



Incentives for the adoption of Good Agricultural Practices

Background paper for the FAO Expert Consultation on a Good Agricultural Practice approach

Rome, Italy, 10-12 November 2003



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Acronyms

EurepGAP	Euro-Retailer Produce Good Agricultural Practices
FAO	Food and Agriculture Organization of the United Nations
GAP	Good Agriculture Practice
HACCP	Hazard Analysis and Critical Control Point
NGO	Non Governmental Organization

Executive summary

This paper examines the incentives and disincentives for the adoption of Good Agricultural Practices (GAPs) by farmers and by downstream handlers of farm outputs in developing countries. GAPs cover a diverse set of objectives and have been developed by a wide array of interest groups from private supply chain-driven systems tied to individual retailers, and industry-wide systems driven by retailer or producer associations, to programmes developed within national policy frameworks or promoted by international agencies.

GAPs can be seen as attempts to improve the sustainability of agriculture on a number of fronts, including protecting environmental and natural resources, improving food quality and food safety and enhancing food security through improved production techniques. Concerns have been raised regarding the potential effect of GAPs on smallholders in developing countries. There are fears that stringent new GAPs could marginalise small producers, cutting off access to export markets and imposing disproportionately higher production costs on smaller producers given the investments that may be needed to adopt good practices. Conversely, GAPs may provide the catalyst for improvements to production techniques and to supply chain infrastructure (e.g. processing, storage, transportation) in developing countries.

Table 1 summarises the incentives and disincentives to adopt GAPs discussed in this paper. The strength of each incentive or disincentive is classed as “strong” or “marginal”. For example, some incentives for adoption (e.g. stabilisation of yield and/or revenue) are expected to be stronger than other incentives (e.g. reduction in wastage). The final column indicates the type of GAPs programme in which this incentive or disincentive is likely to be more prevalent. The GAPs programmes are classified broadly as (i) private industry supply chain GAPs, where the farmers are working with a specific processor, exporter and/or retailer within a closed supply chain (PSC); (ii) industry group GAPs, where the GAP has been established by a producer or retailer association, such as EurepGAP (IG); (iii) national government-initiated GAPs (G), such as the Malaysian Farm Accreditation Scheme, and; (iv) GAP programmes that are championed by international agencies and may extend across multiple national boundaries in developing countries (IA).

In some cases, the (dis)incentive for adoption is relevant regardless of the type of GAP programme, such as stabilised yield (revenue) or increased production costs. Other incentives are more relevant to specific types of programmes. For example, if a farmer must make investments that are specific to one buyer, he/she is vulnerable to the buyer changing the terms of their agreement or refusing to accept supplies. This disincentive applies mostly to private supply chain GAPs. It is less relevant for GAPs implemented by international agencies that may be broader in scope and where farmer investments are not likely to be specific to one buyer. In general, the economic incentives for adoption are stronger for private supply chain systems, whereas many of the economic disincentives (increased costs) apply to all types of GAP system.

Table 1 (Executive Summary) Characterising Incentives/Disincentives to Adopt GAPs

Incentive	Farmer Incentive	Processor/Retailer incentive	GAPs Systems Where Most Prevalent
ECONOMIC			
Price Premium	xx		PSC
Access to market/supply chain	xx		PSC
Access to reliable inputs		xx	PSC, IG
Product differentiation	x	xx	PSC
Stabilise yield/revenue	xx		PSC, IG, G, IA
Reduce storage losses	x	x	PSC, IG, G, IA
Reduce wastage	x	xx	PSC
Increase farm asset value	x		PSC, IG, G
Protection against market externalities	x		PSC, IG
Increase variable production costs (e.g. labour)	--	--	PSC, IG, G, IA
Reduce output/increase average costs	--	--	PSC, IG, G, IA
Increase fixed production costs (e.g. equipment)	--	--	PSC, IG, G, IA
Asset specific investment*	-	-	PSC
Reduce search costs	x	x	PSC, IG (G, IA)
Reduce monitoring costs		xor ^a	PSC, IG, (G, IA)
Altruism/social capital	x	x	
REGULATORY/LEGAL/ INSTITUTIONAL			
Asserting property rights on scarce resources	x		G
Subsidies	x	x	G
Reduce liability/show due diligence	x	xx	PSC, IG
Reliance on institutional infrastructure	-	-	PSC, IG, G, IA
Third party monitoring	x	x	PSC, IG, G, IA
HUMAN CAPITAL			
Expand skill set	x	x?	PSC, IG, G, IA
Record-keeping (literacy)	--	-	PSC, IG, G, IA

Key:

Where xx = strong incentive to adopt; x = marginal incentive to adopt;

-- = strong disincentive to adopt; - = marginal disincentive to adopt

PSC = Private supply chain GAPs;

IG = Industry Group GAPs(e.g. producer association),

G = national government GAPs;

IA = international agency or NGO GAPs

^a Depends on the presence of third party verification which lowers monitoring costs. Without third party verification, processors/retailers will likely face higher monitoring costs.

* An asset specific investment has little or no value in an alternative use, e.g. inputs or equipment that are specific to one buyer. Having made the investment, the farmer is vulnerable to the buyer acting opportunistically by renegeing on a supply agreement.

The incentives for farmers to adopt GAPs include *economic incentives* such as increasing and/or stabilising revenue, reducing average costs, improved market access, increased capital valuation of farm assets, reduced vulnerability to poor agricultural practices of other farmers; *regulatory or legal incentives* including changes in ownership rights or tax burdens, liability rules, subsidies; and *human capital incentives* including access to new skills. Disincentives for farmers to adopt GAPs include *economic disincentives* such as: increased production costs, investment in assets that

are specific to one buyer and/or cannot be recovered if the buyer-seller relationship breaks down; *institutional constraints* including inadequate quality monitoring infrastructure, weak or corrupt public institutions for overseeing GAPs, and; *human capital constraints* such as literacy limits on documentation capabilities; constraints on labour or management time, weak public extension, etc.

Market forces have driven the development of many GAPs through the demand by consumers in developed economies for stronger food safety and food quality assurances. In addition to on-farm practices, Good Manufacturing Practices for downstream firms are important in ensuring the integrity of product attributes assured through a GAP programme. Often this is combined with traceability or identity preservation systems. Smaller firms may have a 'first-mover' advantage if they can capitalise on their ability to tailor production processes to niche markets and offer traceability. However, technological change erodes this competitive advantage, eventually allowing larger firms to adapt their commodity-oriented systems to capture more value-added. Furthermore, the marketing and supply chain infrastructure in many developing countries has limited capacity for segregating GAP and non-GAP produce to allow full traceability and identity preservation of GAP output.

Monitoring (and certification) by an independent third party plays a critical role in assuring the credibility of GAPs. The probability that third party monitoring will reveal true product quality is important in ensuring the integrity of products from GAPs programmes. If third party monitoring is ineffective, the threat of regulatory intervention to mandate specific production practices can provide the incentive for an industry to 'voluntarily' introduce GAPs. However, this presumes that intervention by a government or public agency would improve quality monitoring and certification. In many developing countries, this may not be the case given limited resources and infrastructure for monitoring. An ineffective or corrupt regulatory system will weaken the credibility of public sector-driven GAPs.

The exclusion of smallholders in developing countries from GAP systems is a concern. Strategies to avoid exclusion include (i) providing ample education and training to overcome human capital constraints. (ii) Fostering the development of the institutional infrastructure necessary to support GAPs within a developing country environment (e.g. third party monitoring, quality verification systems). (iii) Encouraging the participation of farmer associations or co-operatives to provide a critical mass in terms of supply, provide a conduit for the dissemination of information on GAPs to smallholders and improve the bargaining power of individual farmers vis-à-vis larger retailers or processors.

1. Background

Good Agricultural Practices (GAPs) covers a wide gamut of on-farm and post-farm activities related to food safety, food quality and food security, the environmental impacts of agriculture and often various social objectives including animal health and welfare and agricultural workers rights. A GAP approach to agriculture involves the establishment of guidelines or standards for agricultural producers and post-farm handlers, the monitoring of these standards, and the communication of these standards through credible quality signals to downstream firms, consumers and the public in general.

Concerns have been raised regarding the potential effect of GAPs on smallholders in developing countries. There are fears that stringent new GAPs could marginalise small producers, cutting off access to export markets and imposing disproportionately higher production costs on smaller producers given the investments that may be needed. There is also a fear that private sector GAPs driven by developing country supermarket chains are not consistent with goals for sustainable agricultural and rural development related to food security. On the other hand, it has also been argued that GAPs can provide the catalyst for improvements to production techniques and supply chain infrastructure in developing countries (Jaffee, 2003a).

This paper examines the incentives and disincentives for the adoption of GAPs by farmers and by downstream handlers of farm outputs (traders, processors, retailers, importers/exporters etc)¹. In examining the incentives for adoption, a number of key questions are explored: What are GAPs? What are the objectives of GAPs? Why have GAPs evolved? What are the different types of GAP and why are these differences important in understanding the incentives to adopt GAPs? What are the respective public and private sector roles in creating, operating and monitoring GAPs?

