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FOOD SAFETY: CHALLENGES AND OPPORTUNITIES FACING PRODUCTION OF LIVESTOCK AND LIVESTOCK PRODUCTS

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CONTENTS

	<i>Page</i>
Summary	3
Challenges Facing Production of Livestock and Livestock Products.....	4
Opportunities for Safe, Clean and Equitable Production of Livestock and Livestock Products	16
Livestock and Food Security [Livestock in the Diversification Component of the Special Program for Food Security (SPFS)].....	18
Livestock and the Environment	19
Livestock and Poverty Alleviation.....	20
Livestock Diseases Limiting Sector Productivity and its Contribution to International Development Goals—Global Framework for the Progressive Control of FMD and Other TADs (GF-TADs).....	21
Conclusions.....	22
References	

Summary

1. Livestock production is growing faster than other agricultural sub-sectors, and it is predicted that by 2020 livestock will produce more than half of the global agricultural output in value terms. The implications of such dynamic developments on national and international public goods, such as sustainability of the natural resource base, (veterinary) public health, and social equality are potentially very substantial; there are therefore commensurate risks to be dealt with, but also opportunities to be exploited.
2. Increasing livestock densities in humid and warm ecologies contribute to higher frequency and exposure to animal disease agents, both endemic and epidemic, and including those of zoonotic nature. New diseases are likely to emerge and known diseases are likely to evolve biologically and epidemiologically in new and potentially dangerous ways.
3. Intensification and industrialisation of livestock production bear the risk of soil, water and air pollution where environmental legislation is either not available or not rigorously enforced. Growing scales of production, often accelerated by the opportunity of unconstrained externalisation of societal and environmental costs of large-scale, capital intensive operations, contribute to the marginalisation of small-scale rural livestock producers despite overall expanding markets.
4. In many parts of the world, extensive grazing systems are associated with environmental degradation due to overstocking and inappropriate herd and pasture management, with arable land encroachment and wildlife–livestock competition often exacerbating such pressure. Where rangeland is still being created through rainforest conversion, substantial environmental costs are often associated with this process.
5. The substantial and rapid structural changes in the livestock sector require that governments and industry prepare for this continuing transformation with policies and investments that will satisfy consumer demands, improve nutrition, direct income growth opportunities to the poor, and alleviate environmental and public health stress. Such policies and investments would provide an enabling environment for enhancing the productivity and competitiveness of the livestock sector through technical interventions in the areas of animal disease management, animal production and post-harvest technology while providing a ‘level playing field’ through the removal of policy distortions that create and maintain barriers primarily to smallholders for entry into markets.
6. Selected examples are given of collaborative interinstitutional efforts of FAO’s Livestock Program in addressing the issues highlighted: (1) the Diversification Component of the FAO Special Program for Food Security (SPFS); (2) the Livestock-

Environment and Development Initiative (LEAD); (3) the Pro-Poor Livestock Policy Facility (PPLPF); and the FAO/OIE sponsored Global Framework for the Progressive Control of FMD and Other Transboundary Animal Diseases (GF-TADs).

Challenges Facing Production of Livestock and Livestock Products

7. The importance of the livestock sector in world agriculture is growing dynamically. Livestock production is growing faster than other agricultural sub-sectors, and it is predicted that by 2020 livestock will produce more than half of the global agricultural output in value terms. This process has been termed '*Livestock Revolution*' (Delgado *et al.*, 1999). Important global livestock sector trends are (1) a rapid increase in the consumption of livestock products in developing countries; (2) a relative geographic shift of livestock production from temperate and dry areas to warmer, more humid and disease-prone environments; (3) a change in livestock production practices from a local multi-purpose activity to an increasingly market-oriented and vertically integrated business; (4) increasing pressure on, and competition for, common property grazing and water resources; (5) more large-scale, industrial production units located close to urban centres, potentially causing severe environmental damage and posing both substantial and growing animal and veterinary public health risks; and (6) a rapid and large rise in the use of cereal-based feed. Such developments mostly occur in a policy and institutional void; since their implications on national and international public goods, such as sustainability of the natural resource base, (veterinary) public health, and social equality are potentially very substantial, there are correspondingly important risks to be dealt with, but also opportunities to be exploited.

8. Livestock production is the world's largest land user both directly (pastures) and indirectly through the use of arable land for fodder crops and other feeding stuffs (FAO, 1996), and it is expected to further increase this role. Developments in the livestock sector are driven by shifts in diets towards livestock products (Delgado *et al.*, 1999), which in turn increasingly influence crop production decisions and patterns (e.g. grain use for animal feeding). In developing countries the *per caput* consumption of animal products is still less than a third of that in industrial countries, thus indicating substantial potential expansion of the livestock sector in the former.

9. Since 1960, global meat production has more than trebled; milk production has nearly doubled; and egg production is nearly four times. Delgado *et al.* (1999) suggest that global meat production and consumption will continue to rise, from 233 million tonnes (2000) to 300 million tonnes (2020), and milk from 568 to 700 million tonnes over the same period. Egg production will also increase by a further 30%. Annual meat consumption per person in developing countries as a whole more than doubled between 1964/1966 and 1995/1997, from 10.2 kg per year to 23.1 kg, a rise of 2.7 percent per year, and it is projected to increase to 37 kg per person in 2030 (FAO, 2003). Average

consumption of milk and dairy products also rose by 50 percent in developing countries, and will increase from 45 kg in 1997/1999 to 66 kg per person in 2030. The rise was particularly rapid for poultry where consumption per person grew fivefold. Pig meat consumption also rose strongly, with most of this rise concentrated in China. There is therefore a significant structural shift on-going in the sector. As human population continues to grow, urbanisation to increase and incomes to rise, it is predicted that the aggregate demand for, and the production of livestock and livestock products in the developing countries will double over the next 20 years (Delgado *et al.*, 1999).

10. The big increase in animal protein demand over the last few decades has been largely met by the worldwide growth in intensive livestock production, particularly poultry. This is expected to continue as real income grows in the emerging economies. The production of poultry meat has increased from 9m tons in 1960, to 15 in 1970, 26 in 1980, 41 in 1990, and 68m tons in 2000, thereby overtaking the production of beef (60m tons in 2000).

