FAO GAP WORKING PAPER SERIES 5

Good Agricultural Practices – a working concept

Background paper for the FAO Internal Workshop on Good Agricultural Practices

Rome, Italy 27-29 October 2004

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Written by
Anne-Sophie Poisot
with **Andrew Speedy** and **Eric Kueneman**
FAO Agriculture Department

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Acronyms

COAG	Committee on Agriculture
CSO	Civil Society Organization
CGIAR	Consultative Group on International Agricultural Research
EurepGAP	Euro-Retailer Produce Good Agricultural Practices
FAO	Food and Agriculture Organization of the United Nations
GAP	Good Agriculture Practice
GMP	Good Manufacturing Practice
HACCP	Hazard Analysis and Critical Control Point
ILO	International Labour Organization
IPM	Integrated Pest Management
IPPC	International Plant Protection Convention
IPPM	Integrated Pest and Production Management
NGO	Non Governmental Organization
OIE	International Office of Epizootics
PAIA	Priority Area for Interdisciplinary Action
SARD	Sustainable Agriculture and Rural Development
TCP	Technical Cooperation Programme
WHO	World Health Organization
WTO	World Trade Organization

FAO Service Acronyms

AGA	Animal Production and Health Division
AGAP	Animal Production Service
AGAH	Animal Health Service
AGAL	Livestock Information, Sector Analysis and Policy Branch
AGD	Office of Assistant Director-General, AG
AGE	Joint FAO/ IAEA division of Nuclear Technologies in Food and Agriculture
AGL	Land and Water Development Division
AGLL	Land and Plant Nutrition Management Service
AGLW	Water Resources, Development and Management Service
AGP	Plant Production and Protection Division
AGPC	Crop and Grassland Service
AGPP	Plant Protection Service
AGSF	Agricultural Management, Marketing and Finance Service
AGST	Agricultural and Food Engineering Technologies Service
ESAE	Agricultural Sector in Economic Development Service
ESCR	Raw Materials, Tropical and Horticultural Products Service
ESCP	Commodity Policy and Projections Service
ESN	Food and Nutrition Division

ESNS	Food Quality and Standards Service
FI	Fisheries Department
FIIT	Fishery Technology Service
FIPP	Development Planning Service
FIPL	International Institutions and Liaison Service
FIRI	Inland Water Resources and Aquaculture Service
FO	Forestry Department
FONP	Forestry Policy and Institutions Service
FOPP	Forest Products Service
FORC	Forest Conservation Service
FORM	Forest Resources Development Service
RLC	Regional Office for Latin America and the Caribbean
RAP	Regional Office for Asia and the Pacific
SD	Sustainable Development Department
SDAR	Rural Institutions and Participation Service
SDRE	Extension, Education and Communication Service
SDRN	Environment and Natural Resources Service
TCDS	Resources and Strategic Partnerships Unit

Executive summary

This paper was prepared for the FAO Internal Workshop on a Good Agricultural Practice approach, which took place in Rome, Italy, 27-29 October 2004. It presents an overview on GAP, from the research and extension services which for many decades have been providing production guidelines to farmers, how the concept of Good Agricultural Practices has evolved out of such recommendations and the recent evolution of GAP in food markets.

The paper then lays out the history of the GAP framework development in FAO which started from early discussions focused on the work of visiting scientist David Connor who proposed some 'common principles of good agricultural practices'. Guidance on Good Agricultural Practices was received from the 17th Session of the Committee on Agriculture (COAG) in April 2003, which led to an expert consultation on GAP in 2003 and the definition of a GAP concept for FAO.

Following this consultation, an internal FAO workshop on GAP was organized from 27-29 October 2004, to provide a forum for exchanges on GAP methodologies, approaches and lessons. This paper presents a number of proposed action areas at global, national and sub-national level. It then outlines the contexts in which a GAP approach can be useful and areas of expertise which FAO can bring into GAP work.

The ultimate goal of FAO GAP activities is to assist developing countries in developing appropriate protocols and processes which fit the local context, with a special focus to ensure that small and medium-holders can participate in GAP-orientated markets, which will continue to be of major importance in the global food system.

1. Background

1.1 The starting point: research and extension guidelines

Research and extension services for many decades, especially in developed countries, have been providing production guidelines to farmers and livestock producers. Objectives include increased productivity, improvement of natural resources use and the generation of higher farmer income. Such recommendations for growers/producers are generally organized following the sequence of activities and choices in the production process, such as:

- crop rotation considerations (the choice of what to produce and when);
- land preparation; tillage;
- plant nutrient requirements; fertilizer kinds and amounts;
- crop establishment methods; planting density, arrangement etc.;
- weed control;
- pest and disease control, with IPM principles in some cases;
- water management and irrigation
- harvest methods;
- livestock rations and feeding systems
- on-farm storage methods, etc.

Often the recommendations give farmers/producers a 'basket of choices' from which to select what they should do to be agronomically and economically successful within the given agro-ecosystem. Recommendations get updated as new knowledge is generated. In the past three decades, perceived failure of research and extension in developing countries to disseminate these codified 'good' practices to farmers and to take into account the variety of farmers' circumstances and local and indigenous knowledge has given rise to the development of approaches of participatory technology development, Knowledge Attitudes and Practices and farmers to farmer extension, in order to more effectively identify and support better farming practices.

Over the years, much of the work of FAO units, especially in AGA, AGP, AGL, AGE, FO, FI and some divisions of SD, has been to respond to requests from developing country governments for technical assistance aimed at optimizing and transferring crop, livestock, forestry or aquaculture recommendations in their local context. These days, within this context, there is very high demand from many members for assistance in particular on horticulture and livestock-based production chains but also on sustainable forest products and fisheries, as countries try to enter global markets (which are increasingly requiring food safety, and, more recently, environmental and social considerations) and to meet their direct food security needs and improve the income of the rural and peri-uban poor.

Various units of FAO have specialized in optimization of components of production recommendations, such as IPM for pests; Integrated Plant Nutrient Management (IPNM) for fertilizer inputs, or no-tillage based conservation agriculture for land preparation. Research programmes from the CGIAR and National Agricultural Research Systems (NARS) generate

new varieties, animal strains or agronomic practices that can be and are integrated into the GAP process.

In this paper, it is recommended that component management practices (e.g. - Integrated Pest Management (IPM), Conservation Agriculture (CA), IPPM etc) which may be used in GAP, not be referred to as 'GAPs'; and that the term GAP be retained for the process (protocol) for full sequence of decision for action to produce a crop from land preparation to on-farm storage, and similarly for animals: from purchase to sale and including milk and egg production. It should also be possible to develop GAPs (protocols/processes) for horizontally integrated systems such as crop/pasture/livestock systems; but there are few well elaborated models at this time where environmental and social-related decisions are explicitly articulated into recommendations for horizontally integrated production systems.

