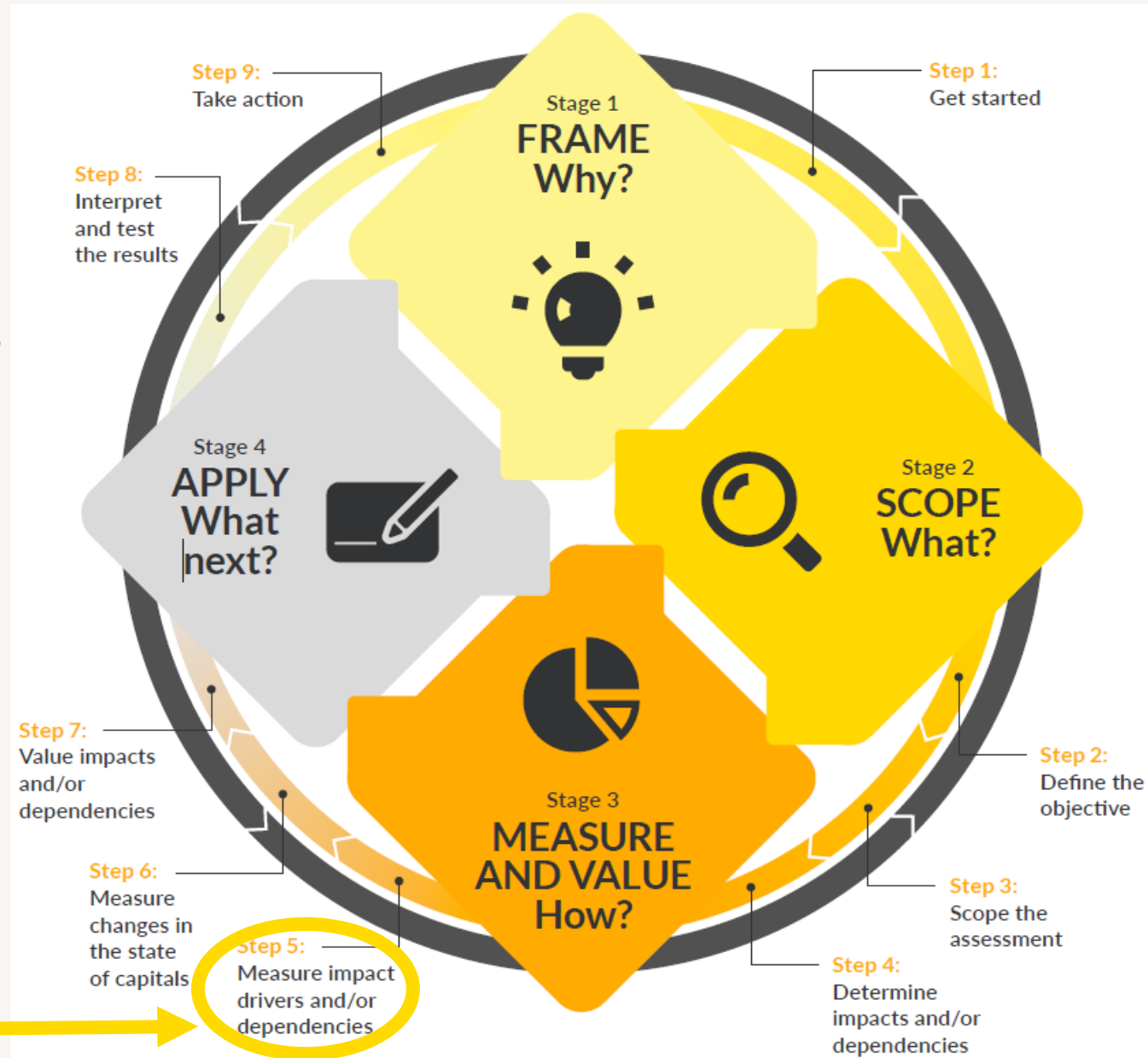
Step 07

WHAT is the **value** of your capitals impacts and/or dependencies



Step 5

Question:
How can
your impact drivers
and dependencies
be measured?



You are here

Impact pathway

This can be measured

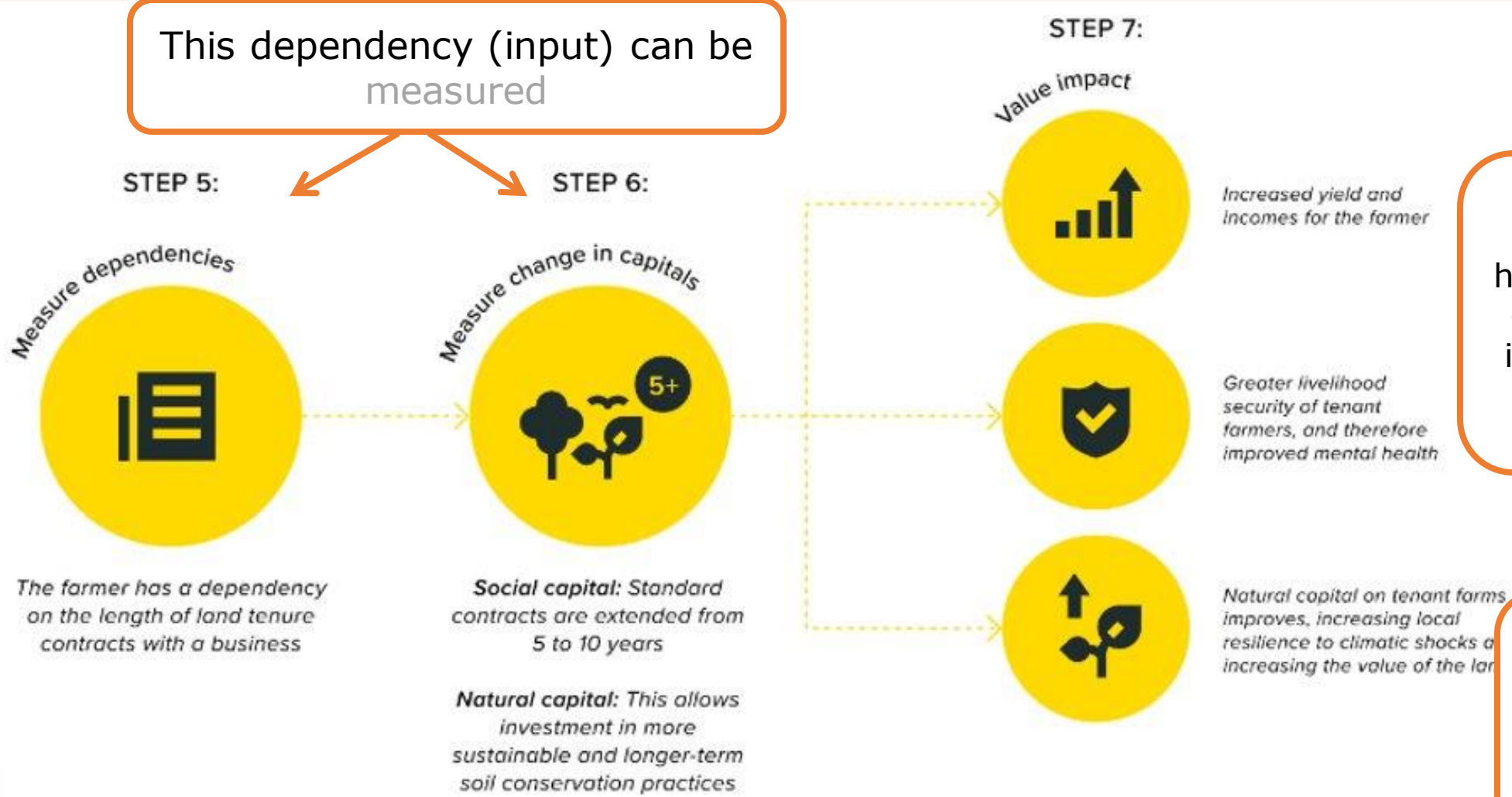


This impact has a **value**, it is felt by the business and people in society.

Understanding value, allows us to manage risk and opportunity.

Dependency pathway

This dependency (input) can be measured

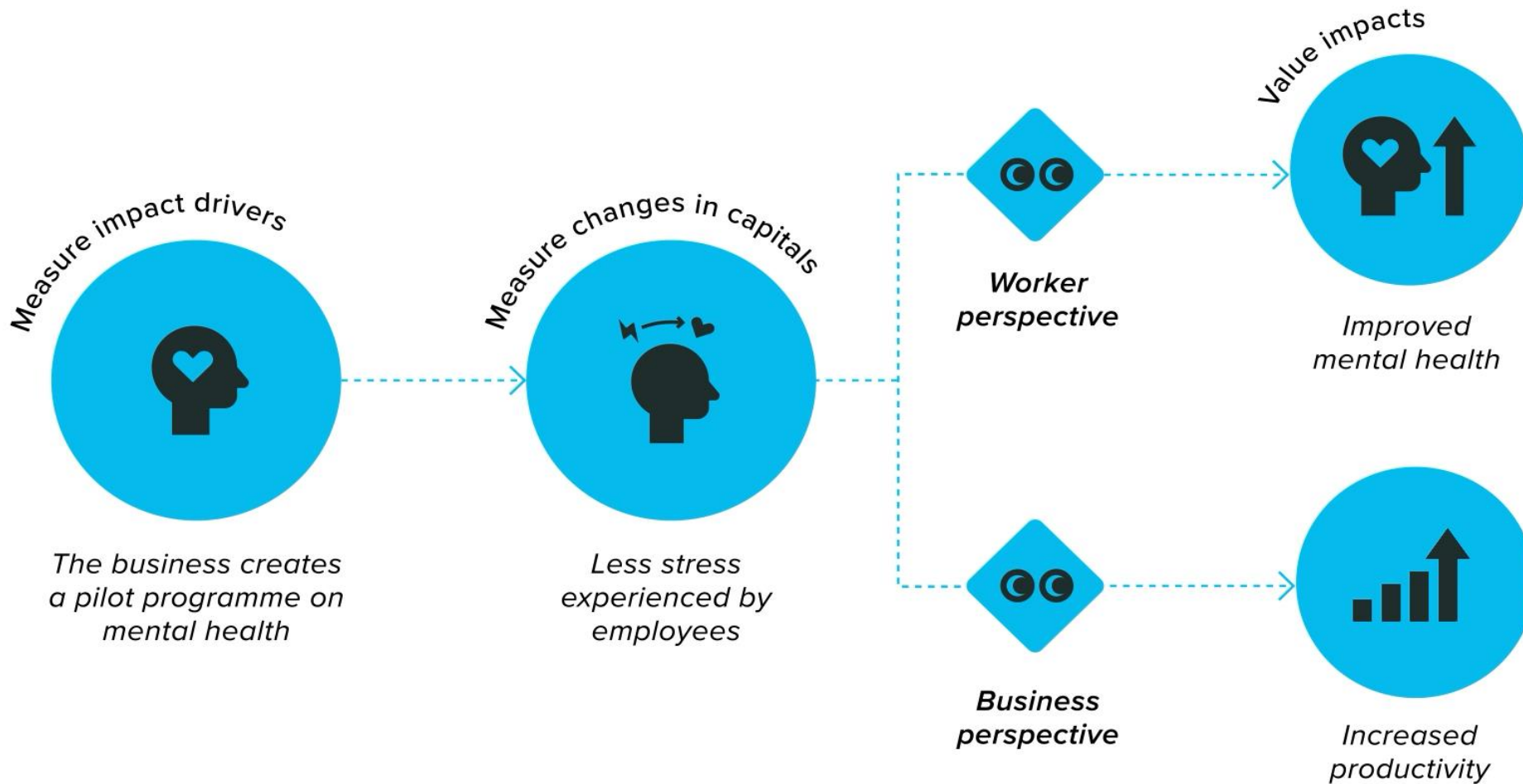


The dependency has an impact that can be **valued**, it is felt by people.

Understanding value, allows us to manage risks and opportunities.