11. There has been a continued increase in livestock production in developing countries, with annual growth rates for bovine meat, ovine meat, pig meat, poultry meat, milk and eggs ranging from 3.7 to 9.4 percent for the period 1989-1999 (Table 1). By contrast, over the same period, production in developed countries declined with the exception of poultry meat (Figure 1). This decline is reflecting primarily the collapse of livestock production in transition countries.

Table 1. Livestock production by commodity: past and projected (FAO, 2003)

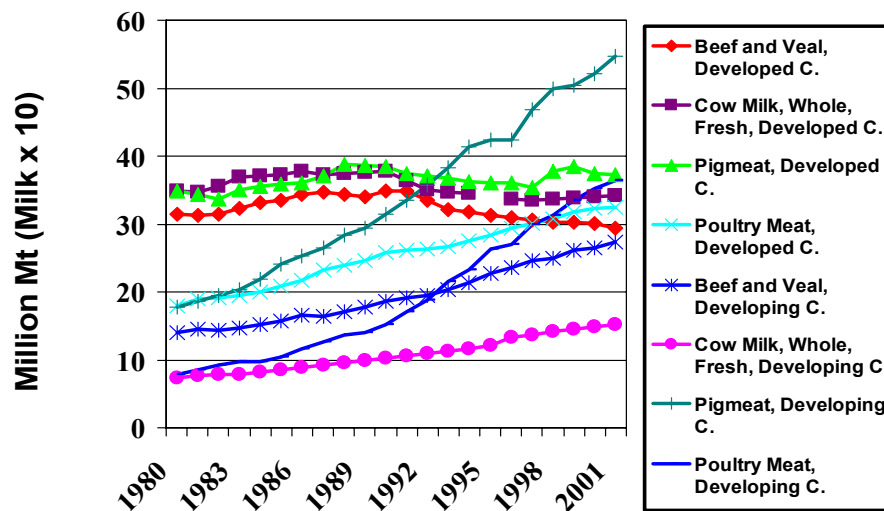
	1967/1969	1987/1989	1997/1999	2015	2030	1969-1999	1989-1999	1995/1997-2015	2015-2030
	million tons					percent p.a.			
Total meat									
World	92	166	218	300	376	2.9	2.7	1.9	1.5
excl. China	84	142	162	218	277	2.1	1.3	1.8	1.6
Developing countries	28	66	116	181	247	5.2	5.9	2.7	2.1
excl. China	21	41	60	98	147	3.8	3.9	3.0	2.7
excl. China and Brazil	18	34	47	79	123	3.5	3.3	3.1	2.9
sub-Saharan Africa	3	4	5	9	16	2.3	2.2	3.3	3.5
Latin America	10	19	28	43	58	3.5	4.5	2.6	2.1
excl. Brazil	7	11	15	24	33	2.5	3.1	2.7	2.3
Near East / North Africa	2	5	7	13	19	4.4	3.8	3.5	2.9
South Asia	3	5	7	13	23	3.7	2.8	3.6	3.9
East Asia	10	33	69	103	131	7.1	7.6	2.4	1.6
excl. China	3	8	13	21	32	5.1	4.1	3.0	2.8
Industrial countries	46	71	85	99	107	1.9	1.8	0.9	0.5
Transition countries	17	29	17	20	22	0.0	-6.4	0.8	0.8
Bovine meat									
World	38.0	53.7	58.7	74.0	88.4	1.4	0.8	1.4	1.2
Developing countries	11.8	19.3	28.0	41.2	55.0	3.0	3.8	2.3	2.0
excl. China	11.7	18.4	23.2	33.5	44.1	2.5	2.2	2.2	1.8
excl. China and Brazil	10.0	14.4	17.3	25.2	34.1	2.0	1.5	2.3	2.0
sub-Saharan Africa	1.6	2.2	2.6	4.3	6.7	1.5	1.7	3.0	3.0
Latin America	6.8	10.4	13.1	18.2	22.5	2.5	2.1	1.9	1.4
excl. Brazil	5.1	6.5	7.2	9.9	12.5	1.4	0.4	1.9	1.6
Near East / North Africa	0.7	1.3	1.8	2.8	4.1	3.2	3.4	2.4	2.6
South Asia	1.7	3.1	4.0	5.7	7.4	3.1	2.3	2.1	1.7
East Asia	1.0	2.3	6.4	10.1	14.4	6.4	11.5	2.7	2.4
excl. China	0.8	1.4	1.6	2.5	3.5	2.1	2.3	2.6	2.2
Industrial countries	19.1	23.8	25.0	26.6	26.5	0.6	0.6	0.4	0.0
Transition countries	7.0	10.6	5.7	6.3	6.9	-0.3	-7.5	0.5	0.6
Ovine meat									
World	6.6	9.1	10.8	15.3	20.1	1.9	1.4	2.1	1.8
Developing countries	3.0	5.0	7.4	11.2	15.4	3.4	3.7	2.5	2.1
sub-Saharan Africa	0.6	0.9	1.3	2.2	3.4	2.8	3.5	3.1	3.0
Near East / North Africa	0.9	1.5	1.8	2.6	3.5	2.3	1.9	2.2	2.0
South Asia	0.6	1.1	1.3	2.1	3.1	3.5	1.4	2.6	2.6
East Asia	0.4	1.1	2.5	3.8	4.8	7.0	8.1	2.6	1.5
Industrial countries	2.4	2.8	2.7	3.1	3.5	0.6	-0.8	0.9	0.8
Transition countries	1.3	1.3	0.8	0.9	1.1	-1.0	-6.4	1.3	1.1
Pig meat									
World	34.1	66.3	86.5	110.2	124.5	3.2	2.7	1.4	0.8
excl. China	28.1	46.2	48.1	57.9	66.2	1.7	0.4	1.1	0.9
Developing countries	9.7	28.0	49.3	69.5	82.8	6.1	5.7	2.0	1.2
excl. China	3.8	7.9	10.9	17.2	24.5	3.7	3.4	2.7	2.4
Latin America	1.8	3.0	3.9	6.0	7.8	2.1	3.9	2.5	1.8
excl. Brazil	1.1	1.9	2.3	3.4	4.4	1.7	2.8	2.3	1.8
East Asia	7.6	24.2	44.3	61.6	71.9	6.8	6.0	2.0	1.0
excl. China	1.6	4.0	5.9	9.3	13.6	5.1	3.3	2.8	2.5
Industrial countries	16.6	26.0	29.3	32.3	33.1	1.8	1.4	0.6	0.2
Transition countries	7.7	12.3	7.9	8.4	8.6	-0.1	-5.3	0.4	0.1

Table 1. Livestock production by commodity: past and projected (FAO, 2003) (cont.)

