Socio-economic impact of improved vegetable seeds in Indonesia

Key findings from the Seed Money Project

12 December 2019, Christine Plaisier (presented by Michiel van Galen)

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Background 1/2

- East-West Seed's mission: to provide innovative products and services that help increase the income of vegetable farmers, and promote growth and quality of the tropical vegetable industry
- Focus on tropical vegetables
- Seeds that improve yields, are suited to local growing conditions, improve seed and food security, promote healthy diets, and improve the lives of smallholder farmers
- But: lack of evidence, and story of change about how change can be attributed to East-West Seed

Background 2/2

- Therefore: WUR was asked by East-West Seed to investigate the socio-economic impact of their improved vegetable seeds
- Focus Indonesia
    - one of the first countries with introduction improved variety
    - joint venture of East-West Seed and Enza (Ewindo)
- In the SMP, WUR has worked with partners to assess the feasibility and optimal conditions for doing a scientifically sound impact study on the socio-economic impact of introducing improved vegetable varieties
- Timeline: May – November 2019

Parties involved

- East-West Seed (Simon and Rutger Groot), Orlando de Ponti, Gerard Grubben
- Enza Zaden
- EWINDO, Indonesia (joint venture East-West & Enza)
- Jan Buurma, consultant and former WUR researcher
- World Vegetable Center
- Wageningen Economic Research

SMP questions

- Feasibility study on:
  - How to generate robust evidence for the economic and societal impact of quality vegetable seed?
  - More specifically: “What are the effects of quality vegetable seeds on the economic development and growth of smallholder farmers in developing countries?”
  - The feasibility of a PPS to answer this research question

SMP study objectives

- To design, discuss and validate the Theory of Change
- To discuss and co-create the relevant KPIs, variables and assumptions
- To identify the availability of existing data, including sources and access
- To define the case to be studied in the research (e.g. tomato)
- To define the scope of the study (number of farmers, locations, etc)
- To collect all necessary information in order to establish the final research design which meets the needs of all stakeholders involved
- To align parties, agenda's, interests and establish a PPS

SMP activities

- Define draft intervention logic (including consumer and healthy diet)
- Define indicators and variables & data needs
- Desk study on existence, reliability + accessibility of existing material and data (including statistics Ewindo/Enza)
- Study potential research designs + scenario’s (light & heavy)
- List of stakeholders / interviewees Indonesia & Netherlands
- Plan mission fieldtrip Indonesia
- Report on mission, data needs & availability
- Define appropriate study design for impact study (including timeframe, resources and limitations)

SMP proposal outputs

Deliverables and outputs:

1) **Study design for robust impact study**

Including approach, data needs, research questions, scope, timeframe indicators, theory of chance, resources needed

2) **Financed via PPS with starting date 2020**

Including parties, contribution, objectives

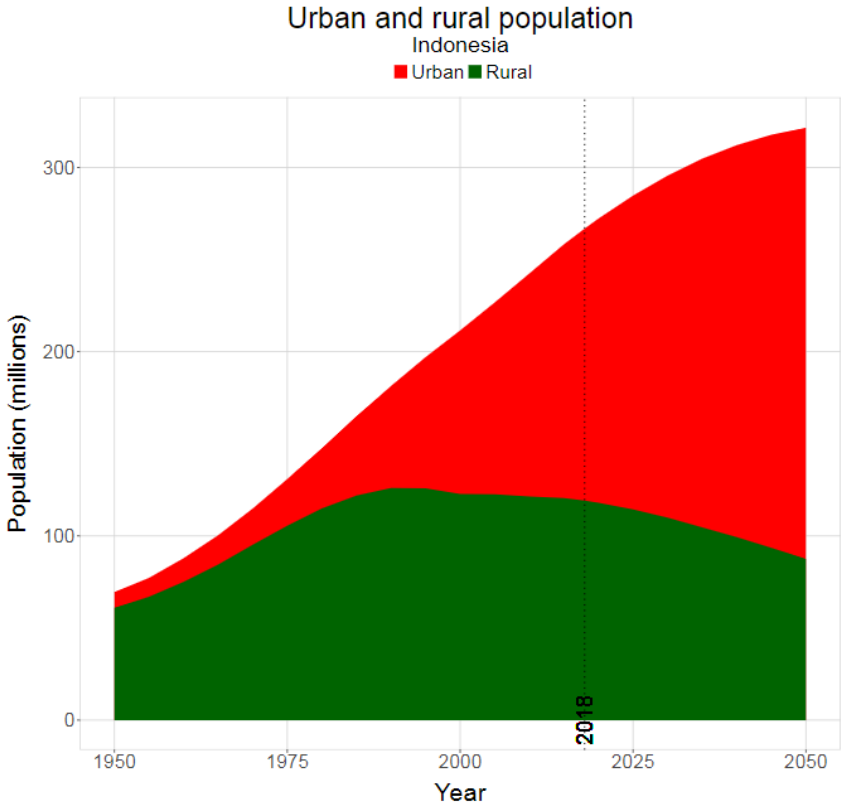
Context Indonesia: exponential urban growth