1.2 Recent evolution: GAP in food markets

The concept of Good Agricultural Practices has evolved out of, and expands on, such production recommendations. Consumers and hence the food industry and the development community are every day more concerned that food – more and more of which comes through processing and supermarket chains - is safe to eat. They also increasingly care that commodities are produced in ways that are in harmony with the environment and social values (e.g., at least the minimal needs of farm workers are met, international agreements on child labour are respected, etc.).

These shifts in the values associated with agriculture in many developed countries have given rise in the past twenty years to a wide array of social, environmental and quality standards, codes of practices and certification programmes in agriculture and the food sector.[1] Governments, especially in developed countries, have established regulations on food safety and quality, voluntary standards on organic agriculture, and sustainability assessments schemes. A multiplicity of 'GAP' codes, standards and regulations have also appeared from governments, NGOs and CSOs as well as producers organizations and the food industry, claiming to codify sustainable agriculture at farm level.

The terminology "Good Agricultural Practices" (GAP) is explicitly used in some of these codes, though not all. Still in all these standards, the underlying assumption is that the standard codifies some form of good practice. However, there is little common ground in these codes as to how a 'good' practice is defined. The term "good agricultural practices' is used to refer to widely varying elements, from monitoring of pesticides use, to more encompassing aspects of primary production and post production systems, such as environmental impact assessment or labour conditions.

Most of the codes and standards in agriculture are process standards (criteria for the way the products are made) rather than product standards (specifications and criteria for the final characteristics of products). These process standards might or might not influence the characteristics of the end products.

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1 Standards: "Documented agreements containing technical specifications or other precise criteria to be used consistently as rules, guidelines or definitions, to ensure that materials, products, processes and services are fit for their purpose". (International Organization for Standardization, ISO, 1996). From this definition it becomes clear that standards are not only used for standardization, but also as "guidelines", i.e. for the purpose of capacity building. On this basis, the words "codes" and "standards" are used interchangeably in this paper.

The scope of a given GAP scheme reflects its intended objectives, which can vary from ensuring food safety and quality of food produce and allowing traceability; or creating product differentiation (in order to capture new market niches by responding to consumer expected desires for sustainable agriculture); or minimizing the negative environmental externalities of agriculture; or creating new opportunities and more just conditions for small farmers in developing countries.

Further down the food chain, Good Manufacturing Practices (GMP) for processed goods including processed food, pharmaceuticals, clothing and nearly anything else we buy, have also been developed and are a routine part of business protocols and national and international government policy regulations, with assistance from WHO, WTO, International Labour Organization (ILO), UNIDO, and to a limited degree, FAO (Codex, International Plant Protection Convention (IPPC)). But to ensure manufactured products are safe and meet other standards, the agricultural products, which are used as raw materials, should logically also be produced in harmony with standards of GMP. This has given rise to the development of approaches 'from farm to table' that take the application of GAP as the starting point to ensuring food safety and quality in the food chain.

GAP processes for decision-making at the farm level have been increasingly recognized by governments and civil society, including the food and related industries, as the essential prerequisite to food safety from farm to fork. The GAP process embraces actions, technologies and systems that are accepted as most effective for optimal management of soil and water, and for crop and livestock production, from the point of view of microbiological and chemical safety, with the added dimensions of environmental, economic and social sustainability. The details of a GAP protocol for a commodity in a given production environment cannot be generalized and prescriptive from a central information source like FAO, but must be adapted locally (taking into consideration local conditions and market requirements, if any) while based on general underlying principles or norms (see below).

The Sanitary and Phytosanitary regulatory instruments of FAO/WHO deal with limits of food contamination from agricultural practices, but do not provide location specific guidelines on how to ensure this on the farm. They also focus on food safety dimensions of the produce, less on environmental impacts or social conditions of production. Herein lies one of the compelling reasons for developing GAP processes that deal with these and other public concerns about agricultural production.

Codes developed to address product safety and quality[2] tend to focus on the impact of production practices on the end-product, less on the impact of production practices on the environment, fair employment or local development. Sustainability indicators and organic or fair trade standards developed by governments, public agencies or NGOs are likely to be more encompassing towards achieving SARD goals than standards developed by market actors. On the down side, they will often rely on public incentives or support such as government payments, extension and technical assistance - which makes them a costly option for developing countries. Or, they may also rely on price premiums based on consumers willingness to pay for environmental and social sustainability - which may limit their market share and therefore their potential as a tool to achieve SARD.

2 "Quality" in this case meaning not adulterated in a manner to deceive the consumer or to substitute or dilute valuable components with less valuable ones.

Attempts by the food industry (large professional organizations, agro-processors, exporters, retailers) to codify, implement and sometimes impose 'GAP' codes of practices on their suppliers (farmers) has raised the question of the extent to which the markets can support sustainable agriculture, how the value-added is distributed in these schemes through the food chain, whether farmers benefit and with what transaction costs, and whether a large proportion of consumers at the end of the chain are willing to pay for sustainable agriculture through such schemes.

One way for farmers to benefit from GAP or GAP-related schemes is when they receive price premiums for complying with the scheme, as is generally the case when the scheme's certification translates into a label designed to influence consumer purchase by claiming specific product attributes.[3] Within markets for products with quality labels, products labelled "organic" have captured the biggest shares. Annual growth rates of 20 percent or more in market volume have been observed for many consecutive years for both organic and fair trade products. However for tropical products, market shares of labelled products (i.e. organic and fair-trade together) are typically only 1 to 2 percent of the total North American and European markets.[4] An interesting lesson from recent studies on organic and fair trade is that in many cases, capacity building, institutional support and absorption by an external partner (like a donor agency or NGO) of the cost of the transition to these schemes have been more important success factors for these schemes than the price premium received by farmer for the product.[5]

The option of supporting sustainable agriculture through segregated markets for sustainable products is interesting, though it shows some limitation as markets may remain limited. Besides, organic and fair trade groups already have both relatively well recognized labels and stringent standards. Promising efforts are developed from various quarters for joint fair trade and organic product labelling, and to support harmonization of standards and standard-definition processes.[6] Many other quality label and schemes supported by NGOs, government or private operators already exist at national or international level. It would therefore be counter productive and undesirable for FAO to support new, separate processes for product segregation based on sustainable agriculture concerns.

Rather, promising options exist for FAO to engage in dialogues with the food industry and a broad range of stakeholders in specific food supply chains in order to better include sustainability concerns along with food safety and quality concerns in their GAP codes. Interesting examples exist where major companies have supported the implementation of good practices and processes as successful business strategies to improve productivity, quality and farm-level income. One example is Campbell Soup Inc. which in recent years has mainstreamed Integrated Pest and Production Management (IPPM) methods for tomato

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3 It should be noted that certification through a given 'good practices' scheme does not necessarily translates into a specific label on the product. Some standards (for instance, EurepGAP, Sustainable Agriculture Network or quality standards set by supermarkets) only operate at wholesale and buyer level to secure traceability and desired food safety and quality attributes of products; but they do not lead to labelling on the product for consumer information. Therefore the product are not differentiated from others at final purchase stage, and so there may not always be a price premium for farmers for meeting the standard, although they may bear the cost of related investments or certification.