	1967/1969	1987/1989	1997/1999	2015	2030	1969-1999	1989-1999	1995/1997-2015	2015-2030
	million tons					percent p.a.			
Poultry meat									
World	12.9	37.2	61.8	100.6	143.3	5.2	5.4	2.9	2.4
excl. China	12.1	34.6	51.2	81.4	117.5	4.8	4.1	2.8	2.5
Developing countries	3.3	13.2	31.3	59.1	93.5	7.9	9.4	3.8	3.1
excl. China	2.5	10.6	20.7	39.9	67.7	7.4	7.2	4.0	3.6
excl. China and Brazil	2.2	8.6	15.6	31.9	56.4	6.9	6.4	4.3	3.9
sub-Saharan Africa	0.3	0.7	0.9	1.9	4.1	3.8	2.6	4.3	5.1
Latin America	1.0	4.7	10.5	18.2	27.3	7.8	9.0	3.3	2.7
excl. Brazil	0.7	2.7	5.4	10.2	16.0	6.7	8.4	3.8	3.0
Near East / North Africa	0.4	2.1	3.2	7.1	11.6	7.7	5.2	4.7	3.3
South Asia	0.2	0.5	1.1	3.9	10.6	7.7	7.2	7.9	6.9
East Asia	1.5	5.3	15.5	27.9	39.9	8.5	11.7	3.5	2.4
excl. China	0.7	2.6	4.9	8.7	14.1	7.3	6.1	3.4	3.2
Industrial countries	8.1	18.8	27.7	37.5	44.1	4.0	3.9	1.8	1.1
Transition countries	1.5	5.2	2.9	4.1	5.7	1.6	-6.7	2.0	2.3
Milk (whole milk eq.)									
World	387	528	562	715	874	1.3	0.6	1.4	1.3
Developing countries	78	149	219	346	484	3.6	4.1	2.7	2.3
excl. China and Brazil	69	128	189	301	425	3.5	4.1	2.8	2.3
sub-Saharan Africa	8	13	16	26	39	2.7	1.9	3.0	2.8
Latin America	24	40	57	81	105	2.6	3.9	2.1	1.8
excl. Brazil	17	26	36	52	69	2.2	4.0	2.1	1.9
Near East / North Africa	14	21	28	41	56	2.3	3.1	2.2	2.1
South Asia	30	65	104	174	250	4.5	4.9	3.1	2.4
East Asia	3	10	15	25	34	6.9	4.5	2.9	2.2
excl. China	1	4	5	8	12	7.3	3.2	3.0	2.4
Industrial countries	199	236	246	269	286	0.7	0.5	0.5	0.4
Transition countries	110	144	97	100	104	-0.3	-4.6	0.2	0.2
Eggs									
World	18.7	35.6	51.7	70.4	89.9	3.4	4.2	1.8	1.6
Developing countries	4.9	16.2	33.7	50.7	69.0	7.0	8.0	2.4	2.1
excl. China	3.2	9.5	13.5	24.6	37.8	5.0	3.4	3.6	2.9
sub-Saharan Africa	0.3	0.7	0.9	1.8	3.4	3.7	2.6	4.0	4.1
Latin America	1.2	3.6	4.6	7.3	10.4	4.5	2.5	2.8	2.3
Near East / North Africa	0.4	1.5	2.2	3.6	5.3	6.0	4.1	3.0	2.6
South Asia	0.3	1.4	2.2	5.7	9.9	6.3	4.7	5.8	3.7
East Asia	2.6	9.1	23.8	32.1	40.0	8.3	10.7	1.8	1.5
excl. China	0.9	2.4	3.6	6.0	8.8	5.0	3.5	3.0	2.6
Industrial countries	10.7	12.8	13.7	14.8	15.5	0.6	0.9	0.5	0.3
Transition countries	3.1	6.5	4.3	5.0	5.5	0.7	-4.7	0.8	0.7

Figure 1

Livestock production in developed and developing countries, 1980 - 2001



12. Production is shifting to developing countries; by 1997/1999 their share in world meat production was 53 percent and in milk production 39 percent as compared with 40 and 28 percent only ten years earlier. This was in part due to the collapse of production in the transition countries, but it is a trend even in the absence of this phenomenon. Annual growth of meat and milk production in developing countries is projected at 2.4 and 2.7 percent respectively. This would raise developing countries' share in world meat production by 2030 to 66 percent (247m tons), and in milk production to 55 percent (484m tons).

13. From 1989 to 1999, the growth in white meat (pork and poultry) production in developing countries has been remarkable at more than double the growth of ruminant meat. There are, however, major regional differences. Growth in poultry meat production has been particularly spectacular in East Asia (11.7 percent p.a.) and South Asia (7.2 percent p.a.) and reflects the rapid intensification of the poultry industry in the region. Latin America saw annual growth rates of 9 percent. In sub-Saharan Africa the annual growth rate was 2.6 percent, which, while substantial, was considerably less than in Asia and Latin America. Red meat (ruminant meat) accounted for almost 37 percent of total

meat production in the developing countries in the late 1980s, but declined to 31 percent in 1997/1999 and is expected to decline further.

