

INTENSIFICATION OF ANIMAL PRODUCTION IN SOUTH AFRICA

(Met opsomming in Afrikaans)

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Abstract

Although historically agriculture and animal production commenced at the Cape along highly intensive lines, farmers soon took to extensive forms of land-use once they moved with their livestock deeper into the interior. Currently the intensification of animal production is occurring in what are termed 'semi-intensive' and 'intensive' areas: the former including the major cropping districts of the winter and summer rainfall regions, while the latter includes both irrigated farms and peri-urban small-holdings.

Intensification of the poultry industry is more-or-less an accomplished fact with broiler production already in the hands of a small number of large-scale producers. Though the tendency is less pronounced in the egg-producing line, it appears that pig production in time will follow suit. Dairying on the other hand has drifted away from the large urban centres and is increasingly being practised where at least a proportion of the feed can be locally produced and labour is more readily available. Whereas intensive beef production should be encouraged, lamb and mutton production verges on over-supply, not only in this country but also elsewhere in the world. Further intensification of the sheep industry, hence, would have to be undertaken with caution.

The processing of animal products is strongly advocated if new and expanded future markets are envisaged, particularly elsewhere on the African continent. This calls for a high level of efficiency on a broad front and includes the concept of optimal soil use as well as efficient fertilization.

Introduction

Historically, agriculture commenced by way of intensive land-use in this country. Shortly after his arrival at the Cape, Commander Jan van Riebeeck reported that a garden had been surveyed with a view to raising the produce required by vessels circumnavigating the Cape en route to the Orient. Even in the line of animal production, intensification was the order of the day; a large pigeon loft at the Company's granary, Coornhoop, providing fresh meat when other forms of supply failed.

However, in subsequent years and for well over two and a half centuries, quite the opposite was true. Barring the Western Cape Province the agricultural scene throughout the country was one of extensive land-use, predominantly pastoral at that. Apart from political grievances on the one hand and a lust for adventurous exploration of the African interior on the other, farmers generally moved inland in search of new and better pastures for their herds and flocks of cattle, horses, sheep and goats which expanded apace once the primary obstacles to animal production were overcome. Increased numbers called for either larger farming units or a system of migratory farming: both, hence, extensive form of land-use. With supply steadily exceeding demand there was moreover no real incentive for intensification. The farmer in fact reckoned his wealth largely in terms of his animal possessions, for land *per se* held little measurable value. He traded his livestock for other material requirements, and at his death he bequeathed them as his major assets.

Intensification, once again outside of the Cape Boland, is

a product of urban development along with the demands created by such changes in our social structure. In agricultural language 'extensive' is patently associated with large-sized units, usually encompassing areas of lower rainfall and high summer ambient temperatures. The agricultural industry, generally, is simple in its structure and solely dependent upon the natural resources (fine-woolled sheep, beef cattle).

Next in line is semi-extensive agriculture with the emphasis clearly on higher production per unit of land area and hence a need for supplementary feeding at times — the latter preferably home grown. These circumstances, by and large, apply to regions of higher rainfall where, though as a result of soil deficiencies and problems of tillage, cash cropping is often problematical. This again is followed by semi-intensive agriculture which generally centres around dryland cash-cropping (maize, wheat, sorghum, potatoes) as the major enterprise. On most such units certain forms of animal agriculture will however be integrated to a greater or lesser extent, the latter depending on the area of natural grazing available and the amount of feed which can then be produced purposefully or which becomes available periodically as a byproduct of the primary undertaking. The system therefore allows for considerable latitude ranging from a flock of Merino sheep to a dairy parlour or indoor piggery.

This brings us finally to the intensive farming unit which may vary from a plot on an irrigation scheme—which permits the integration of animal production *inter alia* because of adjacent natural pasture (either as commonage or as part of the arable portion) — to a very limited land area supplied by municipal conveniences (water, electricity) on which the production unit is composed of batteries, and for which all feed supplies are bought in.

Regionalisation

The situation thus defined calls for identification of the areas suited to intensification in the Republic of South Africa. For this purpose both semi-intensive and intensive forms of land-use should be considered since the obvious line of development in the case of the former category is towards further intensification.

The area 'permanently' under irrigation is estimated at present at roughly 600 000 ha. It is envisaged that with dams and schemes currently either in progress or on the drawing boards this figure might be raised to very close to one million ha towards the end of the century. To these should be added another 400 000 ha privately watered, either full-time or seasonally. Now if we calculate the food-production capacity of this acreage in terms of realistic optimum yields, the potential is clearly enormous. On the other hand it must be admitted that the contribution towards the country's total animal output by these enterprises has thus far been relatively small. It is likely to remain small unless price incentives cause farmers to switch