Adoption of Good Agricultural Practices through Co-regulation

Expert Group Meeting on the scope and setting up of an Arab-GAP

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Outline

• Introduction
• Perspectives of technology adoption
• Potential determinants of GAPs adoption
• Adoption/implementation sequences
• Governance of GAPs
• Some conclusions
Introduction (1/2)

• Food safety is a public health issue (non-negotiable)
• Imagine the 2011 deadly *E. coli O104:H4* outbreak in the Northern Germany
  – 53 deaths
  – Farmers and industries lost $1.3 billion
  – Emergency aid to member states cost $236 million
• The adoption of GAPs is a prerequisite for implementing several food safety management systems such as HACCP and ISO 22000.
Introduction (2/2)

GAPs

- Prevention strategy for potential hazards
  - Provide simple steps growers can implement
- Allow fast traceability in case of outbreaks
- Do not require large investment cost
- Enhance marketability by building trust
- Represent a good business practice
Perspectives of technology adoption (1/10)

• Stylized facts of adoption
  – Rate of new technology diffusion over time follows an S-curve
  – Adoption rates first rise and then fall over time

• Alternative diffusion models
  – Epidemic models
  – Probit models
Epidemic models (2/10)

• Assumption:
  – New technologies (GAPs) are attractive for the whole population (all farmers)

• Farmers adopt new practices once they have access to information surrounding such practices:
  – about the availability of new practices,
  – how to apply them, and
  – what these practices are for
Epidemic models (3/10)

• Why some farmers adopt more slowly than others?
  – Differential access to information about the new practices
• If this is true, it is important to know the time path of technology diffusion.
• Two possible scenarios
  – Central source model
  – Word of mouth model
Epidemic models – Central source model (4/10)

- Information is transmitted from central sources (e.g., development agents, research institutes, etc.)
  - reaching $X\%$ of the population each period.
  - Diffusion of the new practices takes a kind of exponential function (curve A).
- However, this information diffusion process does not produce the expected S-curve.
Epidemic models – Central source model (5/10)

Exponential (A) and logistic (B) diffusion functions (source: Geroski, 2000)
Epidemic models – Central source model (6/10)

• However in practice, technology diffusion takes longer than it takes for information to spread.

• Reasons:
  – New technologies have “hardware (physical resources)” and “software” aspects (Rogers, 1995)
  – Some of the software can be transmitted impersonally through a users manual
  – But much of the software of a particular technology is built up from the experience of using it (tacit knowledge).
Epidemic models – Central source model (7/10)

• New practices must be transmitted from person to person, and cannot effectively be broadcast from a common source.
  – Many potential users will not adopt the new practices, even if they are aware of its importance.

• Communication between potential users and current users of the new practices is essential
Epidemic models – Word of mouth model (8/11)

• Knowledge transfer may rather follow a word of mouth information diffusion,
  – previous users being main sources
• The larger is this initial base, the faster is diffusion.
• The right model of diffusion might be a mix of common source and word of mouth (model farmers)
• Unlike the common source model, this model traces out an S-curve over time (curve B)
  – rate of diffusion gradually rises until it reaches $\frac{N}{2}$, and then declines (as non-users get increasingly hard to find).
Epidemic models – limitations (9/10)

• Epidemic models are rather simple
• Adoption needs to be viewed as a process of persuasion rather than simply as a process of spreading news
  – analogy of technology diffusion with epidemics begins to break down
• Epidemic models assume even flow of information and homogeneous populations
• However, differences between individuals can impede
  – the process of communication and persuasion
Probit models (Choice based models) (10/10)

• Individuals differ in some characteristics, which affect their decision to adopt new technologies.
  – The decision to adopt is a choice made by a particular individual or firm.