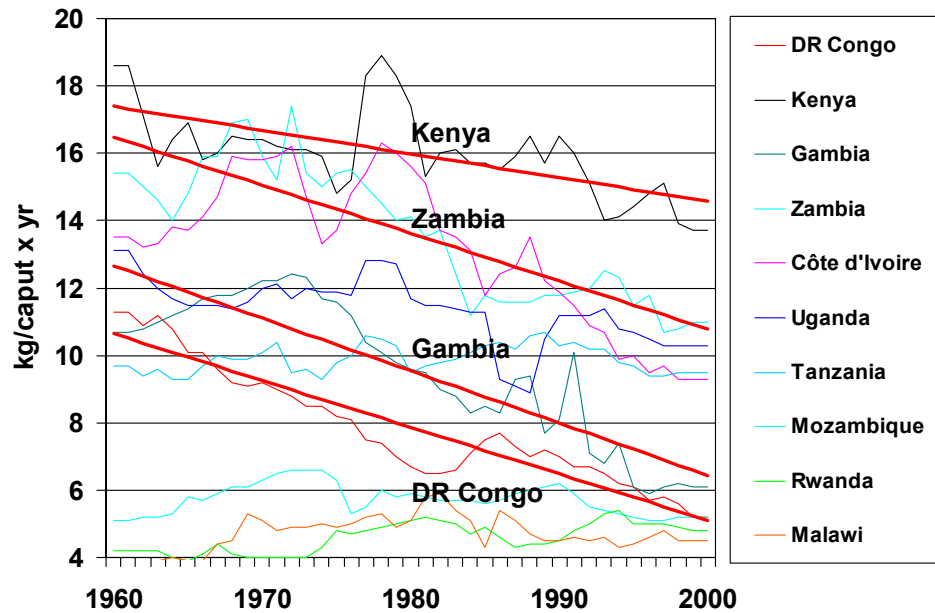
14. Likewise, egg production increased in the developing countries during the decade 1989-1999 with similar regional differences. Annual growth rates for East Asia, South Asia and sub-Saharan Africa were 10.7, 4.7 and 2.6 percent, respectively. Latin America saw a growth rate of 2.5 percent per year, while in the industrialized countries production stagnated and in the countries in transition production fell by 4.7 percent per annum. Buffalo and cow milk production in developing countries grew at 4.1 percent p.a. over the same period, with the highest annual growth found in South Asia (4.9 percent) and the lowest in sub-Saharan Africa (1.9 percent). Milk production in industrialized and transition countries followed the same trend as egg production.

15. While there is a great rise in global livestock production, the pattern of consumption is very uneven (Speedy, 2002). Consumption of meat in the USA is 124 kg *per caput* per year, compared to a global average of 38 kg. The countries which consume the least amount of meat are in Africa and South Asia; the lowest ten are Sierra Leone, Democratic Republic of Congo, Mozambique, Sri Lanka, Rwanda, India, Malawi, Guinea, Burundi, and Bangladesh. Consumption in these countries is between 3-5 kg *per caput* per year. This is compensated to some extent in Bangladesh by higher fish consumption (17.5 kg) and in India and Sri Lanka by higher milk consumption (47.5 kg and 35.9 kg respectively).

16. Many African countries are in the bottom quartile for consumption of meat and fish together, including Benin, Morocco, Cameroon, Somalia, Zambia, Sudan, Sierra Leone, Algeria, Kenya, Angola, Côte d'Ivoire, Djibouti, Guinea, Guinea-Bissau, Liberia, Zimbabwe, Lesotho, Nigeria, Malawi, Democratic Republic of Congo, Burkina Faso, Niger, Ethiopia, Burundi, Eritrea, Mozambique and Rwanda. In many African countries, meat consumption per person is in fact declining, a matter of concern for nutritional status and food security (Figure 2). Also in this lower category are the Central American and Caribbean countries of Guatemala, Honduras, El Salvador, Haiti and Nicaragua, the Balkan-Caucasian-Central Asian countries of Armenia, Bosnia and Herzegovina, Moldova, Azerbaijan, Afghanistan and Tajikistan, as well as the Middle East countries of Syria, Yemen and Iraq and, in South Asia, Pakistan, Nepal, India and Bangladesh.

Figure 2

Meat consumption in Africa

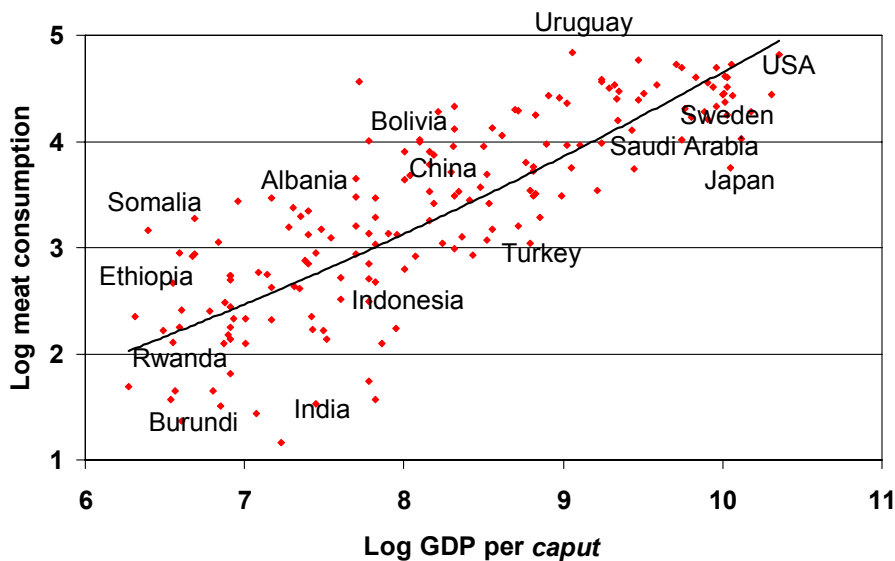


Source: FAOSTAT, 2002

17. The main determinant of *per caput* meat consumption appears to be wealth (Figure 3). The poor African countries are at the bottom and the rich developed countries at the top. There are particular regional and cultural differences reflected in the position of each country on the graph. Traditional herding countries are above the line (Somalia, Ethiopia). Rwanda, Burundi and Mozambique have very low meat consumption following the conflicts in these countries. India is well below the line; China is above the line. Latin American countries have high meat consumption in relation to GDP. Middle East countries are about average and Japan is well below the line but fish consumption is high. Scandinavian countries tend to have lower meat consumption than, e.g. France, Germany and the USA. While the relationship between GDP and food consumption, including meat, is well known, consideration should also be given to the inverse relationship: there is a strong relationship between economic growth and nutritional factors. The impact of nutrition on economic growth appears to be both direct, through the nutrition effect on labor productivity, as well as indirect, through improvements in life expectancy.