4 See in particular "Environmental and social standards, certification and labeling for cash crops" by Dankers, C. with Liu, P., FAO Commodity and Trade Division, Raw Materials, Tropical and Horticultural Products Service (ESCR), 2003.

5 Ibid.

6 In particular the ISEAL Alliance has released in 2003 new guidelines for setting standards (standards for standards) in the field of sustainable agriculture.

production in several countries with the objective to maximize yield and reduce losses, not to seek product differentiation.

Likewise, farmers may have various incentives for applying GAP beyond price premiums, ranging from access to guaranteed new markets or to reliable quality inputs, to increasing asset farm value and farmers' skills set. A useful summary of possible incentives for the adoption of GAPs for different types of GAP codes has been provided by Jill E. Hobbs in the study commissioned for the GAP Expert Consultation of November 2003 "Incentives for the adoption of Good Agricultural Practices (GAPs)".[7] Depending on their scope and objectives and who establishes and verifies them, the GAP codes will have different implications on the nature of the practices which are promoted, and on incentives to adopt them. A precondition to ensure success and viability of any GAP code or scheme will be a clear identification on a case by case basis of expected incentives, disincentives and costs for farmers and market operators to engage in the scheme.

Most agronomists in FAO, and elsewhere, believe that many smallholders can benefit from engaging in the analytical process of GAP whether or not it gives them access to segregated markets that require GAP adherence (e.g. EUREPGAP or supermarket codes). The RiceCheck Yield-gap Methodology from Australia, currently being pilot-tested in Thailand and Indonesia, addresses some of the sequential process elements toward optimization of rice production, but RiceCheck does not yet emphasise explicitly the fundamentals of farmer decision-making associated with environmental and social concerns. The Food and Nutrition Division (ESN) is pilot testing some GAP-process testing in Thailand with a Technical Cooperation Programme (TCP) using food safety as the key entry point, but much more work with local producers and other stakeholders is required to gain experiences and generate examples that can stimulate wide adoption of the GAP approach.

Since the early 1990s, the concept of sustainable agriculture has helped immensely in shifting the attention of the development community and the agriculture sector not only towards a sounder use of natural resources, but also in looking at development comprehensively in its economic, social and environmental dimensions. Originally, the SARD concept in Agenda 21 focused on improving the sustainability of agricultural practices. The institutional and social dimensions were later added.

Present efforts to explore the development of a GAP approach should be seen in the context of Agenda 21, the global plan of action for sustainable development adopted in 1992 at the United Nations Conference on Environment and Development (UNCED, or the Earth Summit) in Rio de Janeiro. Chapter 14 of Agenda 21pertaining to Sustainable Agriculture and Rural Development (SARD) is directly relevant, and Chapter 4, titled *Changing consumption patterns*, states that:

> *4.20. The recent emergence in many countries of a more environmentally conscious consumer public, combined with increased interest on the part of some industries in providing environmentally sound consumer products, is a significant development that should be encouraged. Governments and international organizations, together with the private sector, should develop criteria and methodologies for the assessment of environmental impacts and resource requirements*

7 See in Annex 2 for a summary of the study "Incentives for the adoption of Good Agricultural Practices (GAPs)" by Jill E. Hobbs, University of Saskatchewan, Canada. The full study is available on the GAP website at http://www.fao.org/prods/GAP/gapactivities_en.asp.

> *throughout the full life cycle of products and processes. Results of those assessments should be transformed into clear indicators in order to inform consumers and decision-makers.*
>
> *4.21. Governments, in cooperation with industry and other relevant groups, should encourage expansion of environmental labelling and other environmentally related product information programmes designed to assist consumers to make informed choices.*

Much of the current interest about GAPs is generated by private voluntary standards by agro-processors, exporters or retailers like major supermarkets chains. While claims for sustainability made in these schemes should not necessarily be taken at face value, it is a valid preoccupation to assess the extent to which these standards can help support achievement of objectives of food security and Sustainable Agriculture and Rural Development (SARD) in developing countries. It appears a relevant and important concern to better understand the extent to which and in which conditions "GAP" market schemes can be used to complement "public-sector GAPs" such as extension or public incentive programmes.

The promotion of GAP by industry could be a win-win situation for farmers, ecologists, labourers, processors and consumers; but this is not a foregone conclusion if stakeholders are not included in the definition and implementation. FAO has, consequently, responded to the debate through internal discussion since 2001, and through consultation with stakeholders and experts. For FAO, GAP is an effective way to focus its technical expertise into clear advice and practical application in the current environment of concern for food safety, environmental protection and social equity.

2. History of GAP Framework Development in FAO

2.1 Initial work: defining common principles of GAP

Early discussions focused on the work of visiting scientist David Connor who proposed some "common principles of good agricultural practices".[8] These principles describe farming that uses available technology optimally to promote agricultural productivity of safe and healthy food, to achieve economic viability and agricultural, environmental sustainability and social responsibility, although this last dimension remains somewhat insufficiently addressed in the framework. The underlying process is one of knowing, understanding, planning, measuring, recording, and of managing in order to identify social, environmental and economic aspects of production goals and monitor related impacts. This requires a sound and comprehensive farming strategy and the capability for responsive tactical adjustments as circumstances change. Success depends upon developing the skill and knowledge bases, on continuous recording and analysis of performance, and the use of expert advice as required.

The principles of good farming, presented in Annex 1 are portrayed within 10 groups of practices presented in Annex 1 (soil; water; crop and fodder production; crop protection; animal feed and livestock 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). The principles elaborated within this framework enable specific practices to be identified, described in detail, and quantified for the construction of codes of practice for individual farming systems.

Electronic discussions in 2001-2002 and meetings with major stakeholder groups consolidated the principles with emphasis on such aspects as soil fertility, pesticide use and animal welfare, but still within the framework described above. This was further supported in the paper discussed at World Summit on Sustainable Development (WSSD) 2002 under the title Codes of Good Farming Practices leading the Transition to Sustainable Agriculture.

2.2 Guidance on GAP from COAG 2003

The paper submitted to FAO's Committee on Agriculture (COAG) in 2003 again focused on the principles, requesting Member states' guidance on the development of a GAP approach in FAO, and proposed:[9]

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8 See Annex 1.

9 Information on COAG 2003 can be found at http://www.fao.org/unfao/bodies/coag/coag17/coag17-e.htm. The paper "Development of a Framework for Good Agricultural Practices" presented to COAG in 2003 is available at http://www.fao.org/DOCREP/MEETING/006/Y8704e.HTM. The full text of COAG's recommendations on this paper can be found at http://www.fao.org/DOCREP/MEETING/006/Y9185e.HTM#P167_29482.

- to review existing codes of practice;
- to formulate a set of generic practices and indicators from which guidelines for good agricultural practices for on-farm production and post-production systems could be developed, collaboratively by the public and private sectors and civil society; and
- to engage in discussion with governments on their strategies, priorities and instruments to move towards sustainable agriculture and rural development practices.