History (1950 – 2018)

- Exponential growth urban population
- Growth rural population stagnated around 1980 and started to decrease

Prognosis (2018 – 2050)

- Urban population expected to increase further
- Rural population expected to further decrease in size

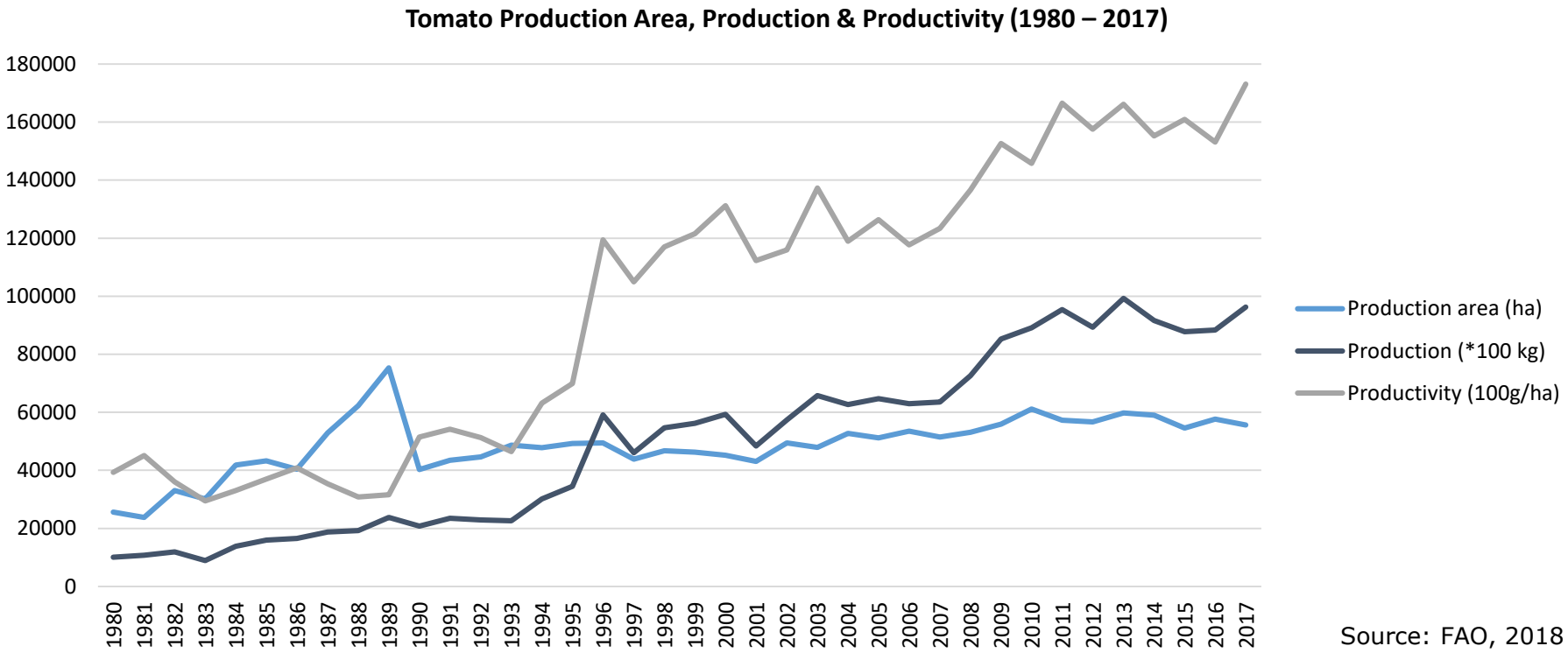


Source: UNDESA, 2018

Context Indonesia: vegetable production statistics

- Monthly data (20-25 crops) at subdistrict level:
  - Harvested/planted areas
  - Production
  - Product prices
- Farmer information + *eye estimates* data collector