Animated pathway

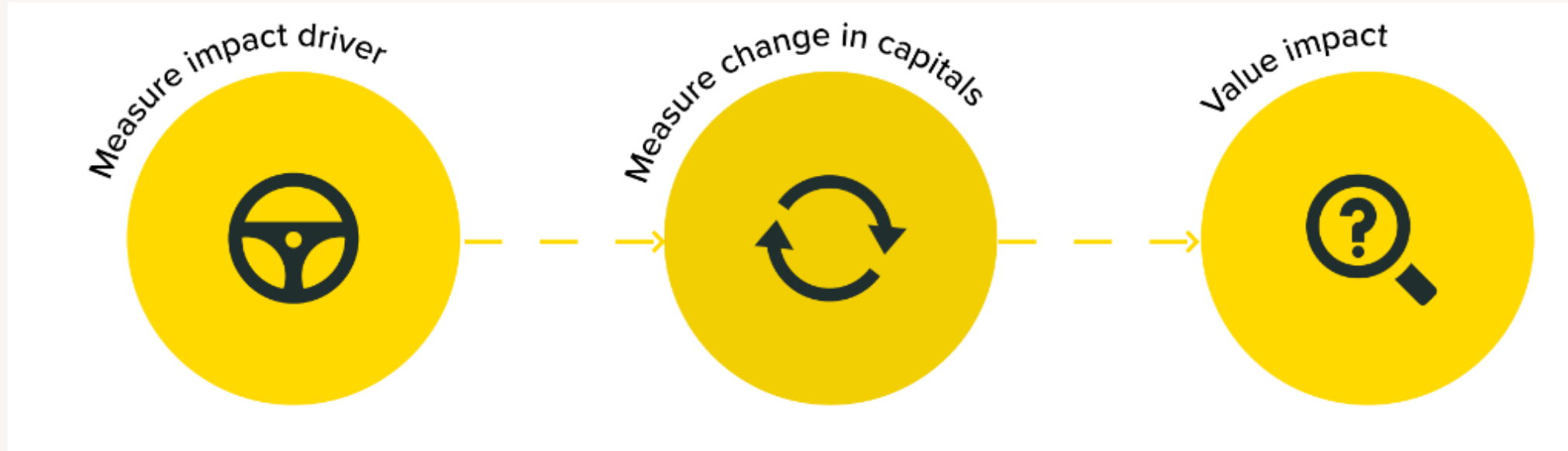
Mental health pathway example



Exercise: fill in an Impact pathway

Understand the cause and consequences.

Allocate each statement near the corresponding ball



Greenhouse gas emissions

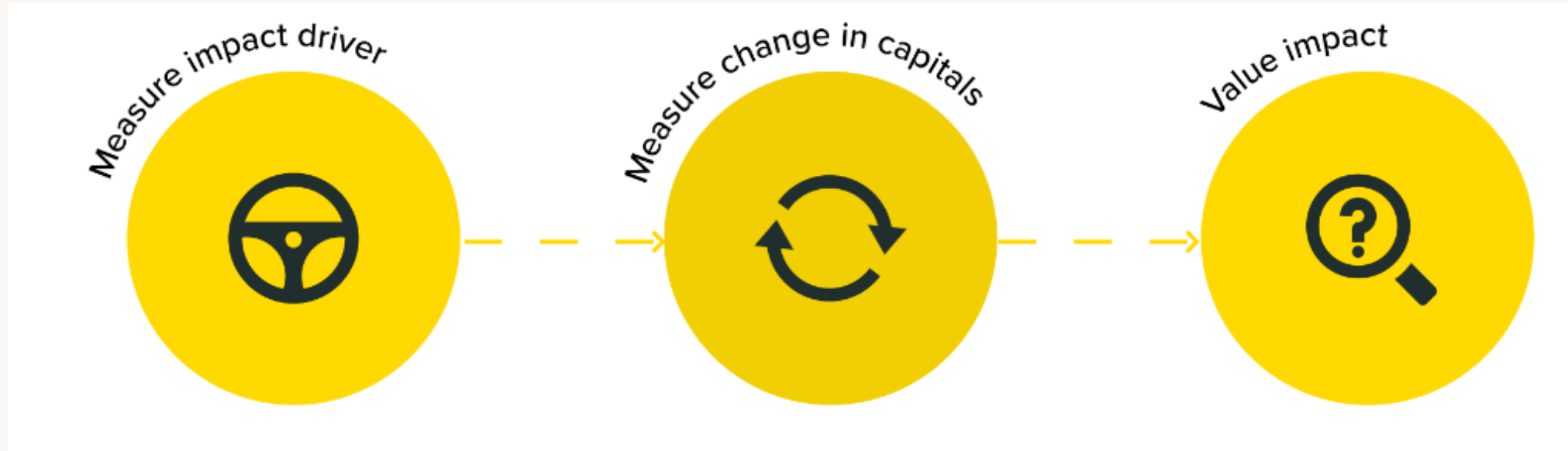
Change in disease incidence

Change in global mean
temperature

Exercise: fill in an Impact pathway

Understand the cause and consequences.

Allocate each statement below the corresponding ball



Change in fatigue and stress level of workers

Change in number and severity of injuries

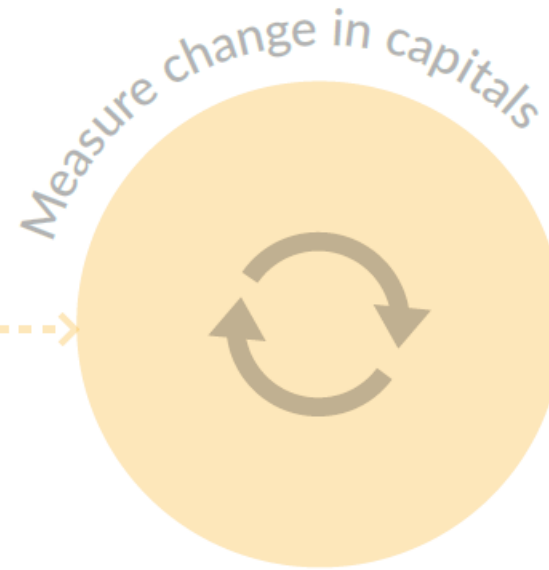
Employee health and safety conditions

Step 5

STEP 5:



STEP 6:



STEP 7:



MEASURE AND VALUE STAGE: How?

Map your activities against impacts and dependencies

Example

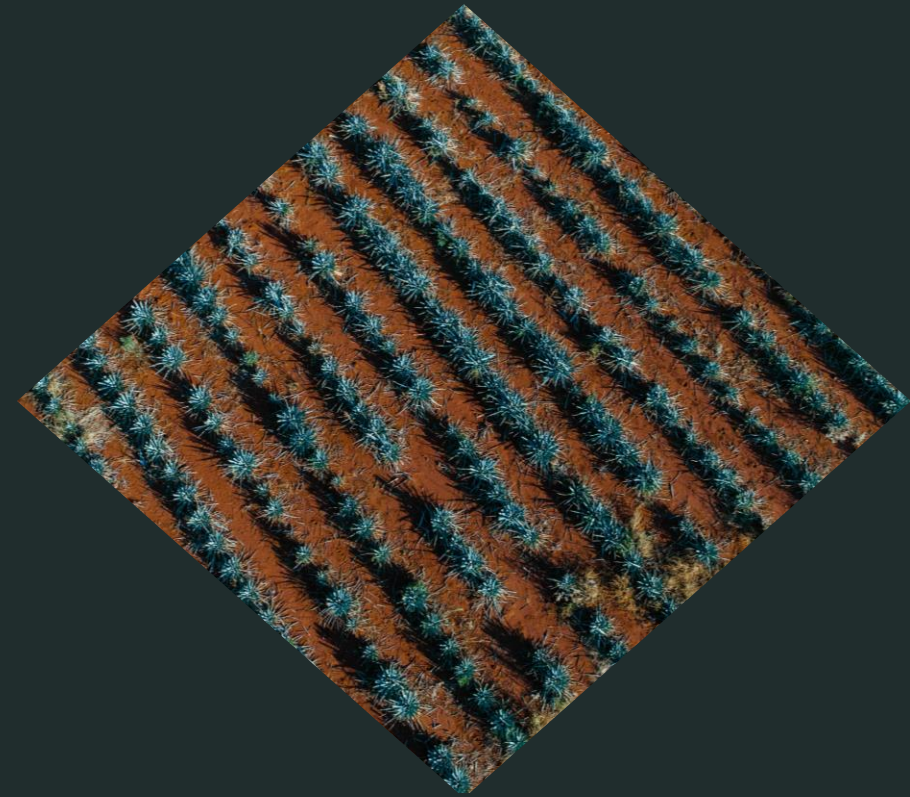
| Company undertaking assessment | Organizational focus | Value-chain element | Priority capitals impacts and dependencies |
|--------------------------------|----------------------|--------------------------|--|
| Mango juice producer | Corporate | Upstream (raw materials) | Impact drivers: water use, pesticide use, fertilizer use, labor rights, workers' living conditions, food loss Dependencies: water supply, land access, access to infrastructure and technology, health of workers, pest control, skills and knowledge |
| | | Operations | Impact drivers: water use, GHG emissions, waste generation, nutritional content of product, labor rights, food waste Dependencies: water supply and purification, laws and regulation, health of workers, skills and knowledge of workers, energy |

ASYX, Candra Naya Lestari – Indonesia

Farm to fashion – reindustrialization of agriculture waste to biodegradable apparel

ASYX is a supply-chain integration firm specialized in agroindustry, working across producers, marketers and retailers. The company shapes best practices as circular economy and sustainable business.

In 2020, ASYX started to incubate natural fibers production through PT Candra Naya Lestari working with communities. The initiative reuses otherwise wasted pineapple leaves and turns them into biodegradable fibers for the apparel industry.



ASYX, Candra Naya Lestari – Indonesia

Measure & Value: HOW

They gathered data on the creation of secure jobs (3 to 15), women empowerment, more efficient water use, use of otherwise wasted leaves, an increase of the fiber production (10 to 600kg/month) and economic contribution to regional growth.

Apply: WHAT NEXT

ASYX used the results to communicate better to buyers and investors. Candra Naya Lestari is now a growing business unit generating shared value, prosperity and well-being for different stakeholders.



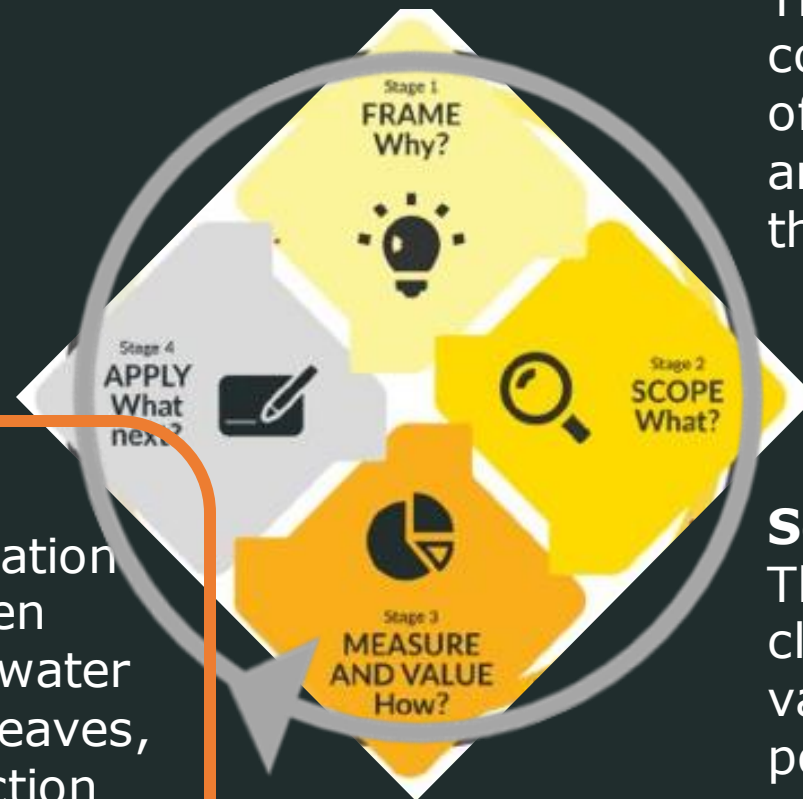
ASYX, Candra Naya Lestari – Indonesia

Frame: WHY

The business application is to communicate the multiple benefits of the project on human, social and natural capital and expand this community-based business.

Scope: WHAT

The specified objective is to gain clarity on the pineapple leaf fiber value chain to better know where positive impacts happen for nature, people and the economy. They compared the situation before and after the collaboration.