• Differences in adoption time reflect differences in the goals, needs and abilities of individuals/firms.
  – Different individuals are likely to want to adopt the new technology at different times.
Potential determinants of GAPs adoption: Individual/firm characteristics (1/6)

The following variables are likely to affect the propensity and intensity of GAPs adoption

– Scale (firm/farm size)
– Skills/capabilities
– Risk attitudes
– Other demographic (age and income levels)
Potential determinants of GAPs adoption: Characteristics of new practices (2/6)

• These include
  – relative advantage of the new practices versus existing practices
  – trialability of the new practices
Relative advantage of new practices (3/6)

- The degree to which the new practices are perceived as being better than the existing practices.
- Input costs, yields and output prices (differentiated prices)
- Impacts on other parts of the production system
- Adjustment costs involved in adoption of the new practices
- Cost of certification
Factors affecting adoption decision: relative advantage (4/6)

• Riskiness of production (e.g., price volatility, yield losses, weeds or pests, etc.)
• Compatibility with farmers’ existing set of practices and resources
• Government incentives
Trialability of the new practices (5/6)

• Potential to be applied incrementally/ its use on a small scale
• Observability of results from the new practices
• Complexity of the new practices
• Cost of undertaking a trial
Institutional factors (6/6)

• Market demand
  – Perhaps the MOST important factor
  – GAPs should be economically viable to be
    • acceptable
    • sustainable
  – GAPs are easily adopted when market driven
Adoption is a learning process
   – GAPs need to be applied systematically

(1) Awareness creation
   – problems and opportunities
   – all stages of the food value/supply chain

(2) Non-trial evaluation/information processing time
   – Farmers need sometime to collect and evaluate information about the new practices
Adoption sequences (2/3)

(3) Trial phase

• Trial can contribute to:
  – decision making processes
  – skill development aspects
  – widespread adoption of GAPs

(4) Adoption phase

– Adoption is the continuous use of new practices.
(5) Non-adoption or dis-adoption

- We shouldn’t expect that all farmers will adopt GAPs
- Some farmers may not accept the new practices at all
  - If information is not well communicated, or
  - trial results are not sufficiently encouraging
- Some farmers may scale down or eventually discontinue using the new practices
  - If economic circumstances of the farmers or market conditions change
GAPs adoption and agrifood supply chains organization (1/1)

• Implementation of GAPs requires development of integrated agrifood supply chains
  – Traditional/ wholesale/ marketing is unsuitable for implementing GAPs

• Wider adoption of GAPs are observed in buyer (demand)-driven supply chains (Lee et al., 2012)
  – E.g., retail-led GAPs (Eurep/Global GAP)

• Concern: potential exclusion of small farmers

• Solution: strong producer groups/organizations
Governance of GAPs (1/3)

Options for governing GAPs (see Martinez et al. 2007)

(1) Command and control (government owned GAPs)
   – Direct regulation
   – Sanctions and penalties

(2) Self-regulation (privately owned GAPs)
   – Make adoption of GAPs a “voluntary codes of practice”
   – GAPs adoption is part of the marketing strategy of the firm or farm
Governance of GAPs (2/3)

(3) *Information and education*

– *Privately owned GAPs*
  
  – Government role is limited to the provision of information and advice to producers

(4) *Incentive-based structures*

– *Privately owned GAPs*
  
  – Government plays a more proactive role by creating economic incentives
    • rewarding producers for adopting GAPs
Governance of GAPs (3/3)

(5) Co-regulations

– Statutory or government-backed GAPs
– Combine primary legislation and self-regulation
– Self-regulatory aspect
  • Supply chain actors determine and implement their own internal rules and procedures to meet requirements.
– Legislation aspect
  • Regulators approve internal procedures and monitor compliance
– Combines advice, support, inspection, incentives schemes to encourage the implementation GAPs
Conclusions (1/2)

• Adoption of GAPs is critical to develop national and regional food safety control systems
• Adoption models may help think logically and creatively to develop GAPs implementation modalities
• Adoption decision is influenced by a number of factors:
  – individual/farm specific attributes,
  – characteristics of the new practices,
  – most importantly the market condition and strong government incentives
Conclusions (2/2)

• Adoption is a learning processes, requires time and needs to be applied sequentially
• GAPs are easily adopted when market driven
  – buyer-driven agrifood supply chains are critical
• The choice of GAPs governance greatly matters
• Co-regulation could be a way forward for the development and implementation of ‘Arab-GAPs’
  – The basis being national GAPs
  – Ultimate goal being Global GAPs (international)
References