Figure 3

**Per caput meat consumption increases
with income**



Source: Delgado et al., 1999

18. In areas affected heavily by HIV/AIDS, animal production and health constraints and opportunities are substantially different from areas which are ecologically similar but not affected by the epidemic. Large stock is far more difficult to sustain and use for production, draught, transport etc. purposes where the active adult population is weakened and decimated by the epidemic. Small stock are more amenable for the surviving children and elderly persons to handle. As conventional local knowledge of livestock production, health and use is seriously reduced with the decimation of the active generation, inter-generational transfer of such knowledge and skills is interrupted, leading to a serious increase in the vulnerability and food insecurity of the rural communities. This is all the more relevant as livestock has traditionally been the mainstay of livelihood maintenance strategies in most areas currently affected, particularly in Africa.

19. Increasing livestock densities in humid and warm ecologies contribute to higher frequency and exposure to animal disease agents, both endemic and epidemic, and including those of zoonotic nature. New diseases are likely to emerge and known diseases are likely to evolve biologically and epidemiologically in new and potentially dangerous ways. Frequency and dynamics of disease outbreaks and their geographic spread are increasing in an alarming way. Countries and regions which have long been free of epidemic disease outbreaks run increasingly higher risk of disease exposure (e.g. FMD,

CSF, Avian influenza, bluetongue in Europe) along with much enhanced international mobility of people and goods in the wake of widespread market liberalisation. Similarly, zoonotic diseases pose substantial, often new and increasing risks. BSE is a case in point, but also well-known parasitic zoonoses expand their areas of impact along with changes in livestock production systems.

20. Intensification and industrialisation of livestock production bear the risk of soil, water and air pollution where environmental legislation is either not available or not rigorously enforced. Growing scales of production, often accelerated by the opportunity of unconstrained externalisation of societal and environmental costs of large scale, capital intensive operations, contribute to the marginalisation of small-scale rural livestock producers despite overall expanding markets. Intensification and industrialisation of livestock production generally also imply the utilisation of genetically more uniform stock which may contribute to the displacement of locally available animal genetic diversity and thus to the acceleration of genetic erosion. Animal welfare associated concerns with these same trends are gaining importance, notably as potential non-tariff related trade barriers.

21. Rapid structural sector changes invariably generate and widen gaps with respect to information and knowledge, technology, policy and institutions, and this both with respect to the requirements for the adjustment of the conventional part and to the configuration of the emerging part of the sector in question. The significant changes in the global consumption and demand for animal products, along with increasing pressures on resources are having some important implications for the principal production systems (Steinfeld, 2002):

22. Grazing systems. A quarter of the world's land is used for grazing, and extensive pasture provides 30 percent of total beef production and 23 percent of mutton (FAO, 1996). In developing countries, extensive grazing systems have typically increased production by herd expansion rather than by productivity enhancing measures, often leading to pasture degradation. As the availability of rangelands is decreasing, through arable land encroachment, land degradation is often exacerbated in these production systems. In some areas, wildlife-livestock competition add to the pressure on grazing land. Where rangeland is still being created through rainforest conversion, substantial environmental costs are often associated with this process.

23. Crop-livestock production systems. In developing countries, the bulk of ruminant livestock are found in mixed farming systems, which are estimated to provide over 65 percent of beef production, 69 percent of the mutton and 92 percent of the cow milk (FAO, 1996). The complementarity between crop and livestock production is well known. Crops and crop residues provide feed, while livestock provide animal traction, manure, food, a form of savings or collateral, income diversification and risk reduction.

Although short-cycle species, such as chickens and pigs, are often very important for household food security and immediate cash needs, only ruminants can convert highly fibrous material and forages into valuable products with little or no alternative use. An estimated 250 million work animals provide draft power for cultivation of about half the total cropland in developing countries.

24. Intensive industrialised livestock production systems. The trend towards intensification is most pronounced in Asia where there is a shortage of land but an abundance of relatively cheap labour. This has encouraged small-scale intensive systems such as “cut and carry” and stall feeding, which have high labour but low land requirements. Increasing access to capital allows for investment in machinery, housing, and inputs such as improved breeds, concentrate feeds, and veterinary drugs. The consequence has been a reduction in the value of livestock’s alternative uses, as the value of its food products becomes relatively more important. This has resulted in improved productivity and has accounted for the shift from ruminant production to monogastric animals such as pigs and chickens.

25. In sub-Saharan Africa, semi-intensive and intensive dairying has developed close to urban centres, and where agro-ecological conditions permit, on the basis of cultivated fodder and agro-industrial by-products. In Latin America, intensive poultry production and, to some extent, dairying has developed partly in response to the high level of urbanisation and a resumption of economic growth in the 1990s.

26. Large scale and vertically integrated intensive industrialised poultry and pig production systems, which have increased significantly in the developing world, particularly in East Asia and Latin America, make use of improved genetic material and sophisticated feeding systems, and require highly skilled technical and business management. They are also dependent on inputs of high energy and protein rich feeds, animal health prophylactics, and consume considerable amounts of fossil fuel, both directly and indirectly. The wholesale transfer of these types of production systems has been facilitated by the relative ease and speed with which the required infrastructure and equipment can be transferred and operationalized in so called ‘turn-key’ operations. In recent years, industrial livestock production grew at twice the annual rate of the more traditional, mixed farming systems (4.3 against 2.2 percent), and at more than six times the annual growth rate of production based on grazing (0.7 percent; FAO, 1996). The major expansion in industrial systems has been in the production of pigs and poultry since they have short reproductive cycles and are more efficient than ruminants in converting feed concentrates (cereals) into meat. Industrial enterprises account for 74 and 40 percent of the world’s total poultry and pig meat production, respectively, and for 68 percent of egg production (FAO, 1996).