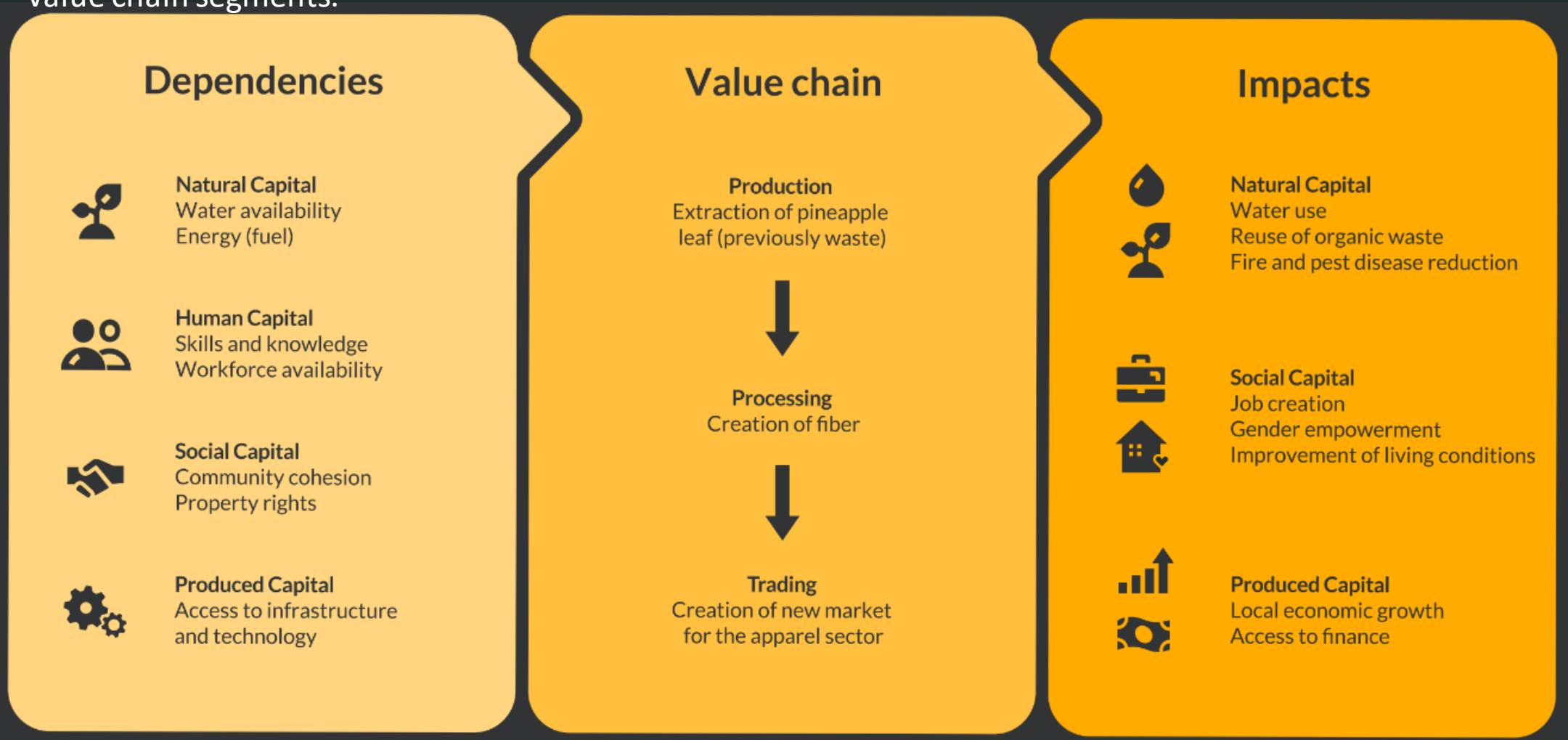


Measure & Value: HOW

They gathered data on the creation of secure jobs (3 to 15), women empowerment, more efficient water use, use of otherwise wasted leaves, an increase of the fiber production (10 to 600kg/month) and economic contribution to regional growth.

ASYX, Candra Naya Lestari – Indonesia

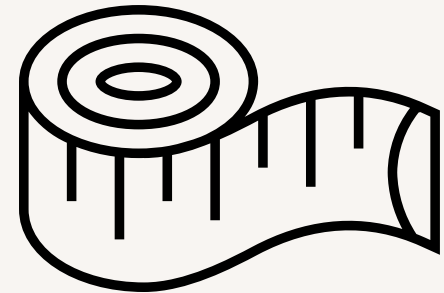
Example of a **value-chain map** showing dependencies and impacts linked to the capitals and with associated value chain segments.



MEASURE AND VALUE STAGE: How?

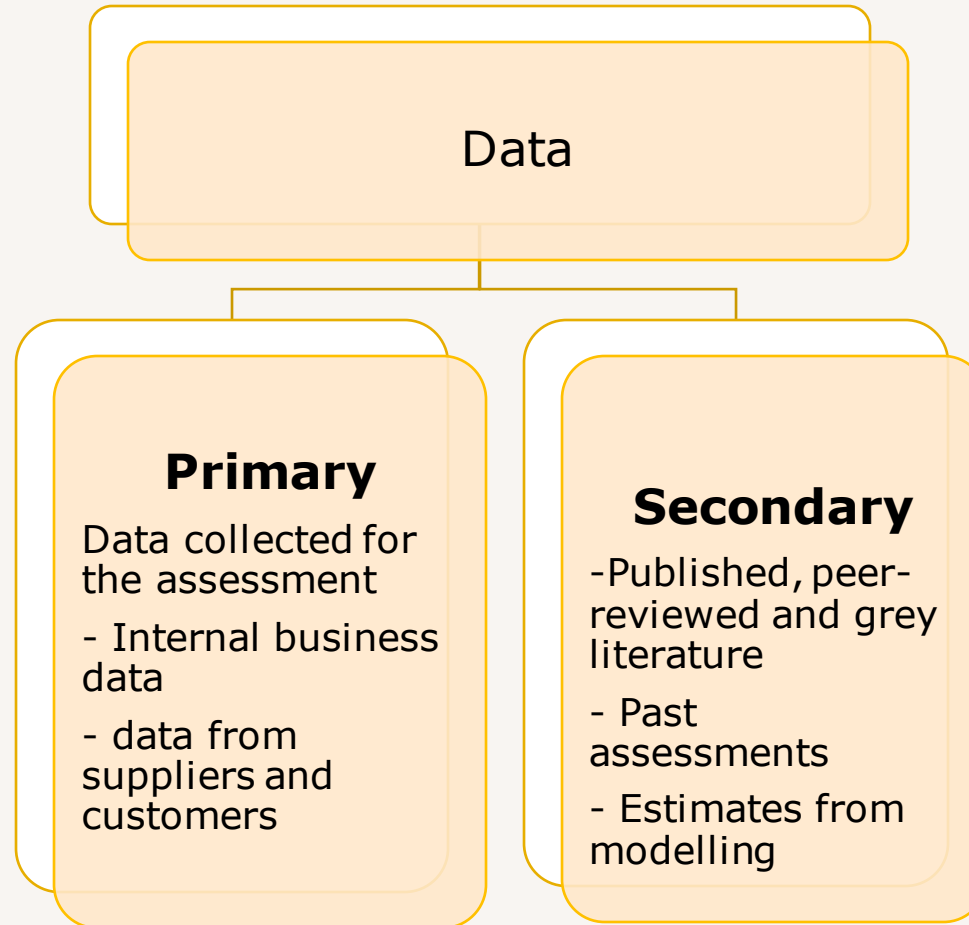
Define which impact driver and/or dependency indicators you will measure

- ❖ Determine **what** you will be measuring
- **the indicator** -
- ❖ Indicators are used to track the performance of a business over time or for comparative purposes.
- ❖ Once you have defined the indicator, you will need to define the type of data needed
- ❖ Indicators can be either qualitative, quantitative, or monetary.



MEASURE AND VALUE STAGE: How?

Identify how you will measure impact drivers and/or dependencies



Primary data will deliver more precise results but involves significant efforts.

Most businesses use a combination of primary and secondary data

MEASURE AND VALUE STAGE: How?

Example of quantitative indicators for impacts drivers

| Capital | Potential impact drivers | Indicator |
|---------|---------------------------------------|--|
| Natural | Water use | Cubic meters of water consumption, ¹ by watershed and month |
| | GHG emissions | Tons of CO ₂ e |
| Human | Food safety practices | Micrograms of pathogens per 100 grams of final product |
| | Employee health and safety conditions | Change in daily intake of pathogens by people Change in risk of occupational illness and injuries/fatalities due to fatigue and stress Number of hours of overtime per week Number of hours in difficult working postures per day |

MEASURE AND VALUE STAGE: How?

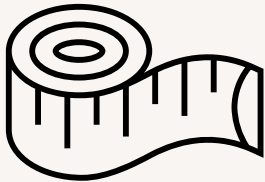
Example of quantitative indicators for dependencies

| Capital | Potential impact drivers | Indicator |
|---------|---------------------------------|---|
| Natural | Water supply | Cubic meters of water extracted by company |
| Human | Experience | Number of skilled workers from the local area experienced in local weather patterns and harvest rhythms |
| | Workforce availability | Number of workers needed to maintain business activity levels |
| Social | Social networks and cooperation | Number of finance cooperatives present in the region |

Indicators : 5 min

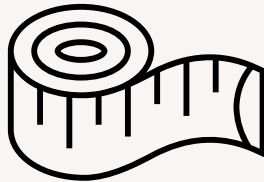
Write indicators that you could use to measure the impacts drivers and dependencies listed below

Pesticide use



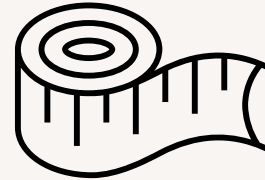
X

Gender rights



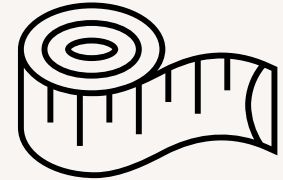
X

Experience



X

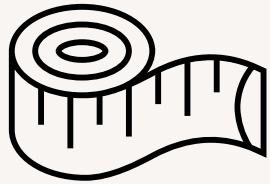
Energy



X

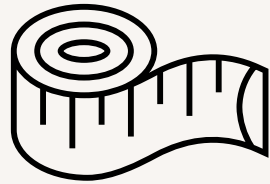
Example answers of potential indicators to use

Pesticide use



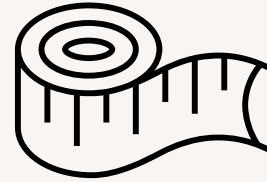
Kg of toxic compounds in pesticide applied

Gender rights



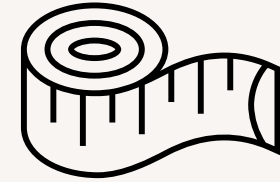
Difference in pay between men and women at the same level

Experience



Number of skilled workers from local area experienced in local harvest rhythms

Energy



Liters of fuel consumed by type of fuel

Arvind - India

A comparative business case on the human and ecological cost of sustainable and conventional cotton production: Part 1, SCOPE

The Indian textile-to-retail conglomerate Arvind Limited is involved in the process of making fabrics and garments with cotton as the key raw material, accounting for 80% of all their products. With altered climatic conditions such as delayed monsoons and an increase in droughts, securing an uninterrupted supply of cotton has become a concern.

This dependency has led Arvind to focus on the sustainability of their cotton supply and the reduction of negative environmental impacts caused during its cultivation.



Arvind - India



Frame: WHY

Securing an uninterrupted supply of cotton has become a concern with delayed monsoons and an increase in droughts. This dependency has led Arvind to focus on the sustainability of its cotton supply and the reduction of negative environmental impacts.

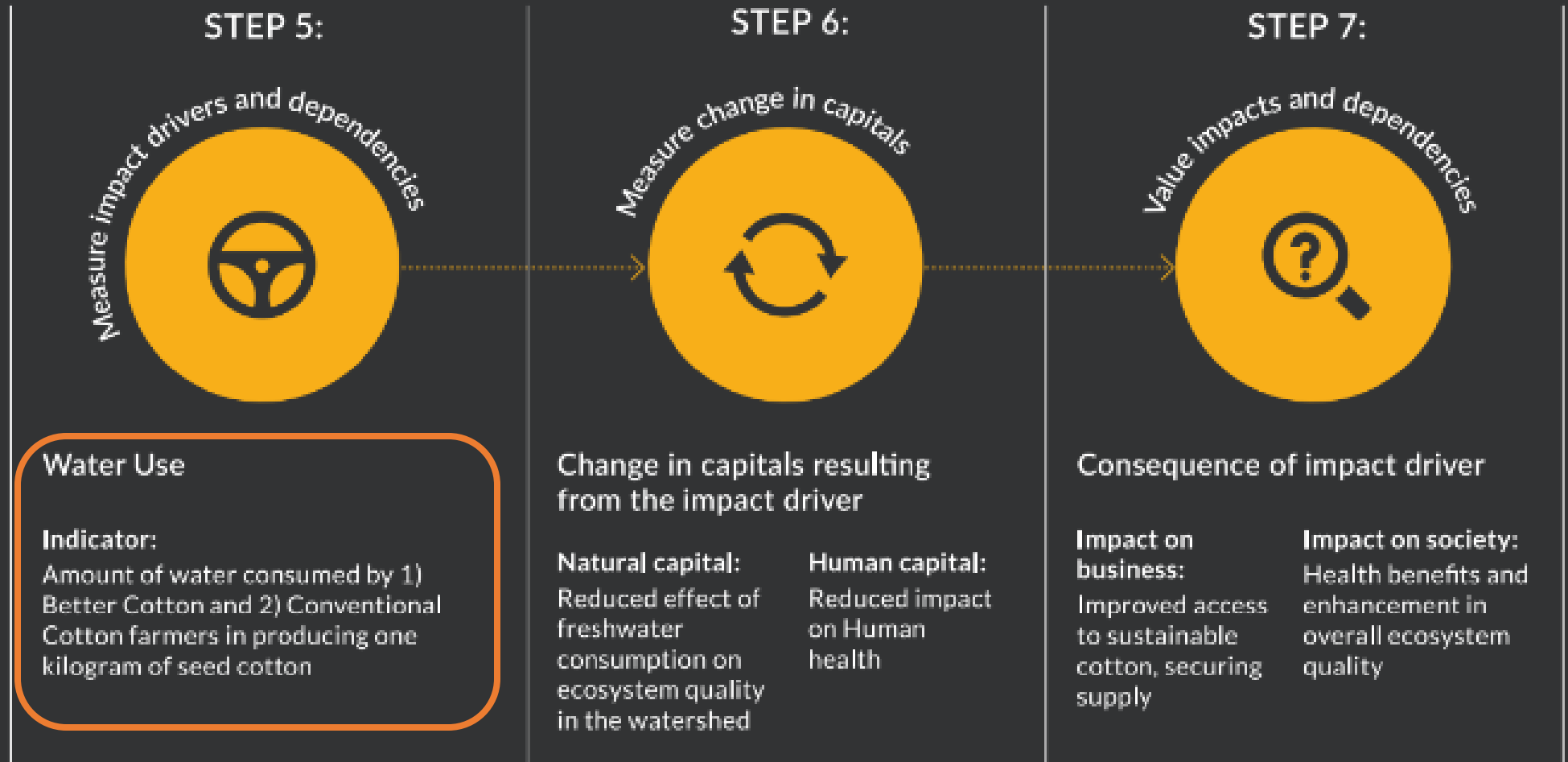
Scope: WHAT

To improve responsible sourcing, they set the objective to evaluate the human and ecological costs of water use per kg of seed cotton produced under Better Cotton (BC) principles and compare this to conventional practices. Thanks to the prioritization process, they decided to focus on water use first.