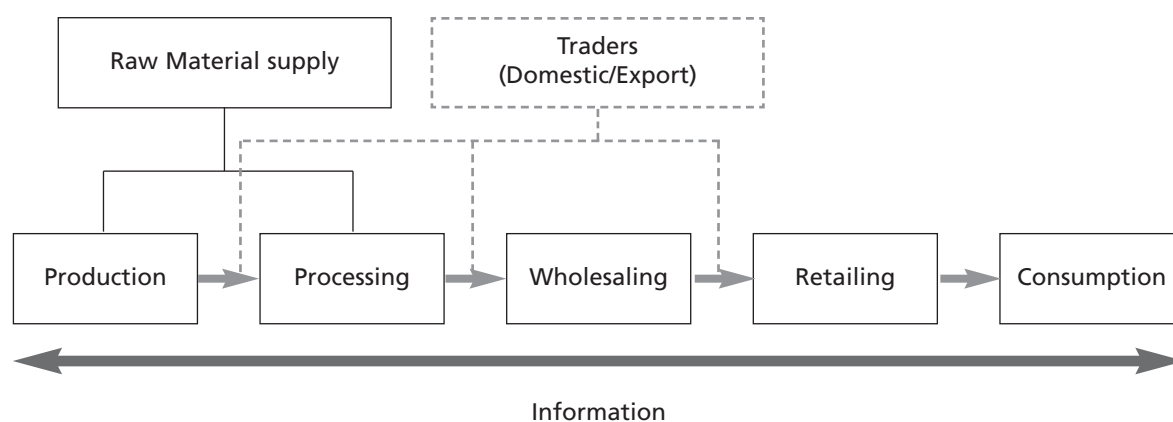
It is helpful to consider GAPs within the context of the overall food supply chain. Figure 1 illustrates a simple food supply chain flowing from production, through processing, distribution and retail to the final consumer. The dotted lines indicate that traders/exporters can play a role at multiple points in the supply chain. There are two flows illustrated in Figure 1: physical commodities flows and information flows. Physical commodities move from producers to consumers through various routes depending on the institutional setting of the market (e.g. role of traders, exporters, wholesalers, etc) and depending on the nature of the commodity (degree of processing, perishability, etc). Independent farms or firms may operate at each stage of the supply chain, or a firm may be vertically integrated owning two or more stages, such as a retailer

¹ For additional information on the development and implementation of the Good Agricultural Practice Approach, readers are referred to additional background papers produced for the FAO GAPs consultation - *Development of a Good Agricultural Practice Approach and Summary Analysis of Relevant Standards, Guidelines, and Codes on Good Agricultural Practices*, FAO Expert Consultation on Good Agricultural Practices, November 2003. http://www.fao.org/prods/GAP/gapactivities_en.htm

that also performs wholesaling functions or a farmer-owned co-operative that engages in processing. The 'food supply chain' for some smallholders practising subsistence agriculture is completely vertically integrated from production to consumption within the same farm household, with retailing and wholesaling functions being unimportant, whereas these functions become more important for smallholders who also sell their produce.

Information flow is a two-way process. Information on consumer demands and the requirements of the market place flow from consumers back through the supply chain. Information on production techniques, quality verification and identity preservation/traceability information flows forwards along the supply chain from production through to retail or point of consumption. The effectiveness with which information on consumer demands reaches producers or the effectiveness with which information on production practices reaches 'downstream' retailers and consumers varies widely across supply chains. Good Agricultural Practice approaches are a way of improving this two-way information flow. Likewise, GAPs may also facilitate the production of food and the physical flow of agricultural products along the supply chain. The incentives for farms and food firms to adopt GAPs and good manufacturing practices will depend on their relative gains or losses from enhancing the physical product flow and/or the information flow through the supply chain.

Figure 1. Basic Supply Chain



1.1 WHAT ARE GAPs?

The FAO Committee on Agriculture proposed GAP framework (FAO, 2003a) provides an insight into the scope and wide-ranging objectives of GAPs. The Framework identifies ten generic components of GAPs, including soil management, water management, crop and fodder production, crop protection, animal production, animal health and welfare, harvest and on-farm processing and storage, energy and waste management, human welfare, health and safety, and wildlife and landscape conservation.

Some GAP programmes are market-driven. These can be private sector supply chain-driven systems where a key player in the supply chain, e.g. the retailer, introduces a set of proprietary GAP guidelines for its suppliers. Alternatively, private sector initiatives can be sector-wide being driven by industry groups, with key roles played by retailer and/or producer

associations in developing guidelines. Examples include the retailer-led EurepGAP² or the on-farm food safety initiative spearheaded by a number of producer associations in Canada.³

Other initiatives are the realm of ‘public sector’ action and may be developed by governments within the national policy frameworks of individual countries to enhance domestic competitiveness. For example, the Malaysian Department of Agriculture is implementing a voluntary farm accreditation scheme to encourage the adoption of GAPs among fruit and vegetable producers, particularly the use of integrated pest management (Agricultural Technical Co-operation Working Group(ATCWG)).⁴ Finally, non-Governmental Organisations (NGOs) and international agencies have also actively promoted the use of GAPs. The Integrated Pest Management and the Better Banana project are programmes promoted by NGOs that encourage the use of GAPs⁵ (FAO, 2003b). Table 1 in the executive summary distinguishes between these four broad groups of GAP programmes.

GAPs cover a diverse set of objectives and have been developed by a wide array of interest groups. The horizontal scope of individual GAPs, in terms of the breadth of their coverage across the ten components, influences the incentives for adoption. The vertical scope, in terms of the involvement of different supply chain participants – and regulators or third parties – are also important influences on the incentives to adopt. Stripping away the objectives of GAPs to their core, it is clear that they attempt to generate or correct economic incentives. Seen in this light, many GAPs can be seen as an attempt to correct a ‘market failure’ by helping markets to function more effectively or by assisting in the flow of information along the supply chain. A review of these basic objectives is helpful in understanding why GAPs have evolved.

1.2 GAPs AS A MEANS OF ADDRESSING MARKET FAILURE

In a functioning, well-developed market economy, the forces of supply and demand send price signals that assist in the efficient allocation of resources, facilitating investment and encouraging economic growth. For example, an increase in the consumer demand for mangoes creates a short-run shortage of mangoes before supply can respond, leading to an increase in prices. Over time, mango producers respond to the increase in prices by increasing their supply of mangoes as more resources move into mango production. In the absence of impediments, the forces of supply and demand are said to allocate resources efficiently. However, economists

2 EUREGAP standards were developed by the Euro-Retailer Produce working group (EUREP) in response to consumer concerns about food safety and food quality. Standards have been developed for livestock, combinable crops, fresh fruit & vegetables, feed manufacturing and on-farm feed production and flowers and establish a baseline set of minimum standards that are widely recognised among European retailers (www.eurep.org).

3 The Canadian On-Farm Food Safety Program (COFFS) was introduced in 1997 by the Federal government and the Canadian Federation of Agriculture, an association representing the agriculture industry. The COFFS program facilitates the development of on-farm food safety and quality assurance initiatives by national commodity organisations. By March 2003, 19 Canadian commodity associations had launched or were developing national on-farm food safety and quality assurance programs for their sectors encompassing GAPs. These include the cattle industry’s Quality Starts Here ü Verified Beef Production program, the pork industry’s CQATM Canadian Quality Assurance program, the Canadian Quality Milk program, the Canadian Hatching Egg Quality program plus programs in grains and in horticulture products

4 The Malaysian government has published a number of extension manuals and technology packages for various fruit and vegetable crops. Supervision and monitoring by extension officers follows an ISO9002 system for Group Farming Extension Services (ATCWG).

5 The Rainforest Alliance Better Banana project developed standards for banana production that incorporated environmental conservation goals, in addition to social goals with respect to labour conditions (FAO, 2003b).

have long recognised that markets sometimes fail. In developing countries, with weak financial, legal and market institutions, market failure can be a significant problem inhibiting investment and stifling economic growth.

‘Market failure’ occurs when price signals fail to adequately reflect society’s true valuation of a good, service or resource, leading to a misallocation of resources. This can result in too little being produced of a good or service that yields economic or social benefits. Alternatively, it can result in too much of a good being produced that results in harm to consumers, other producers, agricultural workers, the general public, etc. Regulatory intervention to correct the market failure may be appropriate *if* the benefits of that intervention outweigh the costs.

GAPs can correct market failures by leading to the adoption of production practices that are socially acceptable and environmentally non-degrading. They can help improve the flow of information along the supply chain. Impediments to the flow of information may result in market failure if downstream retailers or consumers are unable to verify the true quality of a product.

Markets ‘fail’ for a variety of reasons, including the presence of public goods, spillover effects, information asymmetry and inadequate or under-developed institutions to govern market transactions. These terms are explained below within the context of GAPs.

1.3 GAPs AND THE PROVISION OF PUBLIC GOODS

Pure public goods are goods (or resources) which it is not possible to prevent other people from consuming and for which one person’s consumption does not affect another person’s consumption⁶. Typically the private sector under-provides public goods, as it is not possible to control the supply or distribution of the product and therefore reap full returns from the market. Resources with public good properties are subject to over-use due to the ‘common property problem’: the inability to exclude users results in rapid depletion of the resource, for example fish in international waters.

Some GAPs are designed to promote the production of beneficial public goods or to protect threatened public good resources. For example, GAPs that focus on reducing soil erosion, reducing run-off or protecting water resources. In Brazil, the national zero-tillage Federation (FEBRAPDP) focuses on conservation agriculture practices. The Quesungual system for improving agro-forestry practices in Honduras provides alternatives to slash-and-burn practices (FAO, 2003c). The objectives in these cases are to protect scarce or endangered resources and promote conservation practices.

1.4 GAPs AS A MEANS TO ADDRESS SPILLOVER EFFECTS

Market failure also arises in the presence of positive and negative externalities that create spillover effects in markets. A *positive spillover (positive externality)* occurs when the social benefits

⁶ For example, clean air is a public good. It is non-excludable – people cannot be prevented from consuming the clean air and it is non-rivalrous – one person’s consumption does not affect the next person’s consumption. Semi public goods are more common. These include goods or resources to which many people have access but one person’s consumption reduces the amount available for others. Examples include common grazing land or forestry resources on public land.

from a good or service outweigh the private benefits and as a result, the market under-provides this good or service. An example is education. Education of agricultural workers and farmers about good agricultural practices that enhance food safety, reduce soil erosion, improve food security, etc. produces widespread social benefits that may not adequately be rewarded in the price the farmer receives for his/her produce or in the wage received by an agricultural labourer. A core component of many GAPs, particularly those targeted at developing countries, is education and extension. Balsevich *et al* (2003) describe the development of GAPs as an integral part of new supply chain relationships spearheaded by Hortifruiti (the procurement arm of a retailer) in Costa Rica. As well as certifying a subset of its growers as following GAPs, Hortifruiti provides technical assistance to its suppliers with respect to cropping decision and production practices.