27. Production at smallholder level is constrained by a number of barriers, lack of competitiveness and risk factors. The combined effect of these constraints is that much of the growth and poverty reduction potential that is offered by the “*Livestock Revolution*” can not be capitalized upon. Barriers may exist in different forms:

28. Financial and asset barriers prevent small farmers from intensifying their production because the investment required often exceeds their capital wealth. The absence of innovative forms of targeted small to medium-scale credit is restricting the poor’s involvement in the commercialization of livestock production and product processing. Access to land is also an increasing problem. In many parts of Asia and Africa smallholder livestock producers need access to common property resources; these are, however, becoming more limited as demands on land grow.

29. Technical barriers constrain small producers from efficiently supplying a safe and relatively uniform product to the market. The lack of appropriate infrastructure for the preservation of perishable products affects the negotiation power of small production units, particularly if these are distant from the consumption centres. In addition, technical barriers exist in the form of sanitary requirements (including animal welfare) as a prerequisite to trade. A perceived or real low animal health status may exclude countries or groups within countries from international, regional and local markets. Small producers are also currently excluded from the market because of a lack of technologies, goods and services that allow for the implementation of innovative product standards and safety norms. Animal disease constraints also act as technical barriers in that, for example, trypanosomiasis precludes large areas in humid and sub-humid Africa from ruminant production. With tsetse and trypanosomiasis control, expansion of production can result from increased use of land and expanded herd sizes (McLeod and Leslie, 2000, p 16).

30. Social and cultural barriers restrict access to assets, goods and services, including the market, due to ethnic grouping, class, gender, language, education or lack of property rights. A lack of appropriate mechanisms and information campaigns has thus far prevented the equitable participation and empowerment of the most vulnerable groupings in the development process.

31. Lack of competitiveness resulting from a combination of higher production and transaction costs often disadvantage the small producers who do not benefit from the economies of scale associated with large-scale units.

32. Production costs are usually higher in small-scale production enterprises, outweighing any cost advantages from the discounted value of family labour. Furthermore, there is a lack of objective data to inform policies and institutions about the impact of hidden and overt subsidies that may facilitate the supply of cheap animal

products to the cities but at the same time penalize small-scale products, compromise public health or damage the environment. In addition, the public sector has thus far not acted to adapt or disseminate new technologies for small-scale use. The absence of policies and institutions that enable small production units to benefit from the cost advantages of large-scale production skews the playing field further. Furthermore, diseases can substantially add to increased production costs. Various types of diseases have different effects on production systems and their capacity to step up production as described by McLeod and Leslie (2000). The so-called List A diseases (e.g. African horse sickness, African and classical swine fevers, bluetongue, Newcastle disease, Peste des Petits Ruminants, sheep and goat pox, rinderpest and Rift valley fever) all result in high mortality rates, between 50% and 90% in susceptible animals affected. Foot and mouth disease in cattle may not cause high mortalities but often entails important losses of milk and draught power, and in fertility. From a production viewpoint, helminthosis and tick-borne diseases are particularly important. Helminths (worms) while rarely fatal can seriously affect productivity and profitability. Although helminths can be effectively controlled, parasite resistance to drugs through the inappropriate use of antihelmintics is a growing constraint. Ticks have the capacity to transmit diseases, notably East Coast Fever in Eastern and Southern African countries, but the cost of traditional dipping with acaricides for tick control is becoming prohibitive. As production systems intensify, diseases affecting reproductive performance such as brucellosis or nutritional imbalances assume greater importance.

33. Transaction costs can be prohibitively high for small-scale producers because of the small quantities of marketable product produced and the absence of adequate physical and market infrastructures in remote areas. Transaction costs are also increased where producers lack negotiating power or access to market information and remain dependent on middlemen. Moreover, the lack of facilitation in the formation of producers associations or other partnership arrangements makes it difficult for smallholder producers to reduce transaction costs through economies of scale. The desire to reduce transaction costs is a main force promoting vertical integration that can be observed also in developing countries, particularly in poultry and pork production, but also dairy. These economic forces are sometimes further strengthened if governments tax market transactions for, e.g. feed, as described by Delgado and Narrod (2002) for the case of poultry producers in Andhra Pradesh (India). The combined effect of economic gains out of lowering transaction costs from vertical integration, and favourable tax regimes tend to severely disadvantage independent and small-scale producers.

34. Reducing risk and mitigating its effect on poor livestock-dependent people are prerequisites for a sustainable reduction in poverty. Small-scale production is associated with a mixture of both market and production risks.

35. Market risks include price fluctuations for both inputs and products and are often associated with a weak negotiating position. Many small-scale producers evolved from subsistence farming with sound risk coping mechanisms but lack the assets or strategies to sustain full exposure to market risks. The absence of safety nets in the face of economic shocks, invariably present in such markets, will restrict the full participation of the poor.

36. Production risks relate to resource degradation and asset control, to climatic variations such as drought and floods, and to infectious diseases. Although both small-scale and intensive livestock production systems are at risk from the predations of epidemic diseases and droughts, the poor are particularly vulnerable to these types of shocks due to their limited assets and the lack of insurance schemes. Public and private services in disaster-prone poor countries almost invariably lack the capacity to plan for such risks, or to respond in a timely manner.

37. Development interventions in the livestock sector have, generally, not been very successful. Undoubtedly, inappropriate technologies and the failure to deliver services to poor farmers have contributed greatly to the lack of success of many livestock development projects. However, even in cases where the technologies were appropriately targeted and the focus was distinctly pro-poor, technical projects have in many cases failed to deliver any significant sustainable improvements in the livelihoods of the poor. Analyses of these issues clearly indicate that an enabling institutional and political environment is indispensable in adopting a pro-poor focus, enhancing the sustainability of pro-poor interventions, and ensuring that agricultural intensification strategies have impact at the desired social levels (LID, 1999; IFAD, 2001).

Opportunities for Safe, Clean and Equitable Production of Livestock and Livestock Products

38. The substantial and rapid structural changes in the livestock sector require that governments and industry prepare for this continuing transformation with policies and investments that will satisfy consumer demands, improve nutrition, direct income growth opportunities to the poor, and alleviate environmental and public health stress. There are four broad pillars on which to base the desirable livestock strategy for developing countries: (1) removing policy distortions that promote artificial economies of scale in livestock production; (2) building participatory institutions of collective action for small-scale farmers that allow them to integrate and successfully negotiate with livestock processors and input suppliers; (3) creating the environment (organisational, institutional, legal, regulatory, technical) in which farmers will be able to increase investment to improve productivity in the livestock sector; and (4) promoting effective regulatory institutions to deal with the threat of environmental and health crises stemming from livestock.