COAG welcomed the document, which built on the existing activities in this area by governments, civil society, non-governmental organizations, the private sector and international partners. But it emphasized that a GAP approach should not create new barriers to trade and thus undermine poverty alleviation efforts and be consistent with the existing regulatory instruments, such as Codex, IPPC and OIE. The Committee recommended that FAO continue its initial work on a GAP approach, within existing programmes, specifically the Programme Area for Interdisciplinary Action (PAIA) on Integrated Production Systems. It was agreed that the components identified in the Annex, "Good Agricultural Practices for Selected Agricultural Components", drawn from David Connor's work, needed further refinement. COAG asked that follow-up activities be reported on during the 19th Session of the Committee on Agriculture in 2005.

2.3 Expert Consultation on GAP in 2003 and definition of a GAP concept for FAO

The concept of GAP as presented in the COAG paper was considered rather too wide and undefined. However, the original entry point, based on technical aspects of crop and livestock production to ensure food safety, environmental protection, economic and social equity remains clear, and was confirmed at the Expert Consultation on GAP which was held in Rome in November 2003.

Experts agreed that the concept of GAP should, to the extent feasible in a given farming system, seek to include the following aspects:

- three pillars of sustainability: Good Agricultural Practices should be economically viable, environmentally sustainable, and socially acceptable; inclusive of food safety and quality dimensions,
- the focus should be on primary production, within a given incentive and institutional context;
- take into account existing voluntary and/or mandatory codes of practices and guidelines in agriculture.

The Expert Consultation definition clearly establishes GAP within the framework of Sustainable Agriculture and Rural Development (SARD) as developed in the Rio Summit's Agenda 21. There continues to be confusion in the minds of some on how the GAP approach relates to SARD. While both GAP and SARD use the same three pillars (economic, environmental and social), SARD is a far wider concept that embraces not only agriculture production issues on farm (GAP) but issues of rural infrastructure, rural education and much more; operationalizing GAP, however, will contribute to SARD.

Also, it was recommended that GAP do not cover the whole food supply chain. GAP covers the farm-level part of the chain or continuum which further down includes Good

Handling Practices (GHP), Good Manufacturing Practices (GMP), HACCP and quality control standards and others. Indeed, an important aspect in identifying practices as GAP is that they should lead to safe and healthy food taking account the food safety and quality standards requirements in a given market context and legal setting. But the focus and contribution of GAP for this clearly remains at the production stage.

Whereas elements for a working definition of the GAP approach were agreed, it was recommended that the concept be articulated in more detail for moving forward. The Expert Consultation also provided FAO with important insights and recommendations for achieving outcomes including implementation strategies and pilot activities.

The working concept exposed in the present paper for the development and implementation of a Good Agricultural Practice approach in FAO draws from the recommendations of the GAP Expert Consultation. It also builds on lessons from a number of field activities undertaken by FAO units since 2003, in particular projects, workshops or studies in Namibia, Kenya, Burkina Faso, Thailand, the Latin American cone, a regional GAP workshop for Asia organized by FAO and IAEA in Bangkok late 2003, and an Electronic conference organized by the regional office for Latin America in July-August 2004. These projects and activities give a different emphasis to specific aspects of the GAP concept, and many valuables lessons can be learnt from all of them. The objective of the GAP workshop of 27-29 October 2004 is to better explore how synergies between these approaches can be created to improve FAO's capacity to provide coordinated services and expertise to our Member countries.

3. Proposed Action Areas

3.1 At global level

3.1.1 Disseminate information on Good Agricultural Practices related concepts, approaches, methods and projects

We believe that the provision of better information related to GAP can contribute to better decision-making by governments, development agencies and NGOs and Non Governmental Organization (NGO) and Civil Society Organization (CSO) who seek to support farmers in farming more sustainably as well as interested private sector companies. At global level, this can be done through information tools, as well as analytical inventories and comparative studies on GAP schemes, their scope, drivers and the respective incentives to adopt them. This has been initiated through the compilation of a GAP meta-database (http://www.fao.org/prods/gap/database/index.html) of GAP guidelines, projects and field activities relating to work in FAO and elsewhere on agricultural technologies (TECA), FAO technical publications (EIMS) and projects, guidelines, national regulations and legislation related to GAP. The GAP web site (http://www.fao.org/prods/GAP/gapindex_en.htm) is also a support for information dissemination on GAP activities. Such tools can also be of help to those professional agricultural organizations who have the skills and resources to access this information. It is assumed that a different set of communication and information tools is needed to reach farmers and consumers. These specific tools (targeted training material, CD-Rom or publications, communication campaigns) may be developed as relevant in particular contexts.

3.1.2 Define global principles underlying Good Agricultural Practices, reflecting the three pillars of sustainability and food safety and quality considerations

It has been recommended by COAG last year that the principles presented in the annex to the GAP paper (see Annex 1) would need further refinement, drawing from FAO's large range of technical and institutional expertise. It is obviously a challenge to formalize global principles of GAP that are applicable worldwide, and some may question the relevance and usefulness of the attempt. However it is also clear that FAO has developed a substantial body of knowledge, principles and value judgments of what constitutes good practices for different components of agricultural production such as water management, soil and plant nutrition cycles, animal husbandry or integrated crop protection. Knowledge about these separate components could be usefully brought together and formalized in a comprehensive set of principles which would serve as a simple reference point on GAP, to be adapted, translated and prioritized into locally appropriate practices and indicators and to provide a baseline for technical assessment of existing GAP codes and standards. Recent FAO work on the application of holistic agro-ecological principles of farming are a step in the same direction, and the refinement of GAP principles should built on these efforts. The social dimension of sustainability and considerations of food safety and quality may need particular refinement in the GAP components. However, the social dimension of sustainability in particular are difficult to

quantify and should be the outcome of national, local and individual priorities. FAO should bring in the debate other organizations such as ILO, International Organization for Standardization (ISO) 8000 standards and Social Accountability International standards to benefit from their expertise on defining basic social sustainability principles and on appropriate ways of adapting them to local contexts.

3.2 AT NATIONAL/SUB NATIONAL LEVEL

3.2.1 Define approaches to translate the global GAP principles into local practices and production processes and indicators

Rather than embarking on the definition of GAP guidelines for as many productions systems as possible (a daunting task which may not make the best use of FAO's limited resources), the Expert Consultation on GAP recommended that the focus should be on refining a process approach for supporting definition of GAPs by local actors, based on pilot work in a few countries. The approach would support the local development of optimal good agricultural practice which are appropriate and reflect priorities of local stakeholders in that specific context, for a given commodity.[10]

In doing so, a given national project may combine the following components, as locally relevant:

3.2.2 KNOWLEDGE. Provide local/national stakeholders with analysis of:

impacts of production of a specific commodity or production systems and local sustainability dynamics, food safety and quality and other issues. An emphasis on impact assessment (for instance, by documenting and disseminating information on national cases of food contamination, water pollution or loss of biodiversity related to inadequate or excessive pesticide use) is expected to be particularly efficient in raising policy makers' awareness of sustainability issues and triggering immediate policy action.

the scientific validity and policy and economic implications and costs of specific GAP standards and schemes. AGSF has already commissioned a study in a number of Asian countries on fresh produce food safety and quality, existing GAP-related schemes, and issues, costs and opportunities for producers and marketers in implementation.