The EurepGAP protocol for fresh fruit and vegetables lists as requirements (“minor musts”) that harvesting workers receive basic instructions on hygiene before handling fresh produce. It also requires, in general, that formal training be given to all appropriate workers with respect to operating dangerous or complex equipment in the interests of protecting worker health, safety and welfare (EurepGAP, 2001). In addition to the direct worker and producer education or extension components incorporated into some GAPs, the guidelines themselves play an educational and extension role, for example, by explaining the correct method of storing and handling potentially harmful agricultural chemicals.

Some GAPs address *negative spillover* effects (negative externalities). These are external costs that arise when the social costs from a good or service outweigh the private costs incurred by the supplier. As a result, the market over-produces an output that imposes costs on the rest of society. Pollution, contamination of water resources, soil erosion, unsafe food, etc. are all examples of negative spillovers that can be addressed through GAP programmes. Integrated Production and Pest Management programmes encourage the use of non-chemical production and management techniques using naturally-occurring beneficial insects to control insect crop pests. These GAPs reduce negative spillover effects (external costs) with respect to farm workers’ health, the environment and chemical residues on food (FAO, 2003d).

1.5 GAPs AS A CONDUIT FOR INFORMATION FLOWS

Market failure can also occur when the flow of information along the supply chain is impeded. This is known as ‘information asymmetry’, where one party to an exchange (e.g. the seller) has more information about the true quality of a product than the other (e.g. the buyer). Consumers and downstream buyers (retailers, processors, traders, etc) may not have full information about food safety and quality, or about production methods related to animal health and welfare, environmental sustainability, agricultural workers rights, sustainable development practices, etc. GAPs assist in the provision of credible information so that consumer preferences for safe food, high quality food or sustainable production methods are transmitted back to producers through price signals – higher prices for food with desirable characteristics, lower prices for food with undesirable characteristics.

From a buyer’s perspective, goods can have search, experience or credence characteristics. *Search characteristics* can be identified and evaluated by the buyer prior to purchase, for example, the colour of an apple, the exterior blemishes on a potato or the size of an orange. GAPs might address the reduction of blemishes on fresh fruit and vegetables as an educational component in helping producers or food handlers improve production and processing

practices. However there is no information problem as consumers can signal their like or dislike of this attribute through their purchase decision.

It is more difficult for consumers to act on their preferences for products with *experience attributes*. These are attributes that a buyer or consumer can only detect after purchase and consumption, such as the juiciness of an orange or the tenderness of a steak. Food safety has experience properties if a consumer becomes ill relatively quickly after eating a food item and can identify the cause of his/her illness. Quality or food safety signals assure consumers of the presence (absence) of beneficial (harmful) experience attributes. These signals enable consumers to express their preferences through the marketplace.

GAPs facilitate the provision of information signals to downstream buyers and consumers by encouraging and certifying production practices that enhance the quality or safety of food. For example, the Agricultural and Environmental Integral Protection Program (PIPAA) in Guatemala introduced a Safety Certification Seal for fresh produce. Although not yet mandatory, Balsevich *et al* (2003) report that companies supplying the biggest supermarket company in Guatemala are upgrading their production system with the PIPAA safety certification standards.

The information problem is more pronounced for *credence attributes* which a buyer/consumer cannot detect even after consumption. Many of the production and process attributes that are addressed by GAPs fall into this category – for example production practices related to environmental protection, conservation of scarce or threatened natural resources, animal health and welfare, agricultural workers' rights. Some food safety problems also have credence properties if the problem is not immediately obvious (BSE in beef) or it is difficult for the consumer to determine the source of a food borne illness.

Without a quality signal indicating how the product was produced, consumers who wish to express ethical preferences with respect to production attributes are unable to do so. GAPs facilitate the provision of quality signals to consumers provided that they are backed up by transparent, enforceable and credible monitoring and certification systems. The role of credible monitoring and certification is key to the successful implementation of sustainable GAPs systems for product attributes that cannot be easily (or economically) detected after the fact through testing.

1.6 GAPs AS A RESPONSE TO INSTITUTIONAL FAILURE

Finally, GAPs may correct market failures caused by high transaction costs that result from institutional failure. *Transaction costs* are the costs of carrying out an exchange, be it through the open market, between two firms in a contract or strategic alliance or within a vertically integrated firm.⁷ Transaction costs arise from the *search* process of locating reliable buyers and suppliers, discovering potential prices or evaluating quality prior to purchase. Transaction costs also arise from the *negotiation* of the transaction, such as the fees charged by middlemen, the costs of drawing up a contract. Finally, transaction costs are also incurred in *monitoring* product

⁷ A vertically integrated firm owns two or more stages of the production process, e.g. a dairy farm that also processes milk or a retailer that owns a distribution/wholesaling facility.

quality, supplier production practices or buyer produce handling practices after the transaction has been agreed to and in *enforcing* contractual agreements.

In developed countries, institutions have evolved to reduce transaction costs. Market information institutions reduce search costs for producers by providing price information.⁸ Financial institutions reduce negotiation costs by facilitating ease of payment over time and space. Commercial legal systems reduce monitoring and enforcement costs by providing legal redress in the event of a breach of contract. In developing countries, the absence or under-development of these institutions significantly increases transaction costs, impeding investment and hampering long-term economic growth and competitiveness.

The introduction of GAP systems can assist in institutional development or act as a stop-gap to allow time for institutional adaptation to occur. GAPs may be a temporary measure in a rapidly evolving economy as other institutions arise or as new production technologies are developed that eventually make a specific GAPs programme obsolete. Credible information about good agricultural practices reduces search costs for producers in determining the requirements of buyers. It reduces the search costs for buyers in locating reliable suppliers. Monitoring costs may be reduced for buyers if a GAP system includes third party monitoring and certification.

The type of GAP programme affects the distributional burden of transaction costs (refer to Table 1). A ‘public sector’ national or international GAP system developed, managed and monitored by national governments, international agencies or NGOs reduces monitoring and enforcement costs for downstream buyers (retailers, wholesalers, etc). If effective, these firms can rely on the independent GAPs certification to assure product quality attributes without having to conduct additional quality monitoring. Private sector supply-chain driven GAP systems, however, internalise these transaction costs, such that downstream buyers incur costs in monitoring and certifying quality. If a retailer or importer develops its own GAPs programme, it incurs the costs of ensuring compliance among suppliers. In some cases, a portion of these costs may be passed through to farmers through cost-recovery third party audits. The extent to which this occurs will depend on the relative bargaining strengths of the parties and the availability of alternative sources of supply (markets) for buyers (sellers) respectively. In developing countries, farmers typically have weak bargaining power vis-à-vis downstream buyers. Of concern therefore is the extent to which the transaction cost burden from a private sector supply-chain driven GAP will be passed back down the supply chain to handlers and farmers.

⁸ In the UK the Meat and Livestock Commission, a quasi-governmental organisation, collates and publishes weekly livestock prices. In Canada, the Canadian Cattlemen’s Association operates CANFAX – a service providing subscribers with information on average prices paid by processors for finished cattle.

2. Incentives and disincentives for farmers to adopt GAPs

Incentives for farmers to adopt GAPs differ depending on the focus of the GAP programme and the market failure it addresses. Broadly speaking, these incentives can be divided into economic incentives, regulatory/legal incentives and human capital incentives. The disincentives for farmers to adopt GAPs include economic disincentives, institutional infrastructure constraints and human capital constraints. This section will begin by discussing the incentives for adoption before examining the disincentives. It is important to note that the disincentives are often the mirror-image of the incentives to adopt, in the sense that adoption of GAPs to achieve price premiums (an incentive) may be accompanied by higher production costs (a disincentive). For clarity of exposition, the incentives are treated separately from the disincentives, however, it is recognised that they may occur simultaneously.

2.1 ECONOMIC INCENTIVES FOR FARMER ADOPTION

Economic incentives for individual farmers to adopt GAPs broadly encompass an increase or stabilisation of revenue and/or a reduction in costs. Farm households may have multiple goals, including the production of food for sale and for home consumption, the reduction of farm labour, the protection of farm assets for future generations, etc. GAPs may facilitate an increase in revenue from output sold in the marketplace but also could increase the return to the family farm by increasing the food available for home consumption. Farmer decision making is determined by revenue net of costs. While GAPs may increase gross farm revenue, they could also increase costs, so that *net* revenue could increase or decrease. The potential of GAPs to increase gross farm revenues is considered in this section. The potential implications for cost increases are considered in the later section on disincentives for farmer adoption.

If GAPs are market-driven, focused on commercial production of food with attributes demanded by consumers, gross farm revenue may increase through *higher prices*. This includes programmes that enhance food safety or improve the information flow along the supply chain by providing quality assurance guarantees with respect to hidden (experience, credence) product attributes such as environmentally sustainable agricultural practices. Consumers may be willing to pay a premium for these assurances, and a GAP programme provides the institutional infrastructure through which premiums can be passed back to agricultural producers if the institutions to facilitate this do not currently exist in the country. Some programmes have attempted to tie GAP standards related to the environmental impacts of agriculture to 'fair-trade' initiatives that guarantee farmers in developing countries a base price covering cost of production. Price premiums (if they exist) are likely to be a strong incentive for the adoption of GAPs among commercial farmers (see Table 1⁹) and are most prevalent in private supply chain GAPs programmes.

⁹ Table 1 can be found in the Executive Summary and in Section 5

GAPs may be a means of securing access to markets dominated by supermarket retailers, either domestically or in export markets. While still a relatively small component of food supply in most developing economies, supermarkets are growing in importance in many parts of Asia, Latin America and even in some African countries. For example, Zambia has witnessed growing investment by the Shoprite supermarket chain, although supermarket retailers still account for a very small percentage of food sales. Weatherspoon and Reardon (2003) discuss how the rise of supermarkets in southern and eastern Africa offers both opportunities and challenges to producers in these countries.¹⁰ The challenges are most acute for small producers who risk exclusion from growing urban markets due to changes in procurement practices and increased emphasis on food quality and food safety by the supermarket companies.