Measure & Value: HOW

They valued the improved access to sustainable cotton and secured supply from business perspective
From a societal perspective, they also valued the health benefits and enhancement in overall ecosystem

Arvind - India





Module 3

Chapter 3.4

Measure & Value
Measure change in the state
of capitals

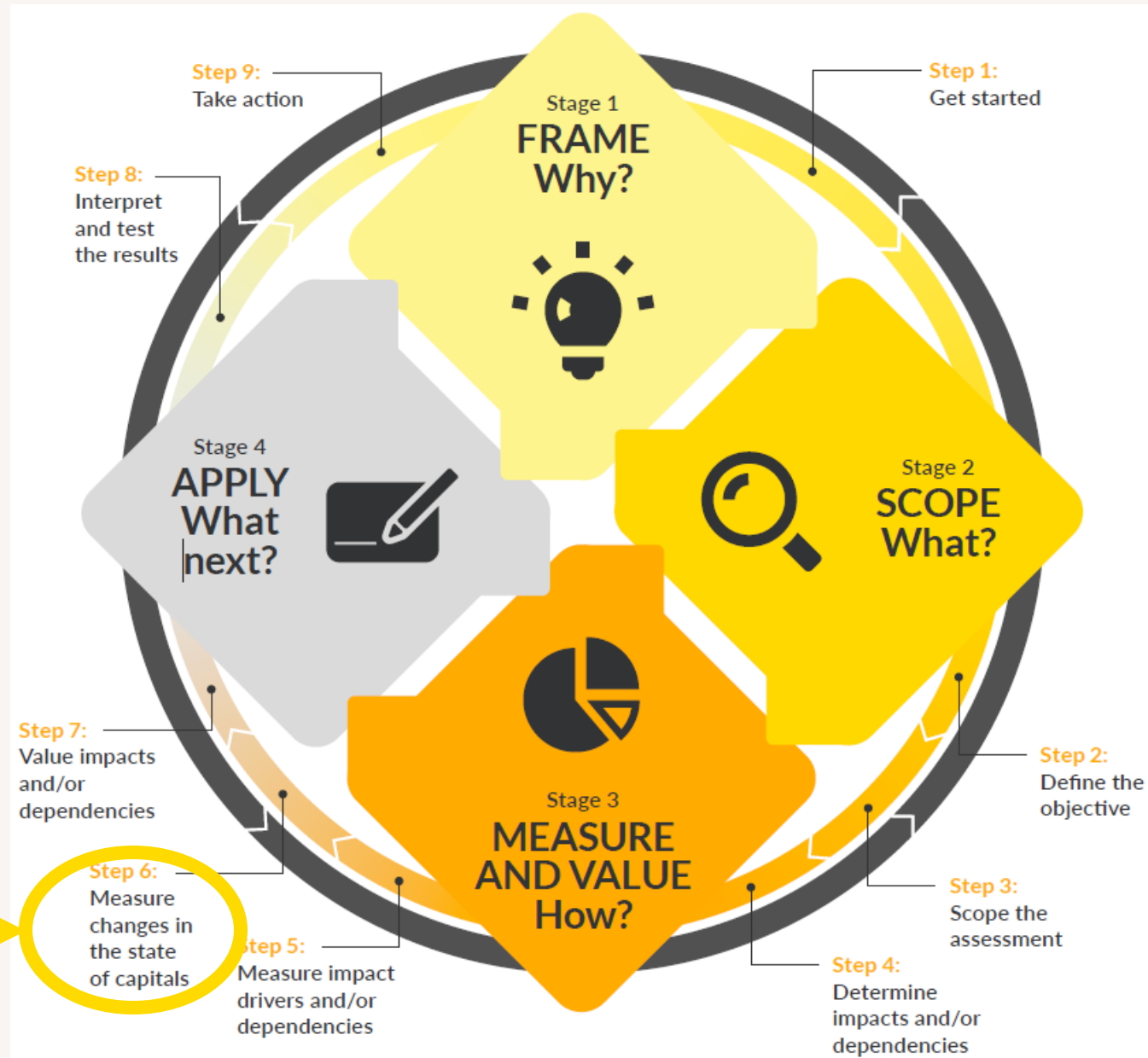


CAPITALS
COALITION

Step 6

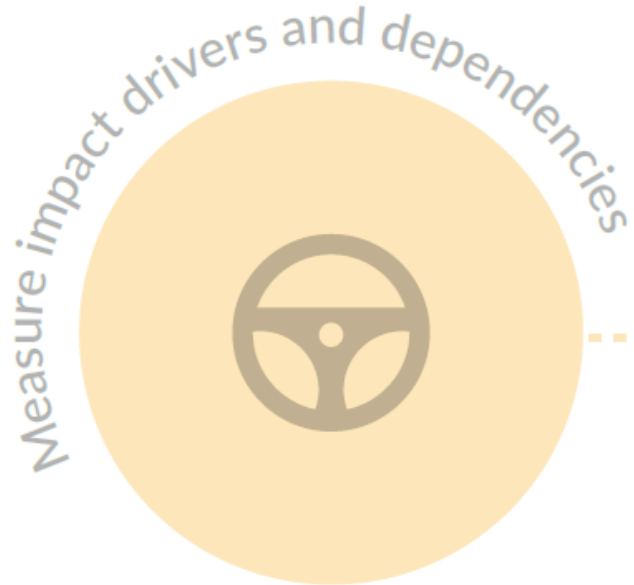
Question:
What are the changes in the state and trends of capitals related to your business impacts and/or dependencies?

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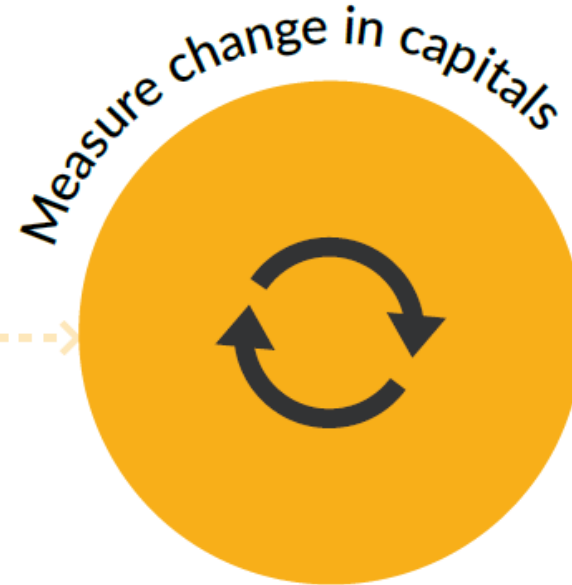


Step 6

STEP 5:



STEP 6:

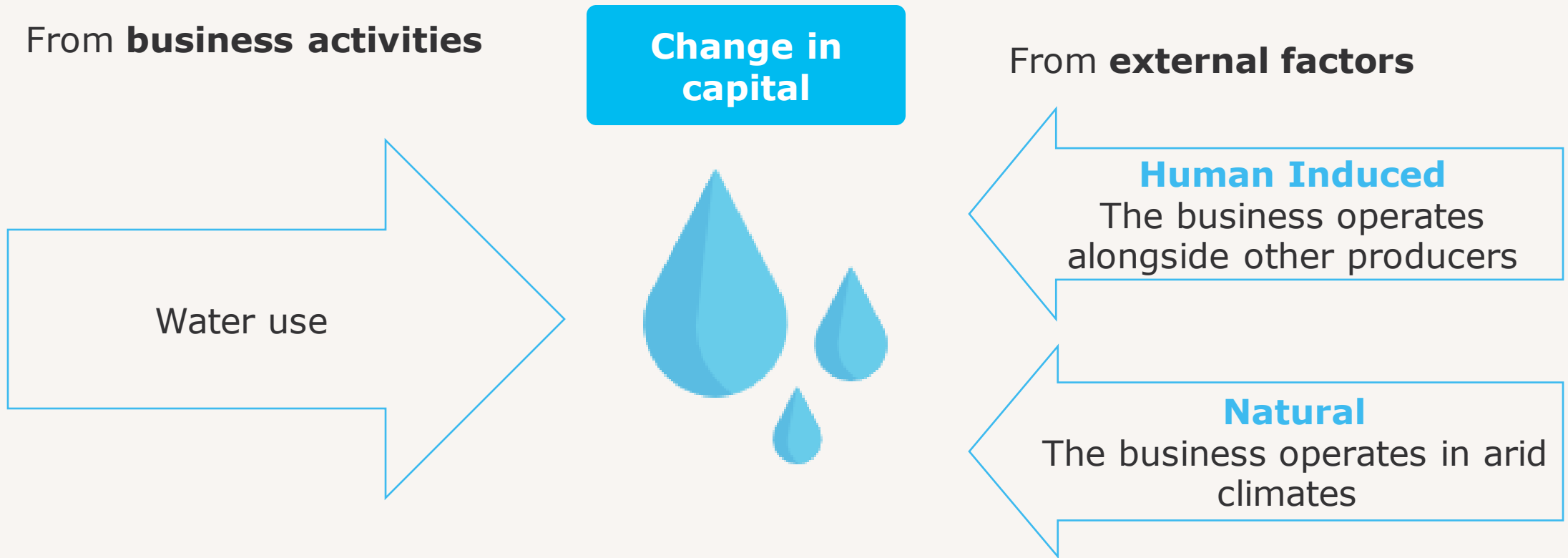


STEP 7:



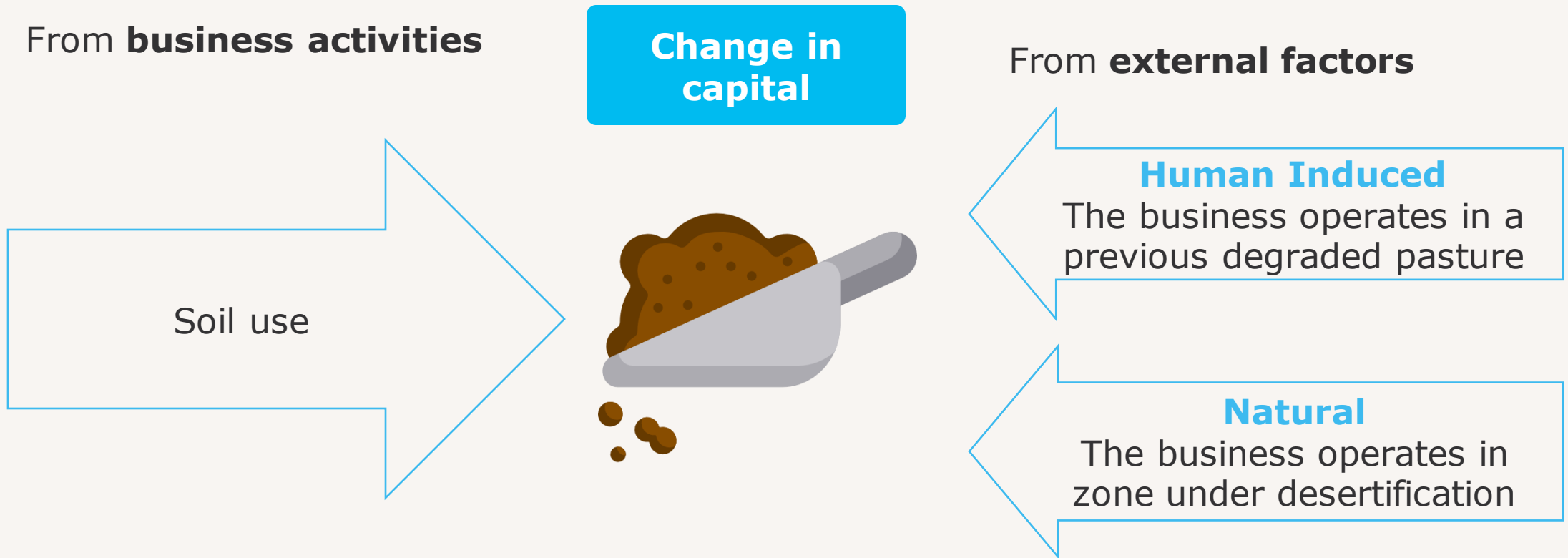
MEASURE AND VALUE STAGE: How?