- Total 3500 subdistricts; about 1750 in Java
- Online data collection since 2014
- Before: regencies > provinces > national

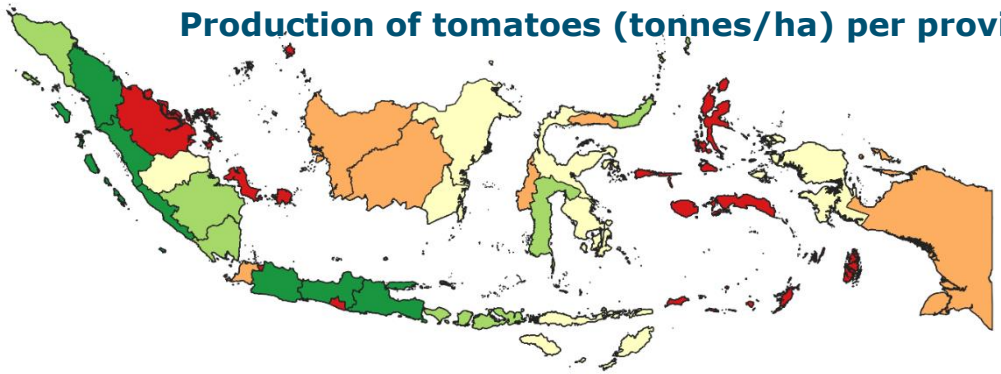
Context Indonesia: trends in tomato production

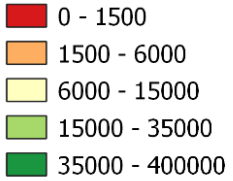


Source: FAO, 2018

Context Indonesia: Expansion of tomato production

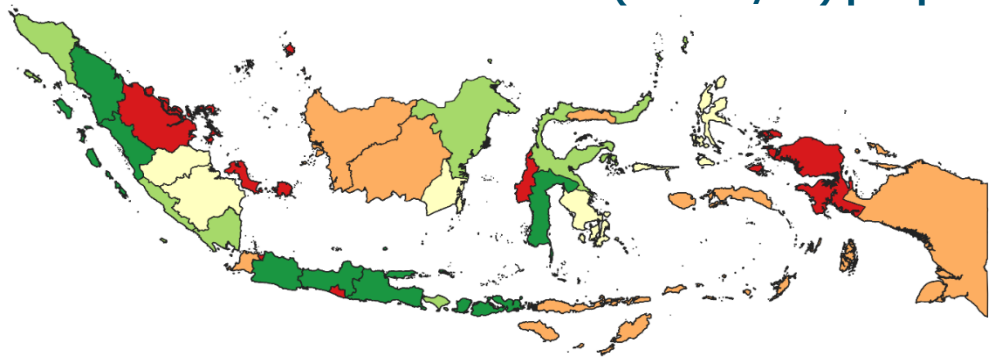
Production of tomatoes (tonnes/ha) per province, 2010

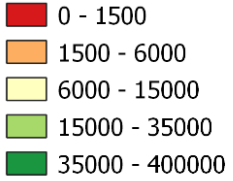




Source: Statistik produksi Hortikultura 2010-2014
Map Visualisation: Quinten Dengerink, juli 2019