Supermarkets have rapidly gained in importance in Central American countries (Berdegué *et al*, 2003). For fresh produce procurement, these retailers are increasingly turning to the implementation of GAPs with preferred suppliers as a means of differentiating their fresh produce from traditional wholesale markets on the basis of safety, cleanliness and quality. The supermarkets perceive that local consumers are willing to pay a premium for food safety and cleanliness assurances in the absence of effective or enforceable food safety regulations (Berdegué *et al*, 2003). It is important to note that these systems do not always translate into price premiums for producers. La Fragua, a retailer operating in Guatemala and El Salvador operates a voluntary safety/quality seal with its suppliers that may become mandatory but there are no plans to pay price premiums to producers, instead the incentive is based on market access (Berdegué *et al*, 2003).

The growth of supermarkets in developing countries mirrors the growth of the middle class and consequently is occurring at different rates across these countries, making generalisations difficult. The priority for the majority of consumers in most developing countries is access to a secure supply of food, with concerns about the safety of food or the method by which the food was produced remaining the luxury of affluent consumers in developed countries. While there may be a growing middle class in some of the more advanced developing countries that also demand these attributes, for the most part, the major source of demand in the short to medium run is likely to come from consumers in developed countries. For now, the extent to which adopting a GAPs approach that focuses on food safety and food quality is beneficial for individual farmers in developing countries depends on the relative importance of food produced for export, versus household or domestic (within-country) consumption.

Price premiums are a direct and tangible revenue-based incentive for producers to adopt GAPs, however, price is only one component of revenue. Another component of revenue is quantity. *Access to markets*, through preferred supplier arrangements in closed supply chains or achieving standards of production that are recognised for access to international markets or by consortia of retailers, provides another strong incentive for producers to adopt GAPs (see Table 1). Some GAPs focus on improving farm management and production decisions to increase or *stabilise yields* in developing countries. This also assists in stabilising and/or increasing the revenue stream for producers. Production techniques that enhance or protect

¹⁰ The authors report that supermarkets had a 55 percent share of the retail food market in South Africa by 2003, which is similar to the share in Argentina, the Philippines and Mexico (Weatherspoon and Reardon, 2003).

soil fertility can help stabilise revenues over the long-run and across successive farm operators. Improvements in post-harvest storage and handling techniques reduce crop losses and increase the available quantity of product for household consumption and for market. This contributes directly to farm revenue in the case of on-farm storage. It contributes indirectly to farm revenue through potentially increasing the net price downstream crop handlers can afford to offer for farm produce by reducing their storage losses post-farm. If improvements in storage result in a large increase in supply, however, the positive impacts on revenue may be tempered by a fall in prices.

Economic incentives also operate on the cost side of the profit (net revenue) equation. Improved agricultural practices that *reduce storage costs*, *reduce wastage* or result in more efficient use of labour or other farm inputs can reduce average costs. Farmers have a direct economic incentive to adopt practices that reduce their average costs of production. The dissemination of information to farmers on what constitutes a ‘good agricultural practice’ can help overcome market failures with respect to producer education and training in good management practices, thereby reducing costs and is a key feature of most private and public sector GAPs programmes (Table 1). According to Jaffee (2003a), the competitive pressure created by new and anticipated food safety standards in the EU led to significant improvements in the cost competitiveness and supply chain efficiency of the Kenyan fresh vegetable sector. The adoption of farm-level GAPs was an important component of this improvement in standards, although Jaffee also notes the changing structure of the Kenyan industry and the increased backward integration by exporters into farm-level production.

In addition to direct effects on short-run profitability through revenue enhancement or cost reduction, farm owner-operators have an incentive to adopt GAPs if they lead to long-run *improvements in the asset valuation* of the farm. Certification under specific quality assurance schemes may require the producer to invest in long-run improvements in soil management techniques, or production practices that reduce residue levels in soils. For example, organic certification systems often require that the land be farmed organically for several (e.g. three) years before commodities from that farm can be certified as organic. This type of certification requirement acts as a short-run barrier to entry, enabling existing producers to capture higher economic rents from the marketplace and from the land market. The strength of this incentive depends on a number of factors, including: the demand for the certified products that the farmer is producing; the ease with which other farmers can enter this market segment (e.g. length of time before land is certified organic) and; the existence of the institutional infrastructure necessary for a viable land market (e.g. enforceable property rights).

Collectively, or individually, farmers have an incentive to adopt GAPs to protect themselves against *market externality effects* from other poorly managed farms. In other words, GAPs could provide farmers with a means of demonstrating their due diligence in practising good production and management techniques with respect to food safety, food quality, etc. In the event of a food safety problem within the industry at large, adherence to a recognised GAP programme may protect the farmer from a loss in consumer or buyer confidence as a result of negligent or poor management practices by other farm firms or supply chains. This incentive is stronger for private sector (supply chain and industry-wide) GAPs programmes (Table 1).

The strength of this incentive is highly dependent on the ability of the marketing system to segregate GAP and non-GAP produce. In the absence of the appropriate transportation and storage infrastructure, blending of GAP and non-GAP output destroys the revenue incentive for farmers to adopt GAP. This is likely to be a significant challenge in many developing countries with poorly developed physical infrastructure.

Product separation is a strategy adopted by Kenyan fresh vegetable exporters in supplying the EU market. To ensure adequate control over quality, some exporters operate separate product supply lines for more discerning clients who demand full traceability and quality assurances, versus those whose requirements are less taxing. In practice, this often means that vertically integrated exporters use produce from their own farms or from large outgrowers to supply their more discerning overseas customers, while produce from smallholders is sold to other market segments (Jaffee, 2003a). In the Kenyan context, Jaffee (2003a) argues that the direct incremental costs of product separation are small, involving the physical costs of maintaining distinct product flows and the accompanying records at the packing house. Nevertheless, while large exporters may have the capacity to practice identity preservation strategies, this may be less feasible for smaller, more disparate market participants in other developing countries.

2.2 REGULATORY AND LEGAL INCENTIVES FOR FARMER ADOPTION

Farmers may adopt GAPs to generate environmental benefits or reduce environmental costs. Some of these yield direct private benefits to the farmer, for example, improving soil quality. Similarly GAPs that improve labour conditions for agricultural workers could yield private benefits to farmers in the form of increased labour productivity and reduced wastage. Farmers may feel that membership of GAPs improves their social capital within their local communities and among consumers. However, these private benefits either directly or indirectly impact revenues and/or costs and are therefore a subset of the economic incentives discussed above. It should be acknowledged that some farmers adopt these practices for ethical or purely altruistic reasons, although this is likely to be a luxury few in developing countries can afford. In most cases this remains the realm of spillover effects (externalities), wherein the incentives for farmers to adopt practices that increase social welfare are weak in the absence of policy intervention.

Policies to correct these types of market failure seek to internalise the external costs by transferring the burden of social costs back to the firm (farm). Taxes, subsidies and regulations are the common means by which policymakers change the incentive structure with respect to spillover effects (externalities). As indicated earlier however, regulatory intervention to correct a problem is only desirable if the benefits of intervention outweigh the costs. If developing countries lack the infrastructure to implement or enforce policies, then regulatory intervention to promote GAPs may not be a viable strategy.

Changing the *property rights* to scarce water, soil or environmental resources can encourage farmers to adopt GAPs. Well defined (and enforced) property rights enshrine the right to make choices about a property or resource, the right to extract rents from its ownership and the right to transfer its ownership without restriction (Cheung, 1982). In this way, resources can be allocated – and reallocated – efficiently among competing users. The economic value of the resource is maximised, and overuse from a common property problem (e.g. too many people trying to graze animals on common land, over-fishing in shared waters) is avoided. Since ownership of property rights confers potential wealth – or loss of wealth depending on the choices made – the distribution and protection of those property rights is crucial in determining whether resources are allocated in response to economic signals or as a result of perverse bureaucratic incentives, corruption or graft. Insecure property rights are a significant constraint on new investment and economic growth.

In theory, regulatory action can be taken to alter property rights in the face of a market failure such as a production practice that is causing environmental degradation. Requiring the polluter to compensate for pollution caused, or requiring that the user of a scarce resource (e.g. water) pay the real social cost of that resource rather than using it for free, can provide farmers with the economic incentive to adopt GAPs. The costs of these resources would then be internalised into the farm operation, encouraging conservation practices.

In practice, however, this may be difficult to achieve in a developing country with poorly developed market, legal and governmental institutions.¹¹ Taxing undesirable agricultural practices is impractical in many developing countries where taxes are difficult to assess and collect. Regulations may be easy to announce but difficult to implement due to physical and financial capacity constraints, corruption possibilities, etc.

Communal and customary rights to land or common assets play an important social and economic role in many developing economies. Joint use of key water, land or other resources requires a common GAPs approach across the users of that resource. An individual producer would not have a strong incentive to adopt GAPs with respect to water or land management if other farmers using the same resource did not also adopt these practices. Community rather than individual-based GAPs approaches would be required in these cases.

Direct *subsidies* or indirect support of GAP initiatives through cross-compliance measures that require the adoption of GAPs for eligibility to government support programmes represent the ‘carrot’ rather than the ‘stick’ approach to regulatory intervention. Experience from western market economies has shown that direct subsidies create a supply response that distorts market signals, becomes a significant budgetary burden for taxpayers and eventually becomes capitalised into agricultural land values so that the intended recipients do not benefit in the long-run. Subsidies are also open to corruption and manipulation by vested interests. Thus, while subsidies are a clear and direct incentive for farmers to adopt GAPs, they come with considerable economic and political baggage and may result in a budgetary-driven race to the top which resource-constrained developing countries cannot hope to win.