What are the changes in the capitals?



MEASURE AND VALUE STAGE: How?

What are the changes in the capitals?



MEASURE AND VALUE STAGE: How?

What are the changes in the capitals?

From **business activities**

**Change in
capital**

From **external factors**

Impact on health of
workers



Human Induced

A new hospital is built in the
area providing better care to
communities

Natural

Young demographic population

MEASURE AND VALUE STAGE: How?

Direct measuring and modelling

**Direct
Measurement**



Measurement is based on
real life data collection

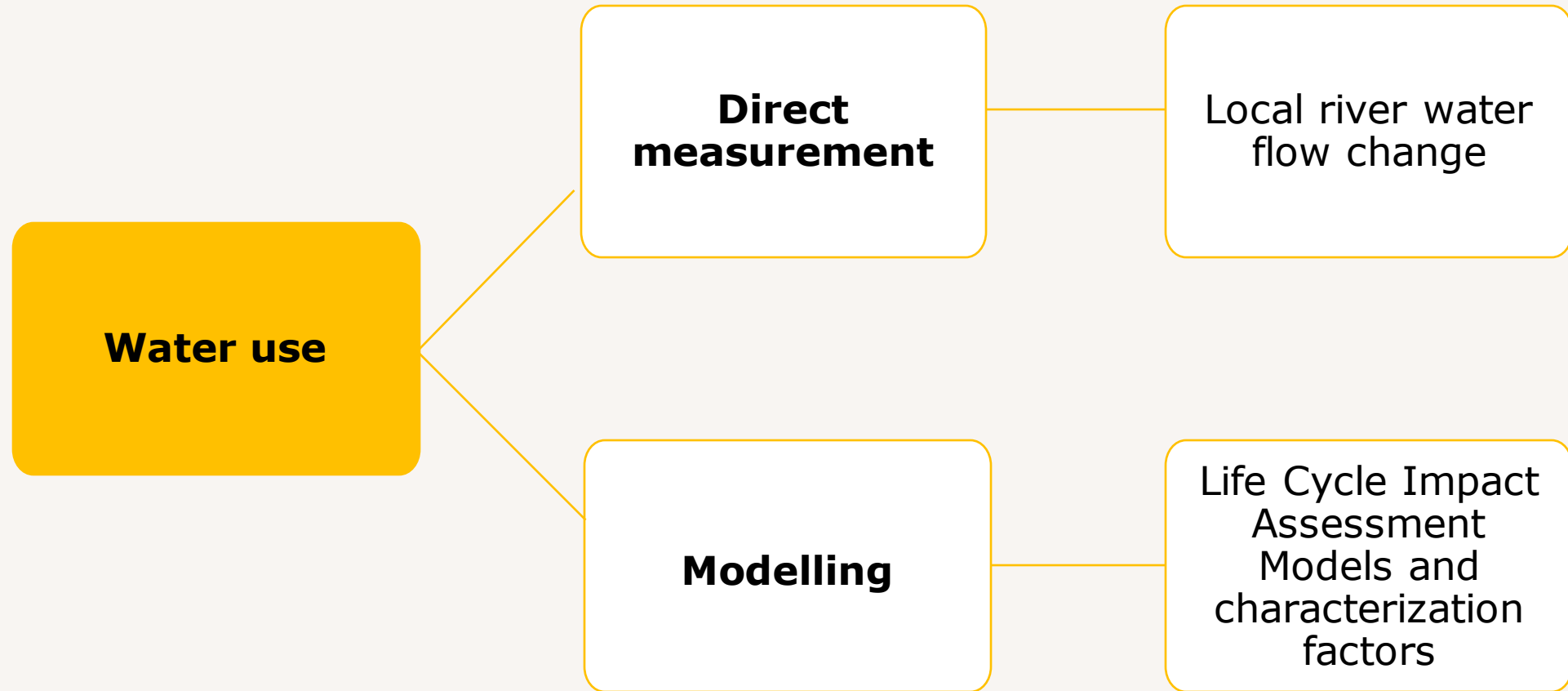
Modeling



Use standardized or
bespoke modelling
methods/ techniques that
rely on secondary data to
make informed estimates

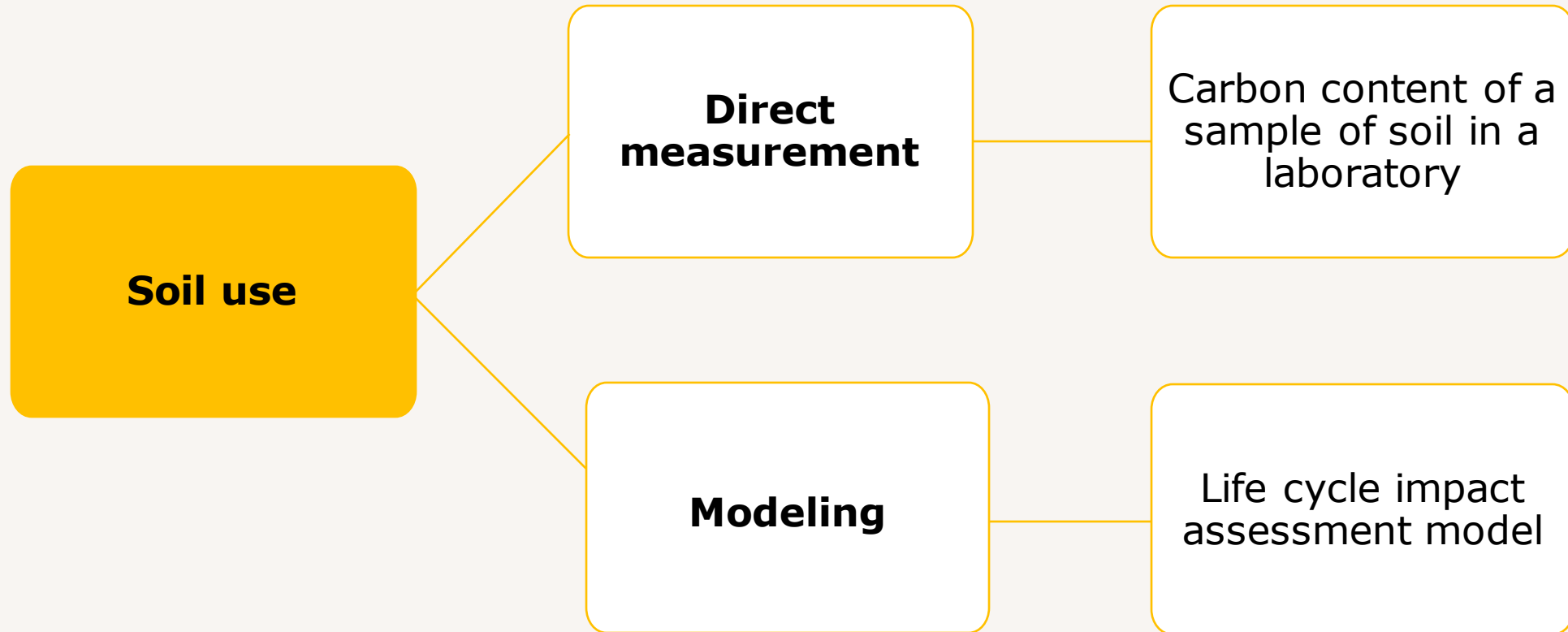
MEASURE AND VALUE STAGE: How?

Measuring changes in the capitals related to your impacts and/or dependencies



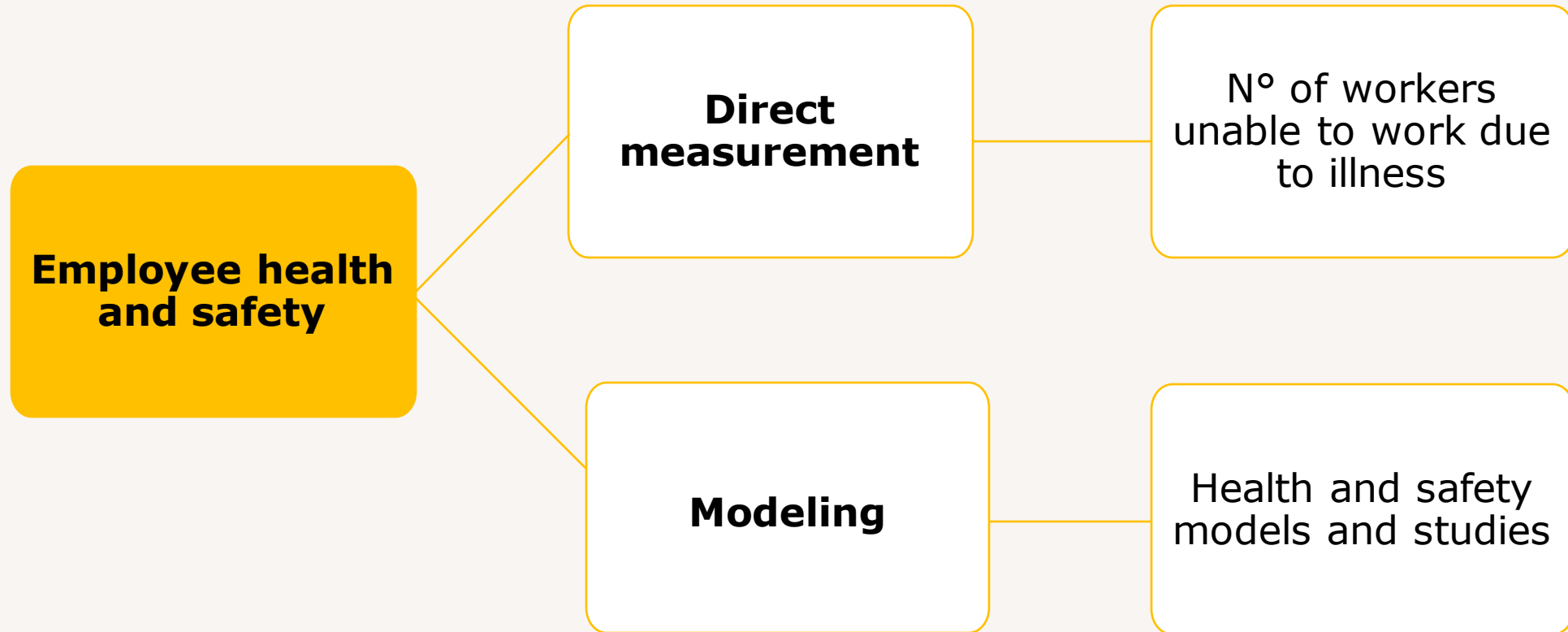
MEASURE AND VALUE STAGE: How?