Production of tomatoes (tonnes/ha) per province, 2014

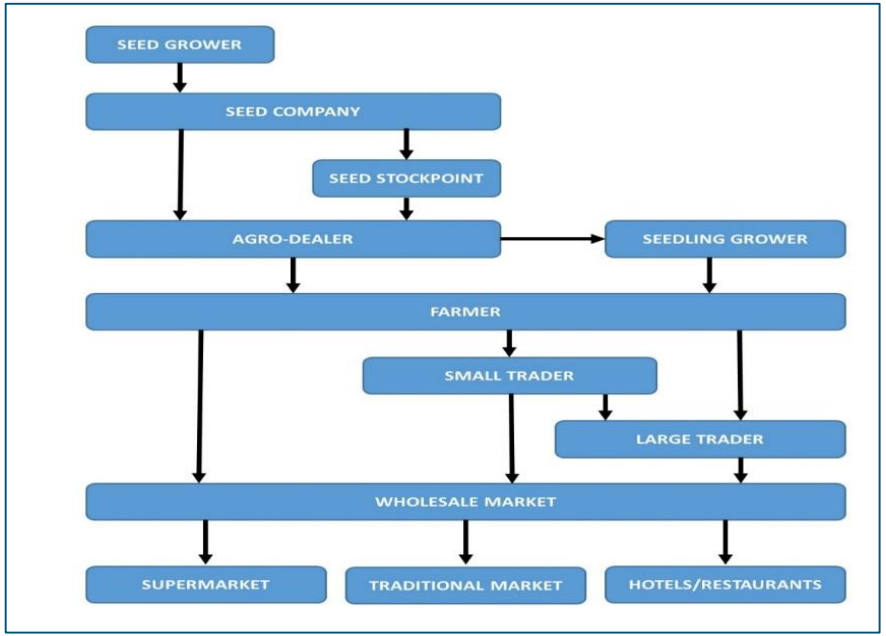




Source: Statistik produksi Hortikultura 2010-2014
Map Visualisation: Quinten Dengerink, juli 2019

Context Indonesia: Understanding the value chain

- Farmer receives seeds either through agro-dealer or seedling grower
- Farmers sell their tomatoes to small or large traders, sometimes directly to wholesale markets
- Wholesale markets sell their tomatoes to supermarkets, traditional markets, hotels and restaurants.



Context Indonesia: Barriers and enablers for farmers

Barriers	Enablers
Diseases/viruses in tomato	Increased demand for tomato
Soil quality degradation	Flow of improved varieties
Labour force bottlenecks	Plant protection products
Crop yields under pressure	Improved irrigation systems
Disappointing farm-gate prices	Wet Season Production
Low knowledge on GAP / Post-harvest handling techniques	Increased up to date knowledge on GAP and (post) harvesting practices

Proposed scope of the research

- Client: applied research for Ewindo, East-West Seed and Enza
- Questions: impact and contribution (role Ewindo in impact measured)
- Product: Tomato (first innovation, expected high impact (low land + high land suitability) and highest market share for Ewindo, but tomato can be exemplary for other crops)
- Region: Java and North-Sumatra (first adopters and later adopters)
- Timeframe: 1980-2020
- Method: mixed (quantitative & qualitative)

Research design – part I

Macro level

- Sales data improved tomato variety Ewindo
- Sales data improved tomato variety other seed breeders
- Trend analysis production data tomato
- Potential tomato production zones

Meso level

Selection criteria cases:

- High / low land
- Year of introduction improved variety
- Market share Ewindo

Selection of cases **(2)**

- Java
- North Sumatra

Micro level

Selection criteria farmers:

- Recent adopters (wet & dry)
- Long term adopters (wet & dry)
- Not anymore
- Not at all (but eligible environment

Selection of farmers **(4 cases**) (or 8 if we distinguish between wet and dry season)

- Java – Highland
- Java – Lowland
- Sumatra – Highland
- Sumatra – Lowland

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Research design – part II

1st data collection
MSC 400 farmers

Most significant change for farmers (life story) in 4 cases with 100 per case = 400 farmer stories. Objective: to verify impact, trace pathways of impact, to get contextual understanding and have input to feed the survey. Analysis will be done quantitatively and the 4 groups are compared.

2st data collection
Survey 800 farmers

Survey at farmers in 4 cases with 200 per case = 800 farmer surveys. To control and verify MSC and macro analysis outcomes, to trace attribution and achieve representativeness. Survey topics: relevance of (improved variety) tomato cultivation, relevance of tomato for household income, knowledge of good agricultural practices, perception of income increase, livelihoods (assets and expenditures), satisfaction of services seed providers, challenges, drivers and barriers for adoption, alternatives.