Other regulatory or legal incentives to adopt GAPs are more subtle. For example, farmers may adopt GAPs as a risk reduction strategy to reduce their *liability* in the event of a food safety, environmental or public health problem. Under these circumstances adherence to a GAP system is evidence of due diligence on the part of the farm operation. Government regulations with respect to food safety, environmental protection, or protection of human health, etc strengthen the incentive for farmers (or downstream processors and retailers) to practice due diligence. For example, the UK Food Safety Act (1990) introduced a due diligence defence clause making all firms in the supply chain responsible for the safety of the food they handled, regardless of the source of contamination. The resulting increase in monitoring costs for retailers encouraged closer supply chain relationships between retailers, processors and producers (Hobbs, 1996). Most UK retailers now require that their suppliers source meat only from farmers who are members of approved farm-assurance schemes. The liability incentive is likely to be more important for private sector (supply chain and industry group) GAPs, as indicated in Table 1.

¹¹ Coase (1960) showed that in the presence of transaction costs it may be very difficult to effect an optimal allocation of property rights to correct a market failure. Weak institutions result in high transaction costs.

2.3 HUMAN CAPITAL INCENTIVES FOR FARMER ADOPTION

Farmers adopt GAPs as a means of developing their human capital *skills* and to access the human capital skills of other supply chain partners or third parties. GAPs can be a means to expand upon core competencies within the farm enterprise. Individuals – and firms – are necessarily limited in what they know how to do well. GAPs offer farms the opportunity to expand their knowledge and skill base (core competencies) by accessing codifiable knowledge – i.e. knowledge that can be specified in production protocols. They may also provide the opportunity to access tacit knowledge – knowledge that cannot be specified in simple protocols but is acquired through experience or shared between supply chain partners. Access to tacit knowledge is more likely to occur in supply chain-driven GAPs if the relationship between farmers and downstream buyers is interactive and includes mechanisms for feedback on the result of good production and management practices. It is less likely to be a strong incentive in generic GAP systems orchestrated at a national policy level or by international agencies with little involvement by downstream firms (Table 1).

2.4 ECONOMIC DISINCENTIVES FOR FARMER ADOPTION

The disincentives or constraints for farmers to adopt GAPs include economic disincentives, institutional infrastructure constraints and human capital constraints. The most obvious economic disincentive is cost. GAP programmes may require farmers to adopt new production techniques that increase variable costs of production, decrease yield or lead to new capital investments. *Increased variable costs* include higher labour requirements or labour training to improve harvesting techniques, increased record-keeping requirements, discontinuing the use of cheaper inputs in favour of inputs that are harder to obtain and/or more costly but that are more environmentally friendly, etc. *Decreased yields* can result from less intensive use of agricultural chemicals or the use of soil and water conservation techniques. Reductions in yield increase average costs of production, assuming that other input costs remain unchanged. New capital investments *increase fixed costs* and can include required improvements in harvesting and storage equipment, energy and waste management or investments to improve farm worker safety. Cost increases will be a disincentive to adoption in any GAPs programme (Table 1).

The development of GAPs needs to be particularly cognisant of the potential impact on farm-level costs and the extent to which the proposed agricultural practices are conducive to local growing conditions, knowledge and resource bases. Many GAPs tend to be process-based, offering guidelines for good production practices, rather than product-based programmes that rely on end-product (performance) testing as a means of evaluating quality and safety. This is appropriate for credence attributes that cannot be detected through end-product testing (e.g. farm animal welfare). It is also increasingly the approach being taken to risk management for food safety in developed countries, for example, the Hazard, Analysis, Critical Control Points (HACCP) system. Nevertheless, the ‘one size fits all’ approach of a process standard can impose disproportionately higher average costs on small farms and firms as the fixed investments necessary to improve management practices are spread over less output.

While it is difficult to generalise about costs, some examples are useful. It has been estimated that national process-based GAPs increased costs for Chilean maize farms by 17 percent, with

cost increases of up to 200 percent for peach farmers (Berdegué *et al*, 2003). Compliance costs are difficult to estimate accurately, however, as it is frequently difficult to disentangle the costs of adopting GAPs from the costs of business expansion or development that would otherwise have occurred (Jaffee, 2003a). In the Kenyan fresh vegetable sector, for example, Jaffee (2003a) reports that the certification process for EUREGAP cost one exporter US\$6000 to US\$8000 with an additional cost of approximately US\$200 per month for continued documentation. This cost was relatively small compared to the costs of developing world-class vegetable farms that could be over US\$1 million.

Compliance costs are incurred at several points along the supply chain. While farmers incur costs in changing and documenting production practices, first-stage handlers, processors and distributors also incur compliance costs in upgrading processing facilities and investing in apparatus for testing and in monitoring the quality of inputs (Jaffee, 2003b). The extent of compliance costs varies considerably between industries and across countries, depending on the extent to which incremental changes are needed versus investments in major upgrades or new capacities (Jaffee, 2003b).¹²

An additional economic disincentive arises if farmers must make investments in assets that have little or no value in an alternative use. These are known as *asset specific investments*. They can include physical assets such as inputs or equipment that are specific to one buyer or human capital investments such as highly specific skills. Asset specific investments can be made at any point along the supply chain. Having made an asset-specific investment, the farmer (or processor) is vulnerable to a trading partner behaving opportunistically by trying to appropriate rent from the investment. For example, suppose a rice farmer invests in production protocols related to land and water management that are specific to a retailer in order to obtain GAP certification from that buyer. The farmer is then vulnerable to the buyer attempting to re-negotiate the terms of the transaction through offering a lower price or changing the delivery terms after the farmer's investment has been made and is unrecoverable (a sunk investment). The farmer is in a weak bargaining position and may have few alternatives but to accept the buyer's less favourable delivery terms. This risk is relevant for private sector supply-chain driven GAPs that tie a producer to a specific buyer or group of buyers (Table 1). Farmer groups or associations can play a role in counteracting the weak bargaining power of individual farmers in these circumstances.

Clearly, the market access incentive for adopting GAPs is a double-edged sword. If a GAP programme places a farmer in preferred supplier list to gain access to a closed supply chain it also leaves the farmer vulnerable to opportunistic attempts by the buyer to re-negotiate the terms of their supply agreement once the farmer is committed to that GAP programme. Generic national or international GAPs that are not tied to individual supply chains reduce the asset specific nature of the farmer's investment, reducing the vulnerability to opportunistic re-negotiating by buyers, but may be less effective at providing access to closed supply chains.

12 For example, the comparative costs of compliance with SPS standards in the shrimp export industries of Bangladesh and Nicaragua was estimated to be US\$18.01 million for industry facility upgrading, government and training programmes in Bangladesh in the period 1996-98 compared with US\$0.56 million in Nicaragua in the period 1997-2002. To put these figures into perspective, this amounted to an estimated 2.3 percent of the value of exports for the period in Bangladesh compared to 0.61 percent of the value of exports for the period in Nicaragua (Jaffee, 2003b).

Obtaining agreement across buyers with respect to a common set of GAPs is a potential solution. The EurepGAP system defines minimum standards acceptable to retail groups in Europe and accredited to ISO 65 standards, with the claim that under its GAP, products are “Certified Once – Recognised Elsewhere”. In reality, EurepGAP protocols set a baseline standard to which individual retailers may bolt on additional quality assurance requirements (EurepGAP, 2001). In general, farmers are faced with a trade-off in incentives with respect to value-added opportunities and market access through closed supply chain GAPs and the vulnerability of asset specific investments.

2.5 INSTITUTIONAL INFRASTRUCTURE CONSTRAINTS TO FARMER ADOPTION

Lack of adequate infrastructure to support GAPs can constrain adoption of all types of GAPs programmes (Table 1). The EurepGAP system has a number of requirements with implications for institutional infrastructure. It requires that the farmer have plant health certification for nursery stock. It requires evidence of residue testing and that laboratories used for residue testing be accredited by a competent national authority to a good laboratory standard, such as ISO17025. All fresh produce must be traceable to the farm on which it was grown (EurepGAP, 2001). There are sound economic reasons for these protocols as they reduce the transaction (particularly monitoring) costs for European retailers in sourcing reliable, safe supplies of fresh fruit and vegetables. However, they also require that farmers can access the necessary institutional infrastructure to verify the input quality, output quality and source of the agricultural commodity. Clearly some farmers in the poorest of developing countries may not have access to these types of services.

Again, GAPs present us with a trade-off. These types of protocols facilitate meaningful, credible quality and safety assurances. They fill an institutional vacuum that would otherwise result in prohibitively high transaction costs, reducing the incentives for retailers to source products from developing countries or reducing the net price they are willing to pay given the higher transaction costs they would face in verifying quality. On the other hand, shifting the burden of monitoring and quality verification back to the supplier country may constrain the ability of farmers to adopt these specific production protocols.

2.6 HUMAN CAPITAL CONSTRAINTS

Farmer adoption of GAPs is sometimes constrained by human capital limitations, i.e. limits on the farmer’s ability to apply the prescribed production and management protocols and maintain the appropriate level of documentation. This will be particularly important in developing countries with high rates of *illiteracy*. The EurepGAP system, for example, requires documentation that would allow traceability of farm products (e.g. records of sales), records of chemical and fertiliser inputs, etc. These records are transaction-cost reducing mechanisms that facilitate trade over time and distance. Record keeping is also a part of good management practice that allows a farm enterprise to review its status and plan future production decisions. In developing countries with high rates of illiteracy, significant extension activities are required to facilitate the adoption and maintenance of GAPs among poorly educated farmers. Without these steps, GAPs could lead to market exclusion for poorly educated or illiterate farmers. If the technical details and procedures necessary for compliance with EUREGAP or other GAP

programmes are not readily accessible to smallholders, they will be disadvantaged relative to larger-scale commercial farmers.

Record and documentation requirements can also be costly in terms of the *opportunity cost* of a farmer's time – i.e. the time spent preparing and maintaining records could more usefully be spent on other activities. This can become a problem where multiple GAP systems are emerging and farmers are faced with duplicative record-keeping tasks for different commodities or to qualify for different GAP schemes. This is relevant for GAPs programmes in developed as well as developing countries. The Canadian government encouraged the adoption of on-farm food safety systems and environmental farm plans in its 2001 Agricultural Policy Framework. The on-farm food safety systems are commodity-specific, so that a mixed farm producing grain, beef, dairy and poultry products could be faced with keeping four separate sets of records pertaining to on-farm practices that affect food safety, in addition to audits for each commodity. Multiple commodity audits are under consideration to reduce the burden for farmers. Environmental farm plans address environmental rather than food safety issues and will add another layer of documentation requirements. It is not yet clear whether the Canadian on-farm food safety systems and environmental farm plans will remain voluntary or become mandatory. The apparent duplicative record-keeping requirements remain a concern for many producers.