Measuring changes in the capitals related to your impacts and/or dependencies



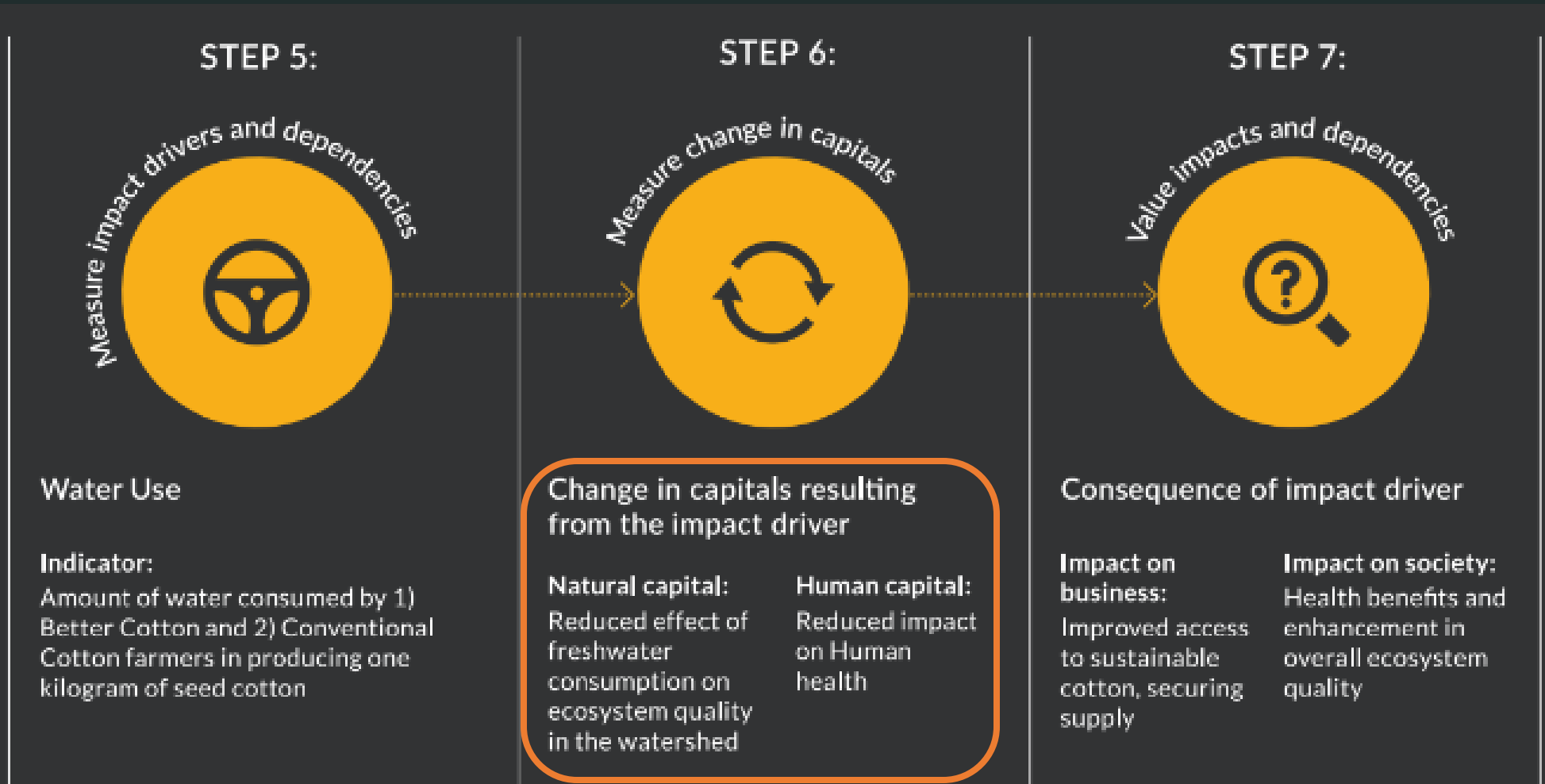
MEASURE AND VALUE STAGE: How?

Measuring changes in the capitals related to your impacts and/or dependencies



For more example, see Guidelines table 6.1, 6.2 and 6.3, p.85, 86, 87

Arvind - India





Module 3

Chapter 3.5

Measure & Value
Value impacts and/or dependencies

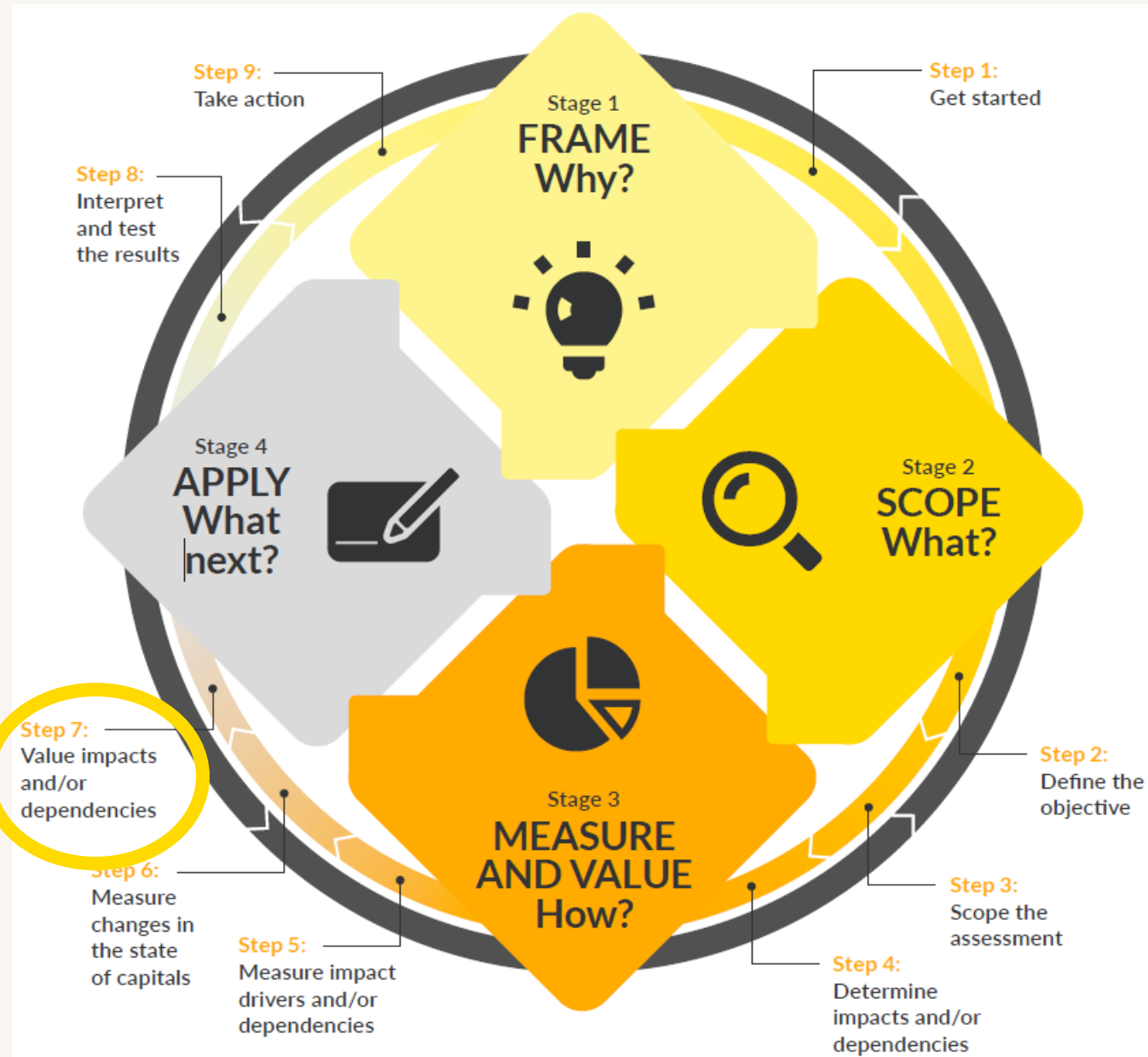


CAPITALS
COALITION

Step 7

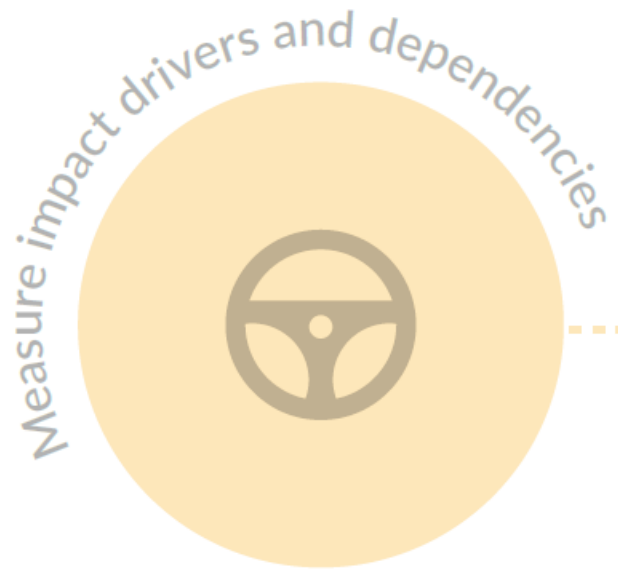
**Question:
How to value
impact or
dependencies?**

You are here →

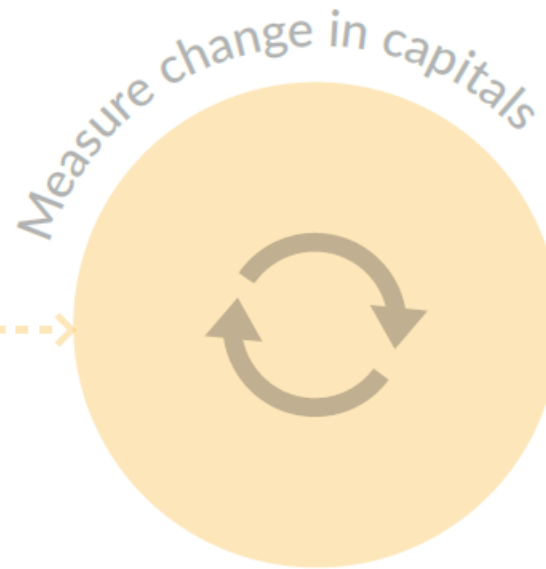


Step 7

STEP 5:



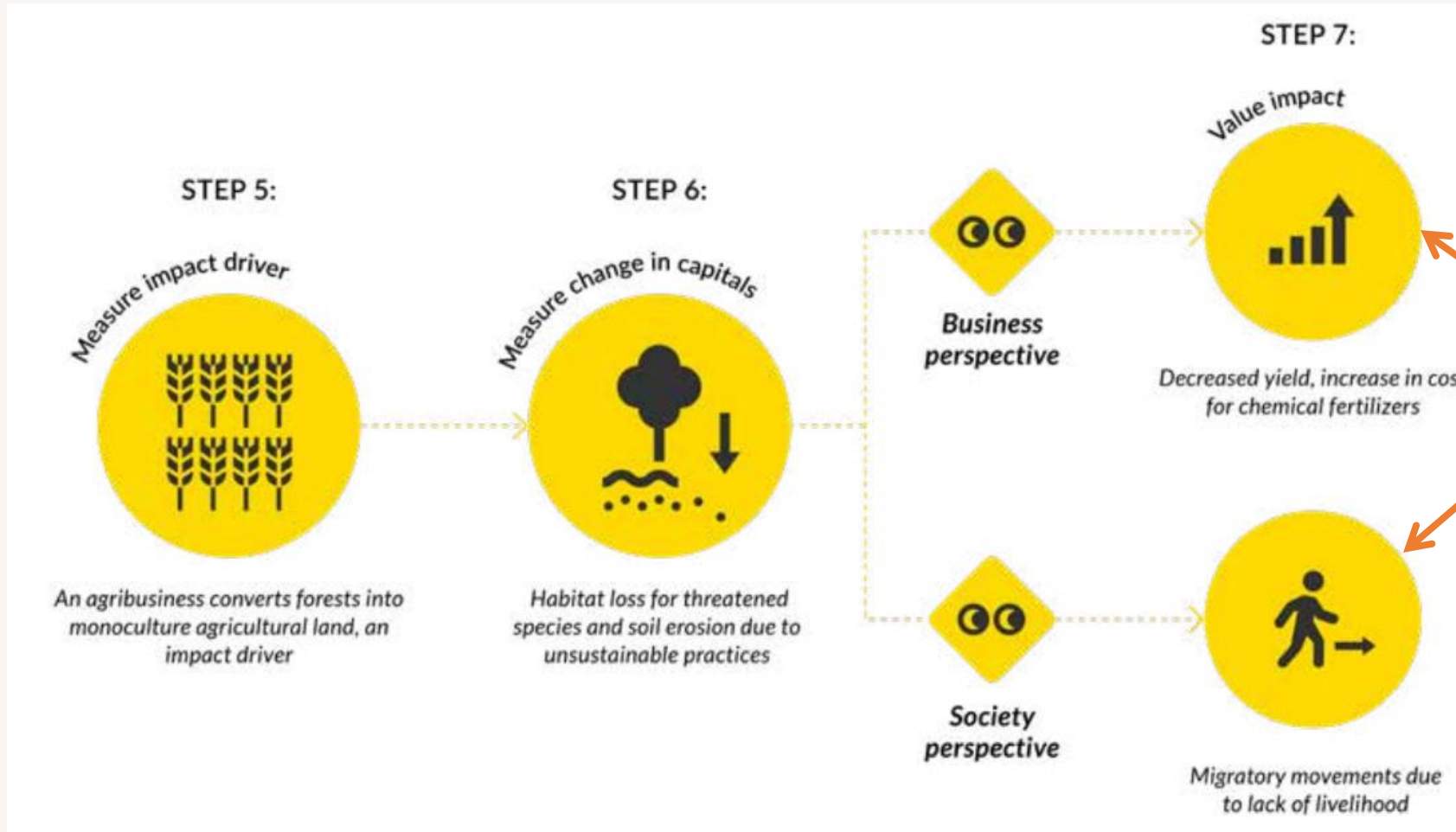
STEP 6:



STEP 7:



Impact pathway



This impact has a **value**
According to the chosen perspective, it has consequences for business and society

MEASURE AND VALUE STAGE: How?

