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Healthy Earth, Healthy Food, Healthy People

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

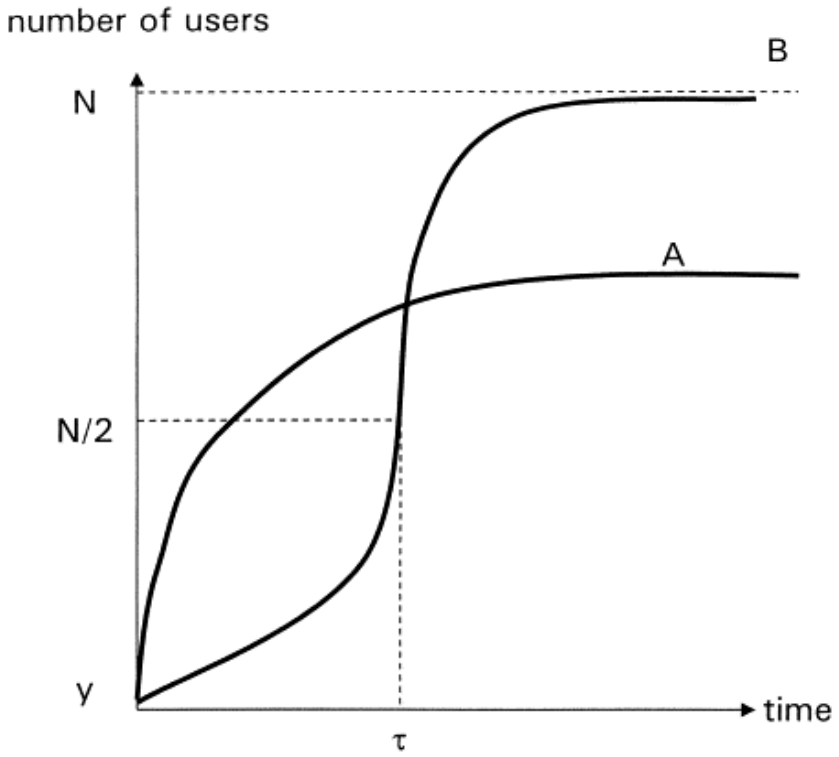
Epidemic models (3/10)

- 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 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 sequences (1/3)

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.

Adoption sequences (3/3)

(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)

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