3.2.3 NEGOTIATION. Upon local demand, act as neutral broker to facilitate the negotiation between local stakeholders of feasible/applicable GAP processes for a commodity

As in any decision-making process, farmers making decisions over production processes face conflicting priorities and trade-offs over the use of limited resources (financial, human, natural, physical, or social assets). Conflicting priorities may also arise between different stakeholders

10 As noted earlier, it should also be possible to develop GAPs protocols/processes for horizontally integrated systems such as crop/pasture/livestock systems. There are few models sufficiently elaborated at this time where environmental and social-related decisions are explicitly articulated into recommendations of horizontally integrated production systems. But this would be one interesting technical area for future GAP work. Work has been initiated in this respect in 2004 on cotton-cereal-livestock farming systems in Burkina Faso involving all major public and private stakeholders, but the work is at an early stage.

(local or national food industry or buyer, farmers and their organizations, local government services for forestry, agriculture, livestock and the environment, extension services) with diverging objectives and views of the most appropriate land use and farming methods. A wealth of local knowledge is often available about what constitutes good practices in a given farming system from the point of view of research and extension, farmers or farmers organizations or market operators. But their implementation often fails because each stakeholders' definition fails to reflect the views and incentives of the others. Collaborative definition of applicable GAPs in a given context coupled with participatory extension methods has been identified as a way to avoid this and try to resolve trade-offs. Such collaborative negotiations can be facilitated by FAO upon request from a national government, commodity board or private operator engaged in developing GAP protocols either as extension tools or as guidelines in national programmes for product quality. When requested to do so, FAO could support national or local actors in prioritizing components of the GAP principles, based on agreed priority outcomes. The focus for FAO should be on developing participatory approaches for supporting such processes. Such methodologies use the range of expertise developed in FAO and elsewhere on multistakeholder negotiation and conflict resolution. This has started with meetings on GAP for meat production in S and E Africa (2004), for dairy production (S Africa, 2004) and the poultry sector (North Africa 2004) and cotton-cereal-livestock production systems in Burkina Faso (2004).

In this local definition process, FAO may also provide technical advice on sustainable technologies and processes that may help minimize trade offs between different sustainability objectives.

One role for FAO's technical assistance in the GAP work will continue to consist in proposing economically and environmentally sustainable practices and processes which help minimize trade offs, providing advice on how to make the best use of a broad basket of new but also indigenous and traditional technology practices. FAO has a wide range of technical expertise and experience ranging from crop production and protection, water management and irrigation, soil fertility and plant nutrition, biotechnology and others. FAO can also build on its experience on participatory technology development, farmers field schools, Knowledge, Attitudes and Practices approaches and other participatory extension methods. This may also imply flagging potential promising research areas where knowledge and information are lacking. Initial pilot projects on GAP will provide guidelines on methodologies for defining pertinent practices and economic, environmental and social indicators. With respect to monitoring or assessment of environmental impacts of production, the question of how to monitor cumulative impacts beyond farm level will be an important issue to take into consideration, building on most recent methodological work in FAO and elsewhere.

3.2.4 Capacity building and policy advice

to support small and larger scale farmers in meeting existing GAP standards and codes and changing procurement practices set by retailers and the food industry, in strengthening institutions such as farmers organizations, extension services and other government institutions, and NGOs and CSOs which support the development and application of locally adapted GAP. Section 5 points out the range of expertise and capacity building experience on which FAO can build to respond to requests from developing countries with respect to GAP.

4. In which contexts can a GAP approach be useful?

Where a company in the food industry is interested in developing or improving GAP standards with FAO assistance and FAO feels that it can substantially influence the adoption of more sustainable standards that satisfactorily meet with the GAP global principles.

Within FAO, there is both a lot of interest and legitimate concern about how to engage in cooperation with large private sector companies, because of concerns on what FAO may lose in terms of scientific credibility, neutrality and the risk to support further exclusion of smaller farmers in developing country from increasingly competitive and globalized food markets. This concern is shared by other government agencies and other UN agencies, as public-good oriented institutions are at odds redefining their relationship with the private-good oriented actors which drive the development of the agricultural sector.

Intergovernmental institutions are concerned that private companies in the agri-food sector are seeking to make use of FAO's credibility for company branding purposes. These concerns are legitimate and FAO rightly exercises cautions in identifying specific activities in which to cooperate with the food industry. Meanwhile, it may be possible to identify win-win situations for cooperation with private sector companies. Incentives for companies to work with FAO on substantially more sustainable production standards could be:

- FAO technical expertise, lessons-learnt and replication from other contexts. In particular where FAO can propose GAP practices and processes that allow to maximize productivity improvements in the form of yield increases, reduction of input use or losses while minimizing negative environmental externalities. The experience of Campbell Soup, Inc. with the IPM program exposed during the GAP Expert Consultation of November 2003 is a particularly interesting case.
- FAO's experience in working with farmers and farmers to farmers approach and participatory extension
- FAO may absorb the cost of training farmers during the transition period from the former production methods to the GAP methods. FAO's role would be to reduce transaction costs of stakeholders to take into account agro-ecological principles.

In response to demands for assistance from government services to 1) understand the implications of GAP-related standards put in place by agro-processors or exporters or retailers, and to 2) improve their capacity to cope with these standards, by fostering the development of the institutional infrastructure necessary to support GAPs within a developing country environment (e.g. third party monitoring, quality verification systems, capacity building in other FAO areas of expertise (see below)

By directly supporting small farmers associations or cooperatives to integrate contract growers or other market schemes that may remunerate the use of GAP, to provide a critical mass in terms of supply, provide a vehicle for the dissemination of information on GAPs to smallholders and improve the bargaining power of individual farmers vis-à-vis larger retailers

or processors. This would require pooling together FAO expertise to provide both technical advice on production processes and managerial advice on farm management, marketing and commercialization.

The e-conference on GAP in Latin America held by FAO's Regional Office in the July-August 2004 pointed at contexts were a GAP approach could be particularly relevant:

- low input systems
- labour intensive systems
- short production cycles
- strong linkages with agro-industry or export markets
- one could also add as a pre-condition for success the identification of a partner in the agro-industry committed to sustainability issues, often in the form of a committed or willing individual (in the case of Campbell Soup for instance, an innovative Scientific director interested in exploring agriculture sustainability principles as a viable business approach for the agro-industry).

A number of issues remain as to the potential impact of engaging in GAP work at country or sub-national level, such as the potential marginalization of small farmers and the risk to generate further confusion for farmers and consumers by creating additional standards. Risk factors will need to be weighed against potential benefits for national actors to engage in GAP on a case by case basis.