Define the consequences of your impacts and/or dependencies

Impacts

Dependencies

Business

Consequences for your business on your impacts



Consequences of your business dependencies



Society

Consequences for society of your impact



For water use

Impact on society: higher rate of infections diseases due lack of water for hygienic purposes

For soil use

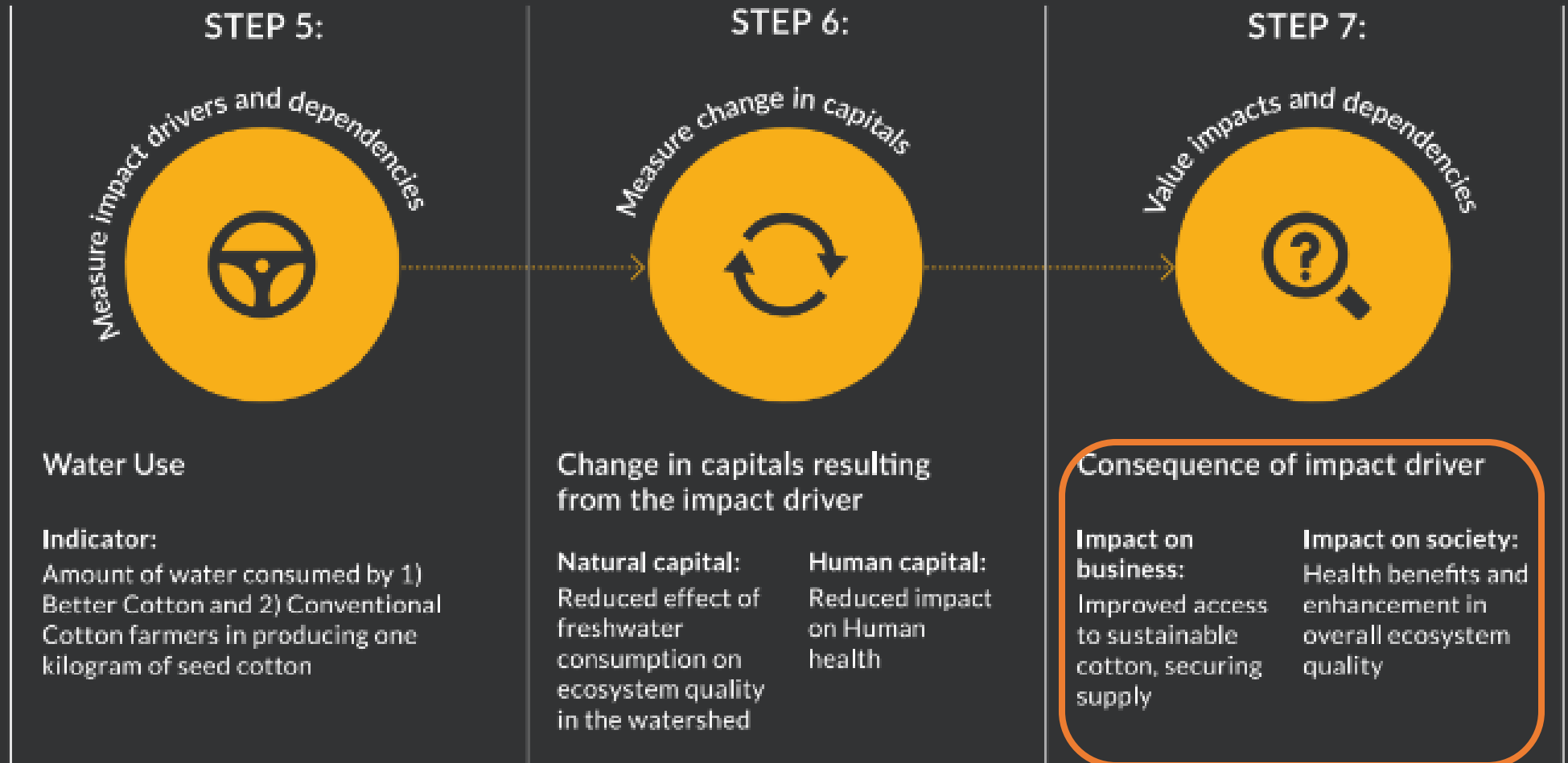
Impact on business: lower yield due to lower organic mater

For employee health and safety

Impact on business: Loss of productivity due to n° of employee injuries

See table 7.1 and 7.2 for more examples

Arvind - India

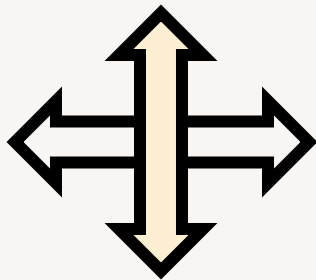


MEASURE AND VALUE STAGE: How?

Select appropriate valuation techniques - to determine associated costs and/or benefits

Qualitative

Used to inform the potential scale of costs and/or benefits expressed through qualitative, non-numerical terms (e.g., increase in health impacts from air emissions, medium increase in recreation services).



Quantitative

Focus on numerical data which are used as indicators for these costs and/or benefits (e.g., % of population with respiratory problems due to air pollutant emissions from a new factory).



Monetary

Translate quantitative estimates of costs and/or benefits into a single common currency.

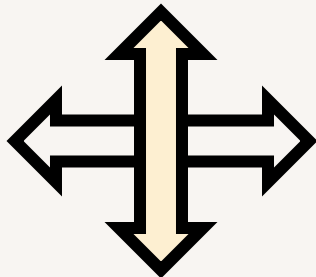


MEASURE AND VALUE STAGE: How?

Select appropriate valuation techniques

Qualitative

- **Non-numerical**
- Opinion survey
- Deliberative approaches
- Expert opinion
- Relative valuation



Quantitative

- **Numerical**
- Structured surveys
- Indicators
- Multicriteria analysis



Monetary

- **Common currency**
- Market prices
- Production function
- Cost based approaches
- Revealed preference approaches
- Stated preference approaches
- Value transfer



MEASURE AND VALUE STAGE: How?

Qualitative valuation



BNP PARIBAS

What?

To understand the impact of BNP's portfolio by assessing the sourcing of seafood for European food retailers

How?

- ✓ Assessed key indicators: Targets & commitments, Stakeholder engagement, Transparency, Risk management, Biodiversity protection, Performance.
- ✓ Assigned companies a positive, neutral or negative view for each criteria
- ✓ Gave each company a bonus/malus if it performed above/below its peers

Sample seafood sourcing performance assessment

| Targets & Commitments | Participation to industry initiatives / Stakeholder engagement | Transparency | Risk Management | Biodiversity Protection | Performance | Bonus/ Malus Seafood Strategy 2018 |
|-----------------------|--|--------------|-----------------|-------------------------|-------------|------------------------------------|
| Neutral | Positive | Positive | Neutral | Positive | Positive | 10% |

Source: BNPP AM, August 2018. For illustrative purpose.

MEASURE AND VALUE STAGE: How?

Quantitative valuation



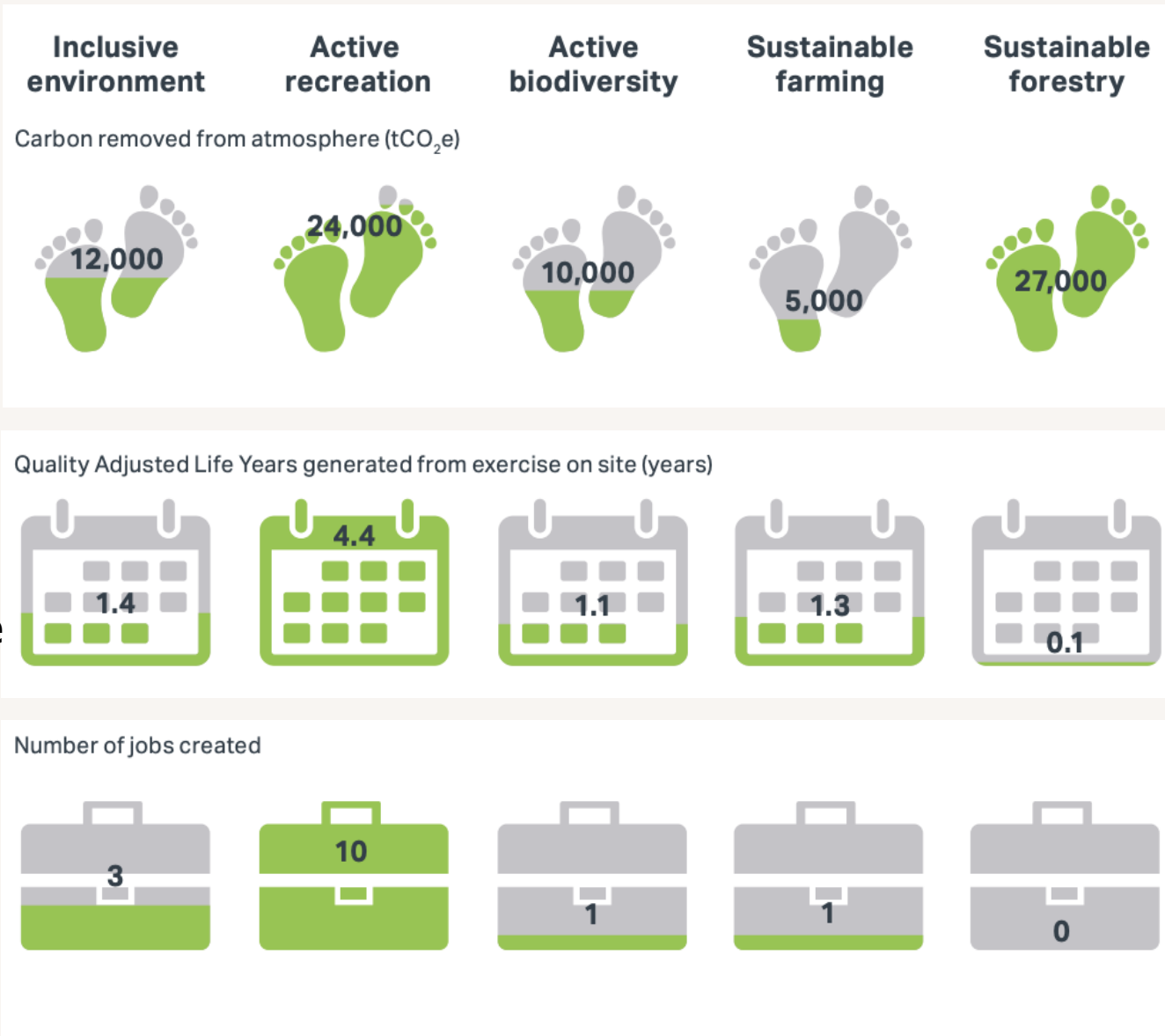
YorkshireWater

What

- ✓ Compared 5 options for investment in recreation uses of one of their reservoir
 - ✓ Inclusive environment
 - ✓ Active recreation
 - ✓ Active biodiversity
 - ✓ Sustainable farming
 - ✓ Sustainable forestry

How?

- ✓ Assessed CO₂ removed from atmosphere
- ✓ Quality adjusted life years
- ✓ Number of jobs created



MEASURE AND VALUE STAGE: How?

Monetary valuation

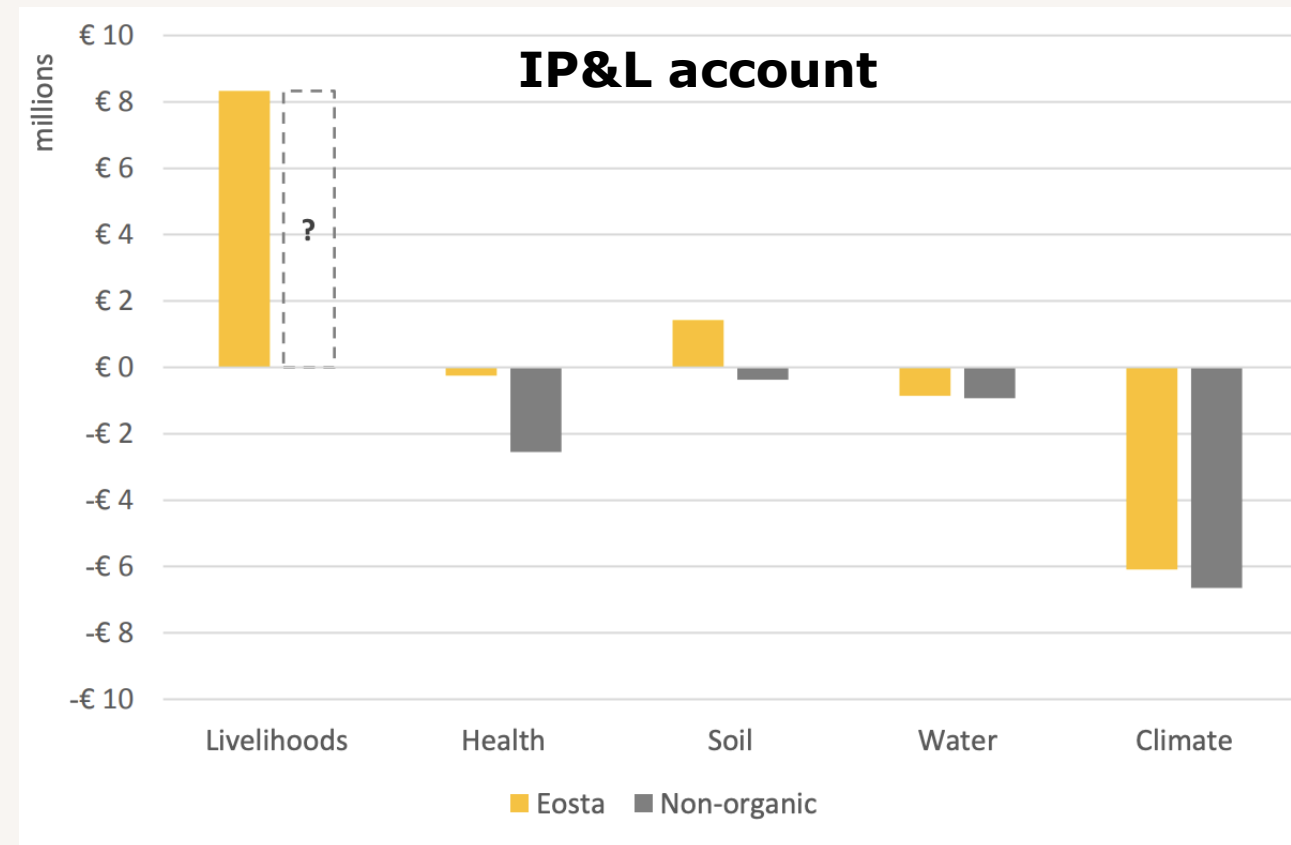


What?