Combined analysis at micro level

Conclusions on (among others):

- Level of importance for (improved) life because of variety
- Importance of improved variety for income and livelihoods
- Comparisons between early and late adopters
- Insights in drivers and barriers for adoption at farmer level
- Unintended effects (positive and negative)

Macro level

Aggregation / extrapolation micro --> meso --> macro level Indonesia ? (Global detector / projections)

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7 Work packages: qualitative & quantitative 1/2

Work package 1: Statistical trend analysis

- Production data (national/district level)
- Consumption data
- Price data

Work package 2: Welfare effect analysis

- Adoption rates
- Social gain
- Welfare Effect (USD, % GDP)

Work package 3: Global detector

- Visualization of statistical data
- Foundation for sampling and selection
- Maps of production expansion
- Identification of market opportunities

7 Work packages: qualitative & quantitative 2/2

Work package 4: Qualitative sector interviews

- Interviews with key players in the vegetable sector

Work package 5A & B: Farmer data collection

- (A) Collection of farmer stories (most significant change) of 400 farmers, 100 farmers per case
- (B) Quantitative survey on production practices and livelihoods among 800 farmers, 200 farmers per case

Work package 6: Impact report, dashboards & ppt

Work package 7: Scientific publication

Proposed budget 2020 - 2023

Work Package	Budget / WP in Euro	Article possible with WP yes/no	Robust impact question answered (yes/no)	Contribution question answered (EWINDO)	WP required impact study (yes/no)
Work package 1: Statistical analysis	30,000	No	No	No	yes
Work package 2: Welfare effect analysis	50,000	No	No	Yes	yes
Work package 3: Global Detector	40,000	No	No	No	no
Work package 4: Sector interviews	15,000	No	No	No	yes
Work package 5A: Farmer data collection: qualitative (stories 400x)	80,000	No	Yes	Yes	yes
Work package 5B: Farm data collection (quantitative 800x)	80,000	No	Yes	Yes	yes
Work package 6: Final Impact reports, validation and dissemination	50,000				
Work package 7: Academic paper	25,000				
Total (Excl VAT)	395,000	Yes	Yes	Yes	

Scenario's 2020 - 2023

Scenario	Components	Excluded	Budget in EUR excluding VAT	Article yes/no	Robust Impact question (yes/no)	Farmer data and stories yes/no
Full scenario 1	All WP		395,000	yes	yes	Yes
Scenario 2	WP 1, 2, 4-7	WP 3	330,000	yes	yes	Yes
Scenario 3	WP 1, 2, 4-6	WP 3, 7	305,000	no	yes	Yes
Scenario 4	WP 1, 4-6	WP 2, 3, 7	255,000	no	yes	Yes
Scenario 5	WP1, 2, 5A, 7	WP3, 4, 5B,7	185,000	no	Yes	Yes
Scenario 6	WP 1, 2	WP 3-7	80,000	no	no	No
Scenario 7	WP 1, 3	WP 2, 4-7	70,000	no	no	No

Tentative Planning

Year	Activities	Deliverables
2020	• Inception phase (Q1) • Welfare effect analysis (Q2-4) • Statistical analysis (Q2-4)	First impact report
2021	• Story harvesting (Q1-Q2) • Farmer survey (Q2-Q3) • Integration of results (Q4)	Second impact report
2022	• Dissemination & validation of results (Q1) • Writing of academic paper (Q2-4)	Final impact report Academic paper

Conclusions

- Very interesting and relevant research question
- Lack of evidence and stories of change
- Impact study: possible but innovative approach needed
- Relevant for multiple actors and parties (practioners, investors and policy makers)
- Private sector, governments, NGOs, science. Generates lessons and insights to feed policy and other initiatives (eg Nigeria)
- Enza: more than willing to join and proceed
- Ewindo: very interested and eager to start
- East-West Seed: not willing to invest (argument: fundamental study, public investment appropriate)

Questions and Discussion

Thank you

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