Weak public extension services also constrain farmer adoption of GAPs in some developing countries. Berdegué *et al* (2003) highlight this as a constraint to adoption of supermarket-driven GAPs in Central American countries. GAPs with built-in extension components to some extent mitigate this disincentive.

3. The role of market forces

A number of market forces are affecting the economic environment for farmers in developing countries. The growth of supermarkets has partly been driven by urbanisation and the rise of the middle class, increasing the demand for the quality of food and service levels provided by supermarkets. Incomes tend to be higher in urban relative to rural areas, so urban areas represent a more viable market to farmers. However, supermarket growth in developing countries is not confined to servicing the middle class, as more efficient procurement channels have also enabled supermarkets to expand into poorer areas as mass merchandisers, for example in Kenya and South Africa (Weatherspoon and Reardon, 2003).

Changes in procurement channels include the development of larger, centralised wholesale markets in place of fragmented, local wholesale markets. The larger wholesalers supply retailers in addition to having their own retail functions. South African supermarkets use a combination of procurement channels to procure fresh produce, using their own distribution centres, direct contracts with growers and buying from fresh produce markets (spot markets) (Weatherspoon and Reardon, 2003). Improvements in transportation, logistics, storage and communication infrastructure facilitates the growth of supply chain relationships between supermarkets, wholesalers and growers. Supermarkets often encourage growers in direct supply relationships to follow GAPs. Spot markets not likely to be a viable market for GAP produce given challenges in preventing co-mingling of GAP from non-GAP produce after it has left the farm.

In addition to the growth of supermarkets within developing countries, supermarkets in rich developed countries also influence the adoption of GAPs through their procurement strategies. The increased focus on food safety, food quality and the environment among consumers in developed countries has been powerful a market force driving the adoption of GAP programmes. Market driven GAPs produce food or non-food agricultural commodities with attributes that are valued in the marketplace. However, these attributes only have value if they can be verified to buyers. The involvement of several stages of the supply chain is usually crucial in providing level of identity preservation necessary to reap market returns for GAP-produced attributes.

GAPs can be an integral part of a 'value chain' approach to agriculture. Successful value chains are usually championed by a 'channel captain' – a firm or organisation in the best position to co-ordinate the value chain and be a conduit for information flows from the market back to producers and from producers back to the market. The co-ordinating role may be played by a retailer, a farmer co-operative or a processor, etc. Communication, transparency and trust are also essential features of a successful value chain based on GAPs. To assist in communication and transparency, GAP schemes often have detailed production protocols covering all aspects of the on-farm production environment. The EurepGAP protocol for fresh fruits and vegetables, for example, lists 15 areas for which mandatory requirements and voluntary guidelines are clearly specified (EurepGAP, 2001).

GAP systems that are part of a value chain approach to providing quality and safety assurances to consumers are only one component of providing credible quality and safety assurances. Good Manufacturing Practices, or food safety management systems (HACCP), or

quality assurance systems also need to extend to downstream processing and retailing activities. For example, the Scottish meat industry launched a joint initiative 'Quality Meat Scotland' that encompasses several stages of the supply chain for beef, pork and lamb. Protocols are developed and monitored for each stage of the supply chain from livestock feed suppliers, farmers, livestock hauliers and auction marts, to processors and retail butcher shops. The protocols emphasise animal husbandry, health and welfare and traceability of the meat products and the raw materials, as well as food safety and food handling practices at the processing plant (Hobbs, 2003a).

In contrast to the industry-wide scope of quality assurance schemes such as Quality Meat Scotland, Tracesafe was a small farmer-owned supply chain in the UK that targeted a niche market in the wake of BSE and growing consumer concerns over the origin and safety of food. Tracesafe differentiated its beef on the basis of its ability to trace the history of individual meat cuts to the animal of origin, with an implied safety assurance. GAPs formed an implicit part of the Tracesafe system, which used a network of cattle breeders and finishers rearing cattle to specific production guidelines. The production protocols specified the purchase of feed from a set of contracted feed mills and included an extensive system of on-farm record keeping. The beef was sold in specialist retail outlets and restaurants under the Tracesafe brand name (Fearne, 1998).

The Tracesafe case illustrates how relatively small-scale, farmer-owned firms (albeit in a developed country) can gain a first-mover competitive advantage in the marketplace by their flexibility and ability to respond quickly. Larger-scale processor and retailers, relying on economies of scale and large throughputs to maintain their competitive edge can be poorly placed to respond to new market opportunities that require traceability or identity preservation, simply because their production systems are set up to handle large quantities of fairly homogenous commodities. The beef packing industry in the US and Canada has become consolidated into fewer, larger firms with large-scale packing plants relying on large throughputs to achieve tight margins. To some extent this has put them at a competitive disadvantage vis-à-vis smaller niche players providing traceability and quality verification. However, the situation is changing rapidly as the technology to facilitate traceability and identity preservation becomes available (for example, bar-coding, electronic implants, DNA-sampling, etc.). Several of the large North American beef packing firms have introduced branded beef programmes that embed GAP principles within their production protocols for producers (Hobbs, 2003a). Nevertheless, these initiatives represent a very small proportion of total beef sales in the US and Canada.

Improvements in traceability and identity preservation technologies facilitate the segregation of agricultural products produced under specific GAPs from the wider pool of commodities. Potentially this allows producers following GAPs to earn greater returns from the market. The accessibility and applicability of these technologies to developing countries, however, remains an open question. The bar-coding and DNA technologies referred to above are likely to be too expensive for most firms in developing countries. Indeed, it is too early to tell whether these technologies are commercially viable in a developed country context, let alone within a developing country. Nevertheless, improvements in marketing, transportation and storage infrastructure could facilitate 'identity preservation' of GAP produce in developing countries. The implementation of a GAP programmes in developing countries needs to be cognisant of the post-farm supply chain. If the objective of a GAP programme is to provide market access for farm produce with specific quality assurances, the supply chain infrastructure must be capable of providing adequate segregation and identity preservation of GAP products.

Some of the (economic) incentives for retailers, processors, importers, exporters and other downstream firms to work within GAP schemes are similar to those for farmers, in the sense that they may be a means of increasing revenues and/or reducing costs. Strong economic incentives include the ability to access reliable supplies of a consistent quality product. Increased consistency reduces wastage and reduces the monitoring costs for downstream firms in verifying product quality, thereby lowering average costs of production.

Access to products produced through market-driven GAPs gives these firms a competitive advantage if they can provide consumers with quality or safety assurances specific to their product. This can be part of the firm's product differentiation strategy based on a private sector supply chain-driven GAP (Table 1). Food industry advertising reflects this trend. Maple Leaf Foods in Canada launched an advertising campaign in 2003 for its chicken meat, focusing on the quality of the feed ingredients fed to the chickens. The company has also placed a major emphasis on traceability, referring to it as the "holy grail of the food supply chain", and is reported to be funding the development of DNA identification technology to facilitate the traceback of meat to the farm of origin (Powell, 2002).

Regulatory-driven incentives for downstream processors and retailers include the need to demonstrate due diligence and reduce legal liability, as discussed in section 2. Social incentives – the improvement of social capital, improved labour conditions, conservation and environmentally-friendly processes, etc. may be important for downstream firms in projecting the image of a good corporate citizen. This manifests itself as an economic incentive if a good public image encourages buyer loyalty or shareholder investment.

4. Establishing GAP guidelines: whose role?

As the earlier discussion and Table 1 indicates, GAP systems run the gamut from individual supply chain initiatives, to industry-wide programmes, national initiatives, and programmes guided by international agencies. Some of these differences depend on whether the GAP is addressing a demand for a private good (e.g. demand by consumers for higher quality food) or a public good (e.g. the need to reduce environmental degradation from agricultural practices). Where there is a strong market-driven demand for products with specific quality or safety assurances, GAP systems are likely to emerge within private sector supply chains. Where 'market failures' exist (such as environmental problems), however, other actors become involved in establishing GAPs. There may be a role for producer industry associations or retailer associations in establishing generic GAPs if producers would be at risk from making investments in assets that are specific to one firm further down the supply chain.

Public sector agencies can play a role in assisting the establishment of GAPs in clear cases of market failure due to externalities (spillovers) or information asymmetry (where quality attributes are hidden). The delineation between private and publicly established GAPs can be blurred. The on-farm food safety programmes in Canada are being established by producer industry associations for individual commodity sectors. But a Federal Government agency, the Canadian Food Inspection Agency, acts as the third party verifier, approving the individual systems for launch and accrediting the certifying agencies who will carry out the on-farm audits.

The provision of credible third party auditing is crucial to the successful operation of GAP systems. Quality assurance and auditing is a burgeoning industry in developed countries and is a function frequently performed by the private sector. In developing countries this industry is likely to be under-developed, leaving an institutional gap that may be filled by the public sector. However, this will only be effective if public sector agencies can be relied upon to perform third party certification services. In resource-constrained developing countries, public sector agencies may be unable to fulfil this role adequately. Transparency and freedom from corruption or graft are essential if public sector auditing and quality assurances are to be effective.

The costs of establishing GAPs include the administrative costs of identifying the critical points in a production process where 'good practices' are needed – for example, pesticide application procedures or water use practices. This could include an extensive audit of existing farm operations to determine local conditions, practices, etc., followed by the development of a set of good agricultural practices. The costs of implementing GAPs for an individual producer will depend on the extent to which the GAPs programme requires new investments, a change in practices, training, etc. Monitoring and certification of GAPs practices, such as testing for residue levels, may require investment in monitoring or testing equipment.