- ✓ Compared organic and non organic produce by quantifying the true cost of fruit and vegetables and creating an **Integrated profit & loss account (IP&L)**

How?

- ✓ Used different methodologies to measure and monetize impacts on
 - **Livelihoods:** Gross Value Added
 - **Health:** Human health impact of pesticide ingestion using DALYs
 - **Soil:** Topsoil loss converted into external costs related to erosion per kg of product
 - **Water:** Global Water Footprint Network guidelines
 - **Climate:** Greenhouse Gas Protocol measured in CO₂e



Final results: Arvind - India

STEP 5:

Indicator unit:

M3 water/ kg of seed cotton

Data source:

Primary data collected for Better Cotton and Conventional Cotton farmers under Arvind's sustainable cotton project

STEP 6:

Indicator unit for change:

Natural capital: Ha.yr/kg of seed cotton

Human capital: DALY/ Kg of seed cotton

Data Source:

Primary data and secondary data at watershed level

Results:

49% reduced damage to human health and ecosystem quality due to adoption of Better Cotton practices compared to conventional agriculture practices

STEP 7:

Type of valuation: Monetary

Chosen valuation technique:

Impact on business: Valuation based on internal business figures

Impact on society:

Natural capital - Ecosystem Quality: Benefit transfer method based on Ecosystem Service Value Database

Human capital - Human health: Value of Life Year (VOLY) based on European Estimates

Results:

Impact on business:

As Arvind has been expanding its Better Cotton portfolio over the years, the business is able to secure the uninterrupted supply of Better Cotton.

Impact on society:

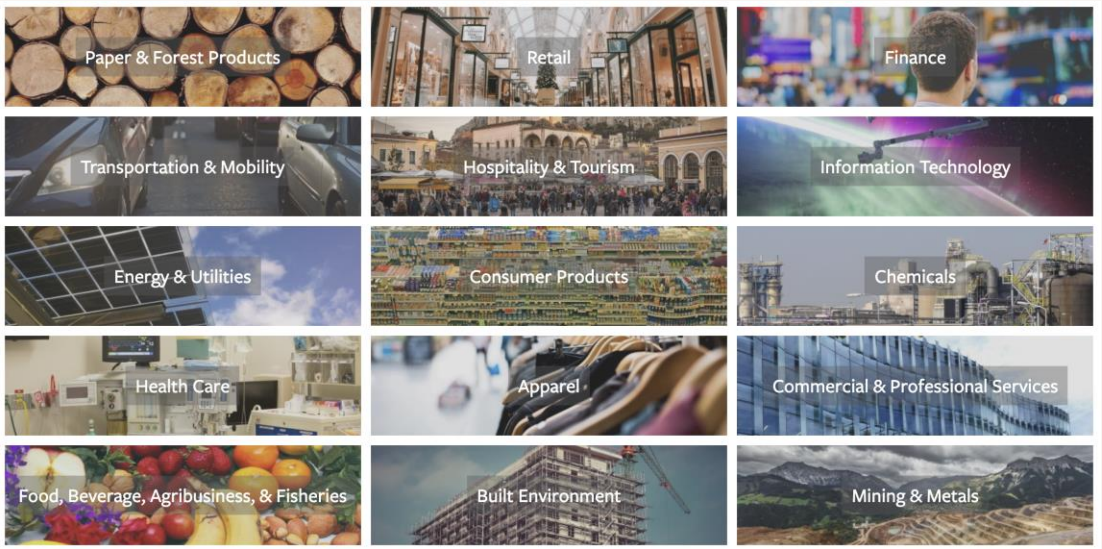
Human health costs associated with Better Cotton farming is 9.99×10^{-3} \$/KG lower than Conventional farming. In terms of ecosystem quality, the damage intensity is 0.31 \$/kg lower than conventional cotton farming.

Additional tools and Resources

SHIFT



Search engine for business sustainability resources



TEEBAgriFood Operational Guidelines for Business Annex 1 and resources

References & resources

References
All weblinks accessed May 2023

| References | Hyperlinks |
|---|--|
| A4S CFO Leadership Network, 2019 edition. Essential Guide to Natural and Social Capital Accounting. An introduction to integrating Natural and Social Capital into accounting and decision making. | www.accountingforsustainability.org/content/dam/ads/corporate/home/KnowledgeHub/Guidepdf/The%20A4S%20Essential%20Guide%20to%20Natural%20and%20Social%20Capital.pdf.downloadasset.pdf |
| Atkinson, G.D., Pearce, D.W., Dubourg, W.R. 1994. The Economics of Sustainable Development. Annual Reviews Energy Environ 19:457-474. Centre for Social and Economic Research on the Global Environment, University College London, United Kingdom. | www.annualreviews.org/doi/pdf/10.1146/annurev.es.19.110194.002325 |

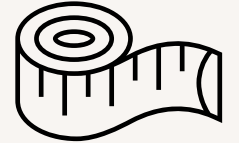
Annex A
Examples of sector-specific published literature to inform capitals assessments for food sector businesses
If you have clicked on the Annex A hyperlink you can click [here](#) to return to your previous page.

| Author | Name | Description | How could it be used in capitals assessments | Capitals |
|-------------------------------------|---|--|---|----------------------------------|
| Accountability Framework Initiative | Accountability Framework Initiative | Roadmap for companies on ethical supply chains that protect forests, natural ecosystems, and human rights. | The framework can be used as a benchmark scenario for a capitals assessment, leading to key action identification | Natural, human, social, produced |

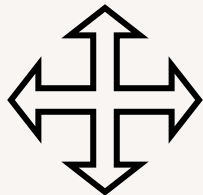
Reflection exercise: data needs

Potential breakout group discussion

- Based on the indicators you identified, what would be your data needs?
- Do you know if you have any of this data already available?
 - From direct measurements: any in-house data that is available already?
 - From modelling: any resources you can use?
- What would be an appropriate valuation technique for your assessment?
Qualitative, Quantitative, Monetary?



Qualitative



Quantitative



Monetary





Module 3

Chapter 3.6

**Measure & Value
Summary of lessons learnt**



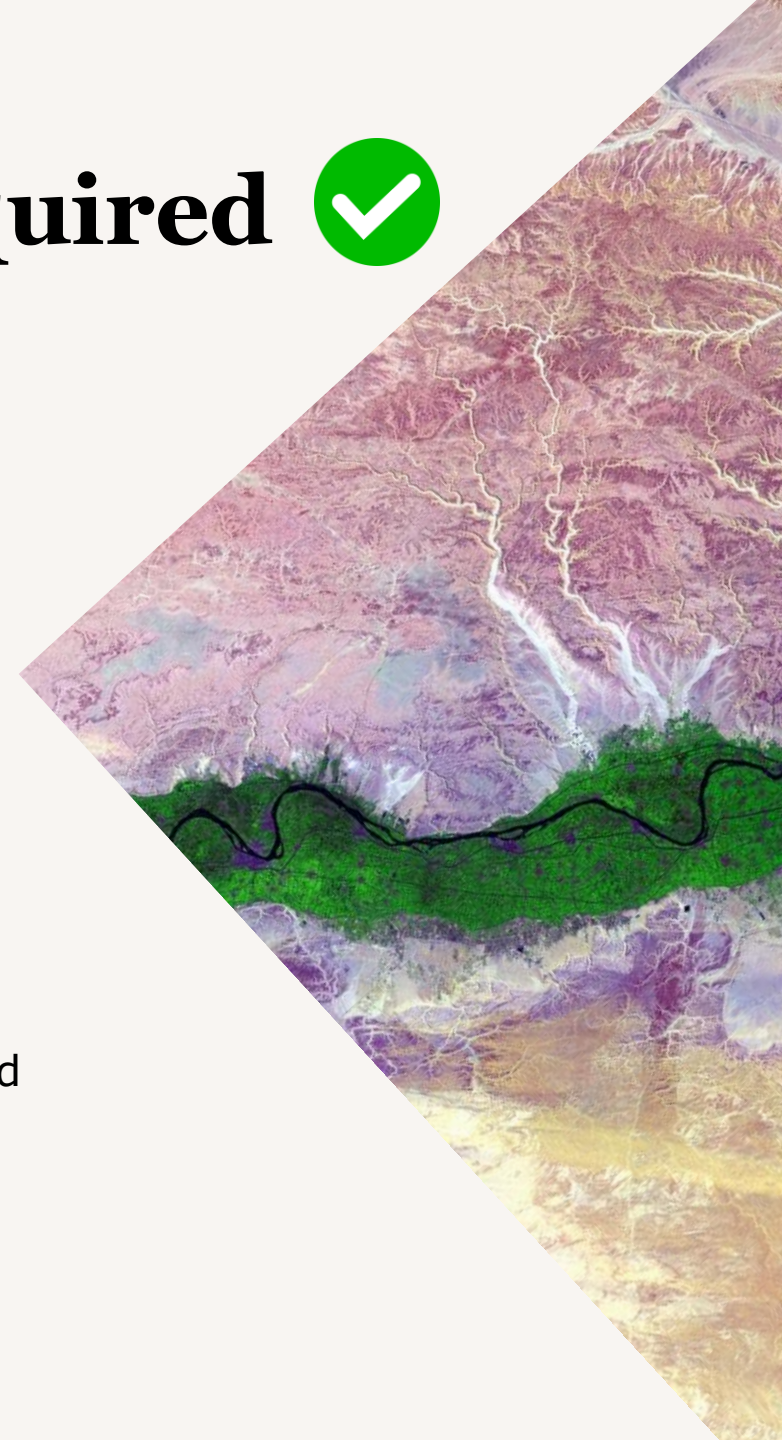
**CAPITALS
COALITION**

Check-in: learning objective acquired



Now, you have:

- Been introduced to the Guidelines third stage: **Measure & Value (HOW)?**
- Understood how to map impacts and dependencies across a **value-chain.**
- Understood how to **use indicators to measure** impacts drivers, dependencies, and how to **value the consequences** of the changes in the capitals.
- **Gained inspiration** from businesses that have measured and valued their impacts and dependencies on the capitals



Key highlights



- ❖ **Impact pathway** connects drivers (business activities or external factors) to change in nature or people states and their consequences.
- ❖ By **mapping the value chain**, it is possible to precisely identify impacts & dependencies
- ❖ After selecting impacts and dependencies from the scope stage, **defining indicators** and the **type of data** needed are practical way to start measuring things. Those indicators can be used to track business performance through time.
- ❖ It is possible to do direct measurement or to use models as Life Cycle Impact Assessment.
- ❖ Valuation technique can be qualitative, quantitative or monetary. Costs and/or benefits can then be determined. For this, **Integrated (or Environmental) Profit and Loss Account**

Collaborative online platform



The screenshot displays the user interface for the TEEB AgriFood community. At the top, there is a large banner image of a lush green tea plantation on a hillside, with a 'Manage group' button overlaid on the left. Below the banner, the group name 'TEEB AgriFood' is prominently displayed. To the right of the name is a circular profile picture of a woman and a 'Joined' button with a dropdown arrow. A horizontal navigation bar below the name contains links for 'Live feed', 'Members', 'Events', 'Media center', and 'Forum'. The 'Live feed' link is highlighted in yellow.

[Teeb AgriFood Community](#)

Thank you



CAPITALS
COALITION

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