39. To effectively address the constraints that currently prevent the poor from taking advantage of the available livestock sector development potential, identification and targeting of the priority policy changes and institutional reforms required under different sector dynamics will be essential: where economic growth is driving a fast expanding demand for animal products with a correspondingly dynamic production response, opportunities for smallholders to take part and evolve in this increasingly competitive market, are more promising than where no such growth takes place. In the latter circumstances, emphasis would be on livestock livelihood-enhancing measures geared to their reduced vulnerability.

40. Despite the trends illustrated in the previous Section, the majority of food, both from plants and animals, currently consumed in developing countries is still produced by semi-subsistence farmers. The projected growth of the demand for animal products therefore offers a unique opportunity for the rural poor, since they already have a significant stake in livestock production. In addition, it presents one of the few rapidly growing markets that poor people can join without a need for substantial resources or training. Livestock ownership currently supports and sustains the livelihoods of an estimated 675 million rural poor (LID, 1999). These people fully or partially depend on livestock for income and/or subsistence. Livestock can provide a steady stream of food and revenues, help to raise whole farm productivity and are often the only livelihood option available to the landless as they allow the exploitation of common-property resources for private gain. In addition, at the smallholder level, livestock are often the only means of asset accumulation and risk diversification that can prevent a slide into abject poverty by rural poor in marginal areas. Recent statistics reveal that 70% of the poor are women for whom livestock play an important role in the improvement of status and represent one of the most important assets and sources of income (DFID, 2000). Livestock ownership also tends to increase the consumption of animal protein and creates employment opportunities beyond the immediate household.

41. The World Food Summit in 1996 with the Rome Declaration on World Food Security and the World Food Summit Plan of Action has committed the international community to the fight against hunger in the world, and has called for decisive concerted action against poverty as the major cause of hunger. Poverty eradication along with the achievement of food security was taken up by the FAO Conference in November 1999 as the first corporate strategy statement in the Organization's Strategic Framework for the years 2000 to 2015 (FAO, 1999).

42. There is a strong relationship between livestock and the rural poor. The statistics indicate that substantially more than half of all the world's rural poor, and 70% of them women, predominantly rely on livestock for their livelihoods. The number of poor extensive grazier farmers is estimated at 135 million, the one of poor rain-fed mixed farmers at 385 million and the one of landless livestock keepers at 155 million. There is

also much evidence available which suggests that poorer segments of the rural population tend to rely more heavily on livestock for the generation of household income than richer segments within the same population.

43. FAO's Strategic Framework 2000-2015 states the following five corporate strategies, to be pursued in efficient and effective partnership and alliance with its members and relevant institutions:

- Eradication of food insecurity and rural poverty (stating the **equity** mandate)
- Policy and regulatory frameworks (stating the **policy** brief)
- Sustainable increases in the supply and availability of food (stating the **productivity** enhancement requirements)
- Conservation, improvement and sustainable use of natural resources (stating the need to maintain **sustainability of the natural resource base**)
- Improving decision-making through provision of information and assessments and fostering of knowledge management (stating the **information and knowledge** task).

44. FAO's Animal Production and Health Division serves these corporate strategies in a balanced manner, thereby strengthening those international public goods which are most affected by livestock, i.e. social equality, sustainability of the natural resources base and (veterinary) public health. Four selected examples of the Divisional efforts in delivering on its program in partnership with others and in support of strengthening the contribution of the livestock sector to the International Development Goals are outlined below.

Livestock and Food Security [Livestock in the Diversification Component of the Special Program for Food Security (SPFS)]

45. The main objective of the SPFS is to help countries, primarily LIFDCs, to improve food security both at national and at household levels - through rapid increases in food production and productivity, by reducing year-to-year variability in production—on an economically and environmentally sustainable basis and by improving people's access to food. The underlying assumption is that in most LIFDCs viable and sustainable means of increasing food availability exist but are not realized because of a range of constraints that prevent farmers from responding to needs and opportunities. By working with farmers and other stakeholders to identify and resolve such constraints—whether they are of a technical, economic, social, institutional or policy nature—and to demonstrate ways of increasing production, the SPFS should open the way for improved productivity and broader access to food. A prominent feature of the SPFS is substantial South-South technical collaboration. The SPFS involves four complementary

components: water control, intensification of crop production systems, diversification of production systems, constraints analysis and resolution. The livestock element is introduced in the diversification component and emphasises the use of short-cycled animals, such as poultry, small ruminants and pigs as they are more amenable to contributing to the target poor rural communities than large stock. The component activities encompass the entire range of technologies and processes from production and health to produce marketing. Of particular relevance is the livestock element in the Diversification Component of the SPFS in areas affected by HIV/AIDS where small animals often play a strategically important role in sustaining food security and providing income opportunities in households deprived of their active adult members. Currently 74 countries are involved in the program with a total turn-over of 494 m\$ since its inception in 1994.

Livestock and the Environment

46. The Livestock, Environment and Development (LEAD) Initiative is an inter-institutional project with the secretariat in FAO. The work of the Initiative targets at the protection and enhancement of natural resources as affected by livestock production while alleviating poverty. Earlier work of LEAD has identified, at a global scale, the consequences of increased pressure on grazing and mixed farming systems and the dangers of the shift to industrial modes of production. It has highlighted the close and complex interaction between government policies and the environmental impact of livestock production, and identified a large number of technologies which are available to mitigate the negative effects in all different production modes, provided the appropriate policy framework is in place. The project has as objectives

- to improve communication and enhance the relevance of research and development issues regarding livestock-environment interactions, i.a. on the social consequences of the ongoing transformation of the livestock sector and associated resource degradation.
- to conduct a series of pilot research and development projects in key areas of livestock-environment interactions, most notably in livestock-wildlife integration, livestock-associated deforestation and the establishment of area-wide integration of specialized crop and livestock activities.
- to develop specific tools to facilitate decision-making on livestock-environment issues, designed to adapt general principles of improved management of livestock environment interactions to the special regional needs and conditions.
- to facilitate the policy dialogue at country level and to provide assistance in policy formulation and incorporating novel concepts at various decision-making levels for the “mainstreaming” of livestock-environment issues within the context of overall economic and social development.