Before initiating GAP activities at national or sub-national level, FAO should work closely with national partners to investigate the following on a case by case basis:

- existing GAP systems in use, avoiding confusion by creating additional systems, building on local demands to improve existing systems or cope with them where relevant
- needs in terms of infrastructure and financing to support the transition period
- security for farmers as to return on investment, clarifying incentives for farmers
- cost of standard or technology compliance, understand other possible disincentives
- needs related to knowledge of appropriate technology components (pesticide management and IPM and irrigation management being two cases in point)

Ultimately, appropriate interventions will be a matter of policy choices based on the specific national and local context, the strength, weaknesses and competitiveness of the national agricultural sector and specific commodities, and national policy objectives.

5. Areas of expertise which FAO can bring into GAP work

There is a wide range of expertise on which FAO can build to respond to requests from developing countries with respect to GAPs. The following section is probably not exhaustive, and any additions are welcome; indeed, better information-sharing on complementary activities is often pointed out by FAO staff as a pitfall common to FAO and other development agencies, and GAP is no exception. One challenge for FAO is to identify concrete opportunities and ways to better integrate this expertise to provide countries with more coordinated responses.

- FAO technical units such as AGPC, AGPP, AGAP, AGAH, AGST, ALLL, AGLW, FORC, FORM, FONP and FOPP, FIRI, FIPP, FIIT, SDRN are important sources of knowledge and material on many technical and economic aspects of good agricultural principles and practices (soil, water, crop and fodder production and protection, animal production, health and welfare, harvest and on-farm processing and storage, energy and waste management, forestry and agro-forestry, aquaculture, wildlife and landscapes and biodiversity and others).
- Methodologies for impact monitoring are also being developed with particular respect to environmental impacts of agriculture by AGAL, AGLL, AGPP and maybe others. Experience with respect to the application of agro-ecological principles is of particular relevance.
- Body of experience from FAO work on farming systems information and typologies (AGSF, AGP, AGL, AGA, SDRN and others).
- Social and environmental certification and labelling in crop and livestock production, fisheries and forestry; analysis of transaction costs for compliance with food safety and quality standards and production; value-chain analysis; how to reduce costs and the institutional innovations to reduce them (ESCR, ESCP, ESAE, AGSF, FIPP, FORC, FORM, FONP and FOPP, staff in regional offices in particular RLC).
- Training of trainers and institutional capacity building to ensure safety and quality of agricultural produce in particular for fresh foods and vegetables, coffee and other commodities; development of adequate laboratory facilities for product quality, lab quality assurance and control procedures; efficiency of sampling processing, etc. (ESNS, AGE, AGPC staff at headquarters, in RAP, RLC and elsewhere).
- Methodologies and approaches to support farmers experiential learning to improve their technical and managerial capacities, in particular by supporting Farmers Field Schools, participatory technology development and Knowledge Attitudes and Practices approaches; (SDRE, SDAR, FORC, FORM, FONP and FOPP, AGPP and others).
- Conflict management approaches and facilitation of multistakeholder negotiations; building alliances with private sector and NGOs (SDAR, FORC, FORM, FONP, FOPP, AGAL/Livestock, Environment and Development (LEAD), FIPL, TCDS and others).
- Capacity to provide comparative experiences through knowledge management systems and support (for instance, TECA, GAP database, LEAD database, SDRN remote sensing tools and others).

6. Conclusion

The further development of GAPs, as a technical and policy basis for food safety, environmental protection, economic and social equity, is an important way forward, which will contribute to but should not be confused with the wider subjects of SARD and Sustainable Livelihoods.

It is important for future work that GAPs are clearly defined as a **process** of decision-making for farmers based on the sequence of choices described above. This process goes on through the phenology of the crop production and on-farm storage until the product moves to market or processing. It should be based on risk analysis principles, not only related to food safety but also to environmental and social concerns. GAP, together with GMP and biosecurity, are regarded as the prerequisites to HACCP applied to primary production and throughout the food chain.

The big challenge for FAO from our perspective (we think others share this vision) is to help countries develop appropriate protocols and processes that fit the local context but with special focus to ensure that small and medium-holders can participate in GAP-oriented markets, which are becoming and will continue to become a major focus of the global food system. AG technical divisions can work with others on technical advice regarding production protocols but the process of engaging farmers and policy makers and food industries, for example on aspects related to food safety and social equity, requires a broad involvement of much of FAO's technical competence and normative tools.

In exploring food and agriculture GAP standards and codes and their impact on farmers in developing countries, FAO's objective is not to support the establishment of more stringent international regulations or define new sets or norms and standards. The objective is rather to examine possible options to support sustainable agriculture and rural development taking into account those existing standards that are developed by Governments, NGOs and the private sector. Setting baseline sustainability principles, clarifying the type of existing standards and their scope and impact, and supporting the negotiation of fairer standards between stakeholders are seen as steps towards the promotion of more sustainable agriculture and rural development.

GAP does not attempt to cover the full dimensions of SARD or of Livelihoods approaches, nor to substitute or duplicate already on-going work in FAO in related areas. It is an action area proposed to encourage synergies among people and programmes in and outside of FAO, pooling expertise to promote GAP that seek to include food safety and quality, environment, economic and social dimensions to the best extent feasible. The GAP workshop of 27-29 November 2004 will provide a forum for exchanges on methodologies, approaches and lessons which may help concretely tackle some pending issues on how to approach GAP, building on FAO's full range of expertise. Lastly, whether or not smallholders using the GAP-process, have access to segregated markets, the GAP approach should enhance economic return, ensure sustainability and minimize social injustice from labour misuse and abuse.

Annex 1
Principles for Good Agricultural Practices (2003)[11]

The concept of Good Agricultural Practices is the application of available knowledge to the use of the natural resource base in a sustainable way for the production of safe, healthy food and non-food agricultural products, in a humane manner, while achieving economic viability and social stability. The underlying theme is one of knowing, understanding, planning, measuring, recording, and managing to achieve identified social, environmental and production goals. This requires a sound and comprehensive management strategy and the capability for responsive tactical adjustments as circumstances change. Success depends upon developing the skill and knowledge bases, on continuous recording and analysis of performance, and the use of expert advice as required.

The Guidelines portray the norms of good agriculture within 10 groups of resource concerns and practices. This structure is designed to provide the framework within which detailed management guidelines can be prepared for individual farming systems and for integrated production systems within specific agro-ecosystems.

1. Soil

The physical and chemical structure, and biological activity of the soil, are fundamental to sustaining agricultural productivity and determine, in their complexity, soil fertility. Soil management shall maintain and improve soil fertility by minimizing losses of soil, nutrients, and agrochemicals through erosion, runoff and leaching into surface or ground water. Such losses represent inefficient and unsustainable management of these resources, in addition to the deleterious off-target effects. Soil management also seeks to enhance the biological activity of the soil and protect surrounding natural vegetation and wildlife. Good agricultural practice will:

- Establish a detailed knowledge of the nature, properties, distribution, and potential uses of soils of the farm.
- Avoid mechanical soil tillage to the extent possible.
- Maintain or improve soil organic matter through the use of soil building crop rotations.