Following the establishment of a GAPs system, producers and third party monitors incur costs in conforming with and verifying GAPs. As discussed earlier, extensive testing may not

be feasible in many developing countries with limited infrastructure and financial resources. In these cases, GAPs that emphasise relatively simple improvements in production practices and the verification of those practices through certification (i.e. a process-based rather than a product-based approach) will be more appropriate.

The complexity of the GAP system determines the appropriate governance structure. Relatively simple technical messages – codified knowledge – can be conveyed through written production protocols communicated by a buyer or through written or oral protocols presented in an extension setting. More complex GAP management protocols may include the transfer of tacit knowledge between downstream firms and producers. This will likely require an interactive relationship among supply chain participants. Third party monitoring and verification will be more important in this setting.

Figure 2 illustrates some of the incentives for establishing GAP systems through private sector versus regulatory actions. The figure is a highly stylised representation of GAP systems and focuses on market-driven GAPs related to verification of product quality. Given the complexity of alternatives alluded to earlier, it is not possible to depict all GAP alternatives in one diagram. Nevertheless, the figure illustrates some of the key points that have been made in this paper, particularly with respect to the role of third party monitoring and certification.

There are three decision-makers depicted in Figure 2: an industry association, a regulator and a representative firm. The industry association is faced with a decision about introducing an industry-wide GAP quality verification system through which products will be labelled for consumers. There are three main paths in Figure 2 indicated by the bold shaded lines: voluntary industry GAP system, mandatory regulated GAP system and no GAP-quality verification system.¹³

Starting at the far left-hand side of the graph, assume the industry association introduces a voluntary GAP system for its sector. Third party monitoring is assumed to play an integral role,¹⁴ revealing true product quality with probability p . The firm chooses whether to produce high quality (complying with GAP guidelines) or low quality. The dotted lines indicate that the firm does not know at which node it is located given uncertainty over the accuracy of third party monitoring. The consumer then makes a purchase decision (not shown). The lower the probability that third party monitoring will reveal true product quality (i.e. the lower is p), the more uncertainty consumers face over product quality. It is anticipated that probability p would be lower in developing countries, resulting in more quality uncertainty for consumers. Lack of credibility for third party monitors, widespread graft or corruption will increase this uncertainty.

In the second path, the industry association opts not to introduce an industry-wide GAP system but the regulator can decide to mandate GAPs if a market failure is perceived to exist. The industry expects a regulator to impose a mandatory system with probability m . Accompanying a mandatory system is third party certification by public sector agencies, which is assumed to be effective (reveal true product quality) with probability s . If certification by public sector agencies in developing countries is hampered by resource constraints or

13 The Figure is based on an analysis of ex ante quality verifications and ex post traceability discussed in Hobbs, 2003b.

14 It is recognised that third party monitoring and certification may not always be components of GAP systems but it is included here to illustrate the effect on incentives to adopt and comply with GAPs.

corruption, s will be low. The firm makes its high/low quality production decision, and the consumers purchase the product (not shown).

If neither the private sector nor public agencies introduce a GAP system, the situation is as depicted on the far right-hand side of Figure 2 (the third path). A firm makes a high/low quality production decision without the over-arching umbrella of a GAP system and without third party quality monitoring. Consumers face quality uncertainty in the absence of a quality verification and labelling system.

The ‘payoffs’ to the firm are indicated at the base of the tree and reflect the incentives for firms to adopt and comply with GAP systems. Four variables affect the payoff to the firm. The revenue from the sale of output is defined at three levels: R_H is the revenue from selling a “high quality” good producing using GAPs, R_L is the revenue from selling a “low quality” good, and R_A is the revenue from the sale of a good whose quality is not signalled *ex ante* to the consumer. R_A represents an average or “pooled” revenue and depends on consumers’ expectations regarding the proportion of ‘low quality’ (versus ‘high quality’) goods in the market. It is assumed that consumers prefer high to low quality and that this is reflected in the price of the good and the revenue to the firm, therefore, $R_H > R_A > R_L$.

There is also a “goodwill premium”, G , available to the firm for participating in an industry-driven GAP programme. The premium reflects marketing and public relations benefits to the firm from voluntarily participating in GAPs rather than adopting them only because it is a regulatory requirement.¹⁵

Two types of costs affect the payoff to the firm. The first is the cost of implementing a GAP system: V_V is the cost to firms in the industry of introducing a voluntary GAP quality verification system, while M_V is the cost of a mandatory system imposed by a regulator. It is assumed that $M_V > V_V$, as voluntary adoption allows the firm/industry flexibility in designing GAPs to suit the production environment in which it operates rather than having to conform to a “one-size-fits-all” mandated system of GAPs and quality verification. The second cost is the cost of production: C_H is the cost of producing a high quality good under a GAP system, while C_L is the cost of producing a low quality good that does not conform to GAPs. It is assumed that $C_H > C_L$.

If the industry introduces voluntary GAPs, the representative firm complies with the GAP protocols (producing a high quality good) and the consumer purchases the product, the firm’s expected payoff is $R_H + G - V_V - C_H$ regardless of the effectiveness of third party monitoring (outcomes i and iii). However, there is an incentive for firms to cheat by free-riding on the GAP system to obtain a price premium without incurring additional production costs. If the firm cheats and sells low quality (non-GAPs) output misrepresented as high quality produced under GAPs, its payoff is $R_L - V_V - C_L$ with probability p (outcome ii), or $R_H + G - V_V - C_L$ with probability $1-p$ (outcome iv). If third party monitoring reveals this cheating, the firm would not earn the goodwill premium as the quality assurance system would not be credible to consumers.

The incentive to introduce and comply with a GAPs system depends on the relative market premium for output identified with a quality assurance, compared to the additional

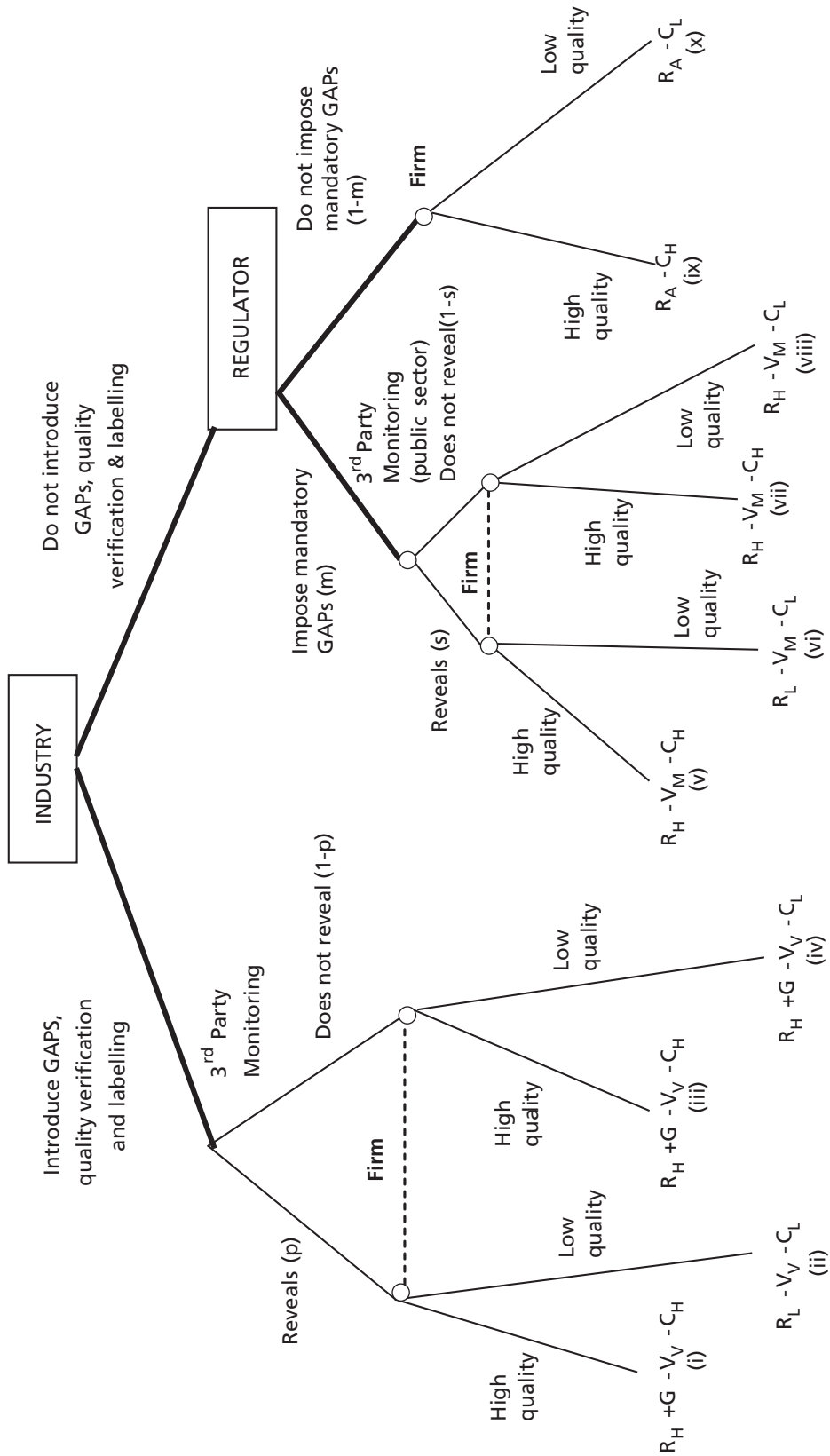
¹⁵ See Segerson (1999) for a similar argument with respect to voluntary versus mandatory adoption of food safety protocols.

costs of producing under this system. In Figure 2, the highest payoff from a voluntary industry GAP system is from undetected cheating ($R_H + G - V_V - C_L$) (outcome iv). The incentive to comply with GAPs or to cheat, and thus the long-run sustainability of the system depends on the perceived effectiveness of third party monitoring – in other words, on the firm's expectations of being caught.