47. The LEAD Initiative has implemented the project "[Decision Support on Livestock and Environment Issues](#)" to provide decision-support on maximising positive and minimising negative interactions of livestock and environment. The project's main goals are to increase awareness, knowledge and understanding of livestock and environment interactions; to identify appropriate options for livestock and environment management at regional and national level and to convey livestock and environment concepts into government and donor policies and projects.

Livestock and Poverty Alleviation

48. More than half of all the world's rural poor predominantly rely on livestock for their livelihood. Whether livestock is their poverty trap or whether livestock can be an instrument for them to get out of poverty is not only dependant on whether there is overall scope for economic growth but also on whether the policy and institutional environment enables the participation of the poor in the benefits of such growth. The Pro-Poor Livestock Policy Facility (PPLPF), hosted by FAO, addresses these questions and endeavours to contribute to poverty reduction through the formulation of international and national livestock policies that will ensure equitable, safe and clean livestock farming. Unfortunately, in many countries the livestock sector is heavily distorted in favour of large-scale producers. The opportunities for broad-based poverty reduction through livestock can only be fully exploited within a policy environment which reduces existing financial, technical and cultural barriers faced by small-scale livestock keepers, and which at the same time reduces their risks and vulnerability.

49. The Facility will therefore, through strategic alliances that capitalize on the comparative advantage of the FAO and different partner organizations, encourage and facilitate conceptual shifts in policy objectives that:

- Create and strengthen the capacity of the poor to act for themselves.
- Engage the poor as partners sharing rights and responsibilities.
- Create incentives for the poor to mobilize resources.
- Help catalyze the formation of people's organization.
- Protect the assets of the poor to reduce their vulnerability.

50. Five regional platforms of the Facility are envisaged for S-E Asia, S-Asia, E-Africa, W-Africa, and the Andes as fora for facilitating the knowledge exchange and for networking key stakeholders with the objective of forming and nurturing the coalitions of change and expanding the range and effectiveness of pro-poor livestock policy interventions at subnational, national regional and international levels.

Livestock Diseases Limiting Sector Productivity and its Contribution to International Development Goals—Global Framework for the Progressive Control of FMD and Other TADs (GF-TADs)

51. Devastating economic losses to livestock farmers all over the world due to major outbreaks of transboundary animal diseases (TADs) such as FMD (1997-2001), classical swine fever in the Caribbean and Europe (1996-2002), rinderpest in the Somali plains (2001) and Rift Valley fever in the Arabian Peninsula (2000) have been the main stimulus for the initiative of FAO and OIE to propose the creation of a Global Framework for the progressive control of FMD and other TADs (GF-TADs).

52. Several international processes and institutions have emphasized the need of controlling TADs due to their devastating impact on livestock agriculture, trade and food security. The World Food Summit (WFS), November 1996, recognised the pivotal, constraining role of TADs and as result the Heads of State and Governments pledged to *'seek to ensure effective prevention and progressive control of plant and animal pests and diseases, including especially those which are of transboundary nature, such as rinderpest, cattle tick, foot and mouth disease and desert locust,.....'*. The OIE International Committee (2002), called on the OIE and the FAO to pursue an international concerted action against a number of diseases having significant effects on food security, poverty alleviation, food safety, public health and access to formal markets. The 31st Session of the FAO Conference (2001) recognized the widespread and increasing impact of epidemic animal diseases, like FMD, and stressed the need to continue the work to combat the disease at the national, regional and international level involving all relevant stakeholders. The WFS:fyl (2002), reiterated the 1996 WFS commitment and called for specific action and voluntary financial contribution to the FAO Global Trust Fund to facilitate food security programs and combat TADs.

53. There is ample evidence from various studies that the risk of spread of TADs will increase unless a concerted international action is put into place for effective prevention and progressive control. This conclusion is predominantly based on predictions of an unprecedented growth of the livestock sector and consumption of livestock products, particularly in TAD-endemic developing countries. The predicted growth in livestock is expected to result in increased livestock farming in the tropical/sub-tropical zones, with trend towards large farming units, and increase in trade in livestock and livestock products through informal and formal markets regionally and internationally.

54. The goals of the initiative, agreed through extensive consultations with regional organisations, regional commissions and offices of FAO and OIE and partners from national agriculture systems are the following:

- to safeguard the livestock industry of developed as well as developing countries from repeated shocks of infectious disease epidemics,
- to improve food security and incomes of developing countries,
- to promote safe trade in livestock and animal products at national, regional and international levels.

55. It is suggested that such goals can only be achieved if the major TADs are controlled at source, which is mainly in the developing countries.

56. The GF-TADs program will be developed along four main thrusts:

- A Global Early Warning, Alert and Response System for major animal diseases to be co-managed by FAO, OIE and WHO.
- The global thrust for progressive control of TADs using the FMD model. FMD has been selected as it was a disease identified by all regions as being important. It concerns both developed and developing countries and it offers a unique opportunity for developing good practices in disease management in all regions of the world.
- Completion of global rinderpest eradication. This thrust builds on the success of the on-going Global Rinderpest Eradication Program (GREP) both in terms of completing this major and unique undertaking of global eradication of an animal disease and offers opportunity for good disease management practices through lessons learned through GREP.
- A flexible Regional Thrust to take account of the regional priorities in terms of target disease, epidemiology and strategy for progressive control of FMD and priority diseases agreed through regional consultations.

Conclusions

57. A dynamic livestock sector can be catalytic in stimulating rural economies. To take on this role, however, pro-active policies are required, such as

- the removal of policy distortions that artificially increase economies of scale and disadvantage small-scale producers
- building of institutional and infrastructural capacities to allow small-scale rural producers to compete and integrate successfully within the developing livestock industry
- a conducive environment, through public sector investment where necessary, to allow producers to increase production through improved efficiency and productivity; and
- effective reduction of environmental, animal and human health threats.

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