11 These principles were presented to FAO's Committee on Agriculture (COAG) in Annex to the paper "Development of a Framework for Good Agricultural Practices" available at http://www.fao.org/DOCREP/MEETING/006/Y8704e.HTM. For a discussion of these principles see section 2 p.6-7 and section 3 p.9 of the present paper.

- Maintain soil cover to minimize erosion loss by wind and/or water.
- Avoid contamination with agrochemicals, organic and inorganic fertilizers and other contaminants by adapting quantities, application methods and timing to the agronomic and environmental requirements.
- Maintain a history of the annual use, inputs and outputs of each individual land-management unit.

2. Water

Agricultural land use carries a high responsibility for the management of water reserves in quantitative and qualitative terms. Careful management of water resources and efficient use of water within agriculture - for rainfed crop and pasture production, for irrigation where applicable, and for livestock - are criteria for good agricultural practice. They include maximizing the infiltration of rain water on agricultural land and covering the soil as often as possible in order to avoid surface run-off while minimizing leaching to water tables. The maintenance of an adequate soil structure including the adequate spacial arrangement of continous macropores and the management of soil organic matter are important factors to achieve this. Efficient irrigation methods and technologies minimize losses in the supply and distribution of irrigation water by adapting the quantity and timing to the agronomic necessities and avoiding leaching and salinization. Water tables should thus be managed to prevent excessive rise or fall. Good agricultural practice will:

- Maximize water infiltration and minimise unproductive efflux of surface waters from watersheds.
- Manage ground and soil water by proper use or avoidance of drainage where required and by build-up of soil structure and soil organic matter.
- Avoid the contamination of water resources with production inputs, waste or recycling products of organic, inorganic and synthetic nature caused directly by inadequate handling practices and technologies and indirectly by erosion and leaching.
- Adopt techniques to monitor crop and soil water status and prevent soil salinization.
- Avoid unproductive irrigation water losses and adopt water-saving measures and re-cycling where possible.
- Enhance the functioning of the water cycle to increase soil moisture storage and minimize runoff of water and associated contaminants. This may include monitoring of water status, monitoring and proper use of irrigation water, establishing permanent cover, or maintaining or restoring wetlands as needed.
- Manage water tables to prevent excessive extraction or accumulation.
- Provide adequate, safe, clean watering points for livestock.
- Increase soil organic matter levels to maximize moisture retention and root penetration.

3. Crop and fodder production

Individual annual and perennial crops, cultivars and varieties are chosen for their suitability to the site and their role within the crop rotation for the management of soil fertility, pests and diseases, available inputs, and local consumer and market needs. Perennial crops are used to provide long-term production options and opportunities for intercropping. Annual crops are

grown in sequence, including those with pasture, to maximize the biological benefits of interactions between species and to maintain productivity. Rangelands are managed to maintain plant cover, productivity and species diversity. Harvesting of all crop and animal products removes their nutrient content from the site and must ultimately be replaced to maintain long-term productivity. Good agricultural practice will:

- Select cultivars or varieties on an understanding of their characteristics, including response to sowing or planting time, productivity, quality, market acceptability, disease and stress resistance, edaphic and climatic adaptability, and response to fertilizers and agrochemicals.
- Devise crop sequences to optimize use of labour and equipment and maximize the biological benefits of weed control by competition, mechanical, biological and herbicide options, provision of non-host crops to minimize disease and, where appropriate, inclusion of legumes to provide a biological source of nitrogen.
- Apply fertilizers, organic and inorganic, in a balanced fashion, with appropriate methods and equipment and at adequate intervals to replace nutrients extracted by harvest or lost during production.
- Maximize the benefits to soil and nutrient stability by re-cycling crop and other organic residues.
- Integrate livestock into crop rotations and utilize the nutrient cycling provided by grazing or housed livestock to benefit the fertility of the entire farm.
- Rotate livestock on pastures to allow for healthy re-growth of pasture plants.
- Adhere to safety regulations and observe established safety standards for the operation of installations, equipment and machinery for crop and fodder production.

4. Crop protection

Maintenance of crop health is essential for successful farming for both yield and quality of produce. This requires long-term strategies to manage risks by the use of disease- and pest-resistant crops,[12] crop and pasture rotations, disease breaks for susceptible crops, and the minimal use of agrochemicals to control weeds, pests, and diseases following the principles of Integrated Pest Management. Any measure for crop protection, but particularly those involving substances that are harmful for humans or the environment, has to be carried out with state of the art knowledge and equipment. Good agricultural practice will:

- Decide on interventions following consideration of all possible methods and their short- and long-term effects on farm productivity and environmental implications in order to minimize the use of agrochemicals, in particular promote integrated pest management (IPM).
- Use resistant cultivars and varieties, crop sequences, associations, and cultural practices that maximize biological prevention of pests and diseases.
- Maintain regular and quantitative assessment of the balance status between pests and diseases and beneficial organisms of all crops.

12 The principles of Good Agricultural Practices for crop protection also apply to risk management relating to the use of Genetically Modified Organisms (GMOs)

- Apply pest and disease forecasting techniques where available.
- Store and use agrochemicals according to legal requirements, e.g. registration for individual crops, rates, timings, and pre-harvest intervals.
- Assure that agrochemicals are only applied by specially trained and knowledgeable persons
- Assure that equipment used for the handling and application of agrochemicals complies with established safety and maintenance standards.
- Maintain accurate records of agrochemical use.
- Adopt successful organic management practices where and when applicable.

5. Animal production

Livestock require adequate space, feed and water to ensure animal welfare and productivity. Record keeping of livestock and of breeding programmes will ensure traceability of type and origin. Stocking rates are adjusted and supplements provided as needed to livestock grazing pasture or rangeland. Chemical and biological contaminants in livestock feeds are avoided to prevent their entry into the food chain. Manure management avoids nutrient losses, minimizes negative, and stimulates positive effects on the environment. Land requirements of livestock production are evaluated to ensure sufficient land for feed production and waste disposal. Good agricultural practice will:

- Site livestock units appropriately to avoid negative effects on the landscape, environment, and animal welfare
- Avoid biological, chemical and physical contamination of pasture, feed, water and the atmosphere.
- Frequently monitor the condition of stock and adjust stocking rates and feeding accordingly.
- Provide adequate, clean water.
- Ensure staff are properly trained in the handling and treatment of animals.
- Design, construct, choose, use and maintain equipment, structures and handling facilitates to avoid injury and loss.
- Make optimal use of by-products and wastes and ensure they do not contaminate crops, products, land, or water resources.
- Take precautions to prevent residues from veterinary medications and other chemicals given in feeds from entering the food chain.
- Avoid the non-therapeutic use of antibiotics wherever possible.
- Carefully record stock acquisitions, breeding, losses, and sales.
- Carefully record feeding plans, feed acquisitions and sales.
- Provide for clean and safe handling and on-farm processing of products (e.g., milk and eggs).
- Integrate livestock and agriculture to avoid problems of waste removal and ensure recycling of nutrients in an efficient way.
- Treat animal waste in such a way as to reduce nutrient loss and green house gas emissions.
- Adhere to safety regulations and observe established safety standards for the operation of installations, equipment and machinery for animal production