In the absence of an industry-driven GAP system, if a firm still chooses to produce high quality, its expected payoff is $R_H - V_M - C_H$ with probability m if the regulator introduces a mandatory GAPs system regardless of the effectiveness of public sector monitoring (outcomes v and vii). The firm's payoff would be $R_A - C_H$ with probability $1 - m$ in the absence of mandatory GAPs (outcome ix). Alternatively, if the firm chooses to produce a low quality good, its payoff depends both on whether there is a mandatory GAPs system in place and on the effectiveness with which it is monitored and enforced. The payoff is $R_L - V_M - C_L$ with probability $m(s)$ (outcome vii) or $R_H - V_M - C_L$ with probability $m(1 - s)$ (outcome viii) or $R_A - C_L$ with probability $1 - m$ (outcome x). The firm's incentive to produce high quality good depends on the market premium for a high quality (GAPs) good over an unlabelled good ($R_H - R_A$) relative to the cost of the mandatory quality verification system (V_M), on the firm's subjective probability (m) that a regulator will impose a mandatory GAPs system, and on its expectations regarding the effectiveness of public sector GAPs certification procedures. If m is zero, we expect the firm to produce low quality [$(R_A - C_L) > (R_A - C_H)$], unless the revenue from producing verifiably higher quality (R_H) plus the goodwill premium (G) is large enough to cover the costs of establishing a voluntary system.

Figure 2 is a stylised representation intended to illustrate the key variables leading to the establishment and adoption of private sector versus public sector GAPs. Actual GAPs systems will differ in their set up, in the role of third party monitoring, in the identity of the catalyst organisation or firm initiating the GAP system, and whether output is labelled with GAP characteristics. Nevertheless, it is a useful means by which to map out the incentives for different actors to participate in GAPs systems. Not shown in Figure 2 are the wider societal payoffs from GAPs that might underlie a regulator's motivations for encouraging the adoption of environmentally friendly or socially acceptable agricultural practices.

Figure 2. GAPs and Quality Verification



5. Implications and conclusions

Table 1 summarises the incentives and disincentives to adopt GAPs discussed in this paper. Consistent with the discussion in section 2, the incentives are classified under the three broad headings of economic, regulatory-legal-institutional, and human capital categories. The table distinguishes between farmer incentives to adopt GAPs and the incentives of downstream firms such as processors and retailers. The table is not intended to be an exhaustive list of incentives/disincentives; instead it presents a framework to guide the process of identifying and evaluating incentives.

The strength of each incentive or disincentive is classed as “strong” or “marginal”. By necessity this is a subjective assessment based on the examples discussed in this paper. The final column indicates the type of GAPs system in which this incentive or disincentive is likely to be more prevalent. The GAPs systems are classified broadly as (i) private industry supply chain GAPs where the farmers are working with a specific processor, exporter and/or retailer within a closed supply chain (PSC); (ii) industry group GAPs, where the GAP has been established by a producer or retailer association, such as EurepGAP (IG); (iii) national government-initiated GAPs (G), and; (iv) GAP programmes that are championed by international agencies and may extend across multiple national boundaries in developing countries (IA).

In some cases, the (dis)incentive for adoption is relevant regardless of the type of system, such as stabilised yield (revenue) or increased variable costs. Other incentives are more relevant to specific types of programmes, for example, (asset) specific investments tied to one buyer are an important disincentive for private supply chain GAPs but less relevant for GAP systems implemented by international agencies. Broadly speaking, the economic incentives for adoption are stronger for private supply chain systems, whereas many of the economic disincentives (increased costs) apply to all types of GAP system. Ultimately, an assessment of the relative incentives for adoption of GAPs would probably need to be done on a case-by-case basis. However, the analysis presented in this paper, and the template in Table 1, provide a basis upon which a case specific evaluation can be built.

Good Agricultural Practice programmes represent a value-adding diversification opportunity for those farmers able to adopt the specified production and management practices. These opportunities are driven by a growing demand for quality assurances with respect to food safety, food quality and production methods related to environmental sustainability, animal health and welfare, labour standards, etc. However, there is a very real risk that smallholders in developing countries will be excluded from these opportunities given economic, institutional and human capital constraints to adoption.

Strategies to avoid the exclusion of smallholders in developing countries need to tackle these constraints head-on. These strategies include providing ample education and training to overcome human capital constraints. GAPs need to be backed by an educational and extension component to support delivery. Limited resources for extension activities in developing countries are a constraint to the adoption of GAPs by small farmers. Preventing the exclusion of smallholders also means minimising the economic burden of GAPs by

Table 1 Characterising Incentives/Disincentives to Adopt GAPs

Incentive	Farmer Incentive	Processor/Retailer incentive	GAPs Systems Where Most Prevalent
ECONOMIC			
Price Premium	xx		PSC
Access to market/supply chain	xx		PSC
Access to reliable inputs		xx	PSC, IG
Product differentiation	x	xx	PSC
Stabilise yield/revenue	xx		PSC, IG, G, IA
Reduce storage losses	x	x	PSC, IG, G, IA
Reduce wastage	x	xx	PSC
Increase farm asset value	x		PSC, IG, G
Protection against market externalities	x		PSC, IG
Increase variable production costs (e.g. labour)	--	--	PSC, IG, G, IA
Reduce output/increase average costs	--	--	PSC, IG, G, IA
Increase fixed production costs (e.g. equipment)	--	--	PSC, IG, G, IA
Asset specific investment*	-	-	PSC
Reduce search costs	x	x	PSC, IG (G, IA)
Reduce monitoring costs		xor ^a	PSC, IG, (G, IA)
Altruism/social capital	x	x	
REGULATORY/LEGAL/ INSTITUTIONAL			
Asserting property rights on scarce resources	x		G
Subsidies	x	x	G
Reduce liability/show due diligence	x	xx	PSC, IG
Reliance on institutional infrastructure	-	-	PSC, IG, G, IA
Third party monitoring	x	x	PSC, IG, G, IA
HUMAN CAPITAL			
Expand skill set	x	x?	PSC, IG, G, IA
Record-keeping (literacy)	--	-	PSC, IG, G, IA

Key:

Where xx = strong incentive to adopt; x = marginal incentive to adopt;

-- = strong disincentive to adopt; - = marginal disincentive to adopt

PSC = Private supply chain GAPs;

IG = Industry Group GAPs(e.g. producer association),

G = national government GAPs;

IA = international agency or NGO GAPs

^a Depends on the presence of third party verification which lowers monitoring costs. Without third party verification, processors/retailers will likely face higher monitoring costs.

* An asset specific investment has little or no value in an alternative use, e.g. inputs or equipment that are specific to one buyer. Having made the investment, the farmer is vulnerable to the buyer acting opportunistically by renegeing on a supply agreement.

designing practices that capitalise on the agronomic and economic strengths of existing production systems and that recognise the limitations of local growing conditions.

Sustainable and accessible GAPs programmes require adequate institutional infrastructure, e.g. third party monitoring, quality verification systems, improvements in transportation and storage infrastructure to prevent co-mingling with non-GAP produce. The participation of farmer associations or co-operatives can assist in balancing the bargaining strength of

producers with respect to large buyers or supermarkets who are encouraging the adoption of GAPs among suppliers. Producer associations may be a conduit for overcoming some of the disincentives to the adoption of GAPs through providing counter-balancing bargaining power, educating and assisting individual producers in following GAPs, in addition to reducing the search costs for buyers in locating a reliable source of supply.

Finally, it will be important to clarify and simplify the goals from a GAP approach. Rather than trying to be ‘all things to all people’, a targeted GAP programme that focuses on a key objective is likely to be more successful in resource-constrained developing countries than a GAP programme that addresses multiple goals with respect to food safety, environmental degradation, agricultural worker health, etc. In this respect, there may be a dichotomy between GAPs that focus on sustainability requirements (e.g. improved mulching practices or water use practices to improve sustainability) and those that address market requirements (e.g. food safety, food quality). While the two need not be mutually exclusive, GAPs that focus on the latter will be more appropriate for commercial farmers with the potential to reap rewards from the marketplace for adopting specific practices. The challenge will be in ensuring that GAPs do not widen the gulf between larger commercial farmers and smallholders producing primarily for home or local consumption. A primary consideration, therefore, is to determine whether GAP programmes are a suitable vehicle for economic development in a specific country or region. *If* GAPs are seen as a method of encouraging economic development through improving agricultural practices and opening up new market opportunities for poorer farmers in developing countries, methods to ensure that smaller farmers can participate in GAPs will need to be found. Understanding the incentives and disincentives for farmers to adopt GAPs is a necessary step in identifying methods to facilitate participation by smaller farmers.

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Incentives for the adoption of Good Agricultural Practices

Background paper for the FAO Expert Consultation
on a Good Agricultural Practice approach

Rome, Italy, 10-12 November 2003

The Food and Agriculture Organization of the United Nations (FAO) has been working on Good Agricultural Practices (GAP) for many years. The FAO GAP Working Paper Series presents a selection of papers to illustrate this initiative.

This paper was prepared for the FAO Expert Consultation on a Good Agricultural Practice Approach, which took place in Rome, Italy, 10-12 November 2003.

Good Agricultural Practice programmes represent a value-adding diversification opportunity for those farmers able to adopt the specified production and management practices. These opportunities are driven by a growing demand for quality assurances with respect to food safety, food quality and production methods related to environmental sustainability, animal health and welfare, labour standards and other aspects. However, there is a very real risk that small holders in developing countries will be excluded from these opportunities given economic, institutional and human capital constraints to adoption.

This paper examines the incentives and disincentives for the adoption of Good Agricultural Practices (GAPs) by farmers and by downstream handlers of farm outputs in developing countries. In examining the incentives for adoption, a number of key questions are explored: What are GAPs? What are the objectives of GAPs? Why have GAPs evolved? What are the different types of GAP and why are these differences important in understanding the incentives to adopt GAPs? What are the respective public and private sector roles in creating, operating and monitoring GAPs?

Understanding the incentives and disincentives for farmers to adopt GAPs is essential in identifying methods to facilitate participation by smaller farmers.