6. Animal health

Successful animal production requires attention to health. The health of livestock is maintained by proper management and housing, by preventive treatments such as vaccination and by regular inspection, identification, and treatment of ailments, using veterinary advice as required. Good agricultural practice will:

- Minimize risk of infection and disease by good pasture management, safe feeding, appropriate stocking rates and good housing conditions.
- Keep livestock, buildings and feed facilities clean and provide adequate, clean bedding under housed conditions.
- Seek appropriate veterinary advice to avoid disease and health problems.
- Ensure good hygiene standards in housing by proper cleansing and disinfection.
- Monitor disease incidence and treat sick or injured animals promptly in consultation with a veterinarian.
- Purchase, store and use only approved veterinary products in accordance with directions and regulations.
- Comply with withdrawal periods for veterinary medicinal products.
- Keep detailed records of all sickness, medical treatments and mortality.

7. Animal welfare

Farm animals are sentient beings and as such their welfare must be considered. Good animal welfare is recognised as freedom from hunger and thirst; freedom from discomfort; freedom from pain, injury or disease; freedom to express normal behaviour; and freedom from fear and distress. Good agricultural practice will:

- Provide adequate and appropriate feed and clean water at all times.
- Avoid non-therapeutic mutilations, surgical or invasive procedures, such as tail docking and debeaking.
- Minimise transport of live animals (by foot, rail or road) and the use of livestock markets.
- Avoid rough handling and the use of instruments such as electric goads
- Maintain animals in appropriate social groupings where possible; isolation of animals (such as veal crates and sow stalls) should be prohibited, except for injury and sickness.
- Avoid overcrowding and conform to minimum space allowances and maximum stocking densities.
- Maintain slaughter methods that are humane and appropriate for each species, with attention to supervision, training of staff and proper maintenance of equipment.

8. Harvest and on-farm processing and storage

Product quality depends upon implementation of acceptable protocols for harvesting, storage, and where appropriate, processing of farm products. Harvesting must conform to regulations relating to pre-harvest intervals for agrochemicals and with-holding periods for veterinary medicines. Food produce should be stored under appropriate conditions of temperature and humidity in space designed and reserved for that purpose. Operations involving animals, such

as shearing and slaughter, must adhere to animal health and welfare standards. Good agricultural practice will:

- Harvest food products following relevant pre-harvest intervals and with-holding periods.
- Process produce hygienically, e.g. for washing, use recommended detergents and clean water.
- Store food products under hygienic and appropriate environmental conditions.
- Pack food produce for transport from the farm in clean and appropriate containers.
- Maintain accurate records regarding harvest, storage and processing.

9. Energy and waste management

Farms require fuel to drive machinery for cultural operations, for processing, and for transport. The objective is to perform operations in a timely fashion, reduce the drudgery of human labour, improve efficiency, diversify energy sources, and reduce energy use. Farming produces by-products, some of which are potential pollutants of soil, water, or air. The production of these by-products should be minimized while others are resources that can be reused or recycled. Good agricultural practice will:

- Establish input-output plans for farm energy, nutrients, and agrochemicals so as to ensure efficient use and safe disposal.
- Adopt energy saving practices in building design, machinery size, maintenance, and use (e.g. zero or minimum tillage).
- Investigate alternative energy sources to fossil fuels (wind, solar, biofuels), and adopt them where feasible.
- Identify and recycle most organic wastes and inorganic materials, where possible.
- Minimize non-usable wastes and dispose of them responsibly.
- Store fertilizers and agrochemicals securely and in accordance with legislation.
- Maintain accurate records of energy use, and of storage and disposal.
- Establish emergency action procedures to minimize the risk of pollution from accidents.

10. Human welfare, health, and safety

Farming must be economically viable to be sustainable. The social and economic welfare of farmers, farm workers, and their local communities depends upon it. Health and safety are also important concerns for those involved in farming operations. Due care and diligence is required at all times. Good agricultural practice will:

- Direct all farming practices to achieve an optimum balance between economic, environmental, and social goals.
- Provide adequate household income and food security
- Establish and adhere to safe work procedures with acceptable working hours and allowance for rest periods.
- Instruct workers in the safe and efficient use of tools and machinery.
- Pay reasonable wages and not exploit workers, especially women and children.
- Buy inputs and other services from local merchants if possible.

11. WILDLIFE AND LANDSCAPE

Agricultural land accommodates a diverse range of animals, birds, insects, and plants. Much public concern about modern farming is directed at the loss of some of these species from the countryside because their habitats have been destroyed. The challenge is to manage and enhance these wildlife habitats while keeping the farm business economically viable. Good agricultural practice will:

- Identify and conserve wildlife habitats and landscape features, such as isolated trees, on the farm.
- Create, as far as possible, a diverse cropping pattern on the farm.
- Minimize the impact of operations such as tillage and agrochemical use on wildlife.
- Manage field margins to reduce noxious weeds and to encourage a diverse flora and fauna with beneficial species.
- Manage water courses and wetlands to encourage wildlife and to prevent pollution.
- Monitor those species of plants and animals whose presence on the farm is evidence of good environmental practice.

Annex 2
Paper abstract[13]

from
"INCENTIVES FOR THE ADOPTION OF GOOD AGRICULTURAL PRACTICES (GAPs)"
By Jill E. Hobbs, University of Saskatchewan, Canada

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).

13 The full paper is available on the GAP website at http://www.fao.org/prods/GAP/gapactivities_en.asp

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 made 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.

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.

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 reneging on a supply agreement.

Good Agricultural Practices – a working concept

Background Paper for the FAO Internal Workshop on Good Agricultural Practices

Rome, Italy 27-29 October 2004

The Food and Agriculture Organization of the United Nations (FAO) has being 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 Internal Workshop on a Good Agricultural Practice approach, which took place in Rome, Italy 27-29 October 2004.

It presents an overview of the recent evolution of GAP in food markets, and the history of GAP framework development in FAO, from early discussions focused on the work of visiting scientist David Connor who proposed some 'common principles of good agricultural practices'. Guidance on Good Agricultural Practices from the 17th Session of the Committee on Agriculture (COAG) in April 2003 led to an expert consultation on GAP in 2003 and the definition of a GAP concept for FAO.

Following this consultation, an internal FAO workshop on GAP was organized from 27-29 October 2004 to provide a forum for exchanges on methodologies, approaches and lessons. The final aim is to assist developing countries in developing appropriate protocols and processes which fit the local context, with a special focus to ensure that small and medium-holders can participate in GAP-orientated markets which are and will continue to be of major importance in the global food system.

To feed discussions at the FAO GAP Internal Workshop, this document presents a number of proposed action areas, outlines the contexts in which a GAP approach can be useful, and areas of expertise which FAO can bring into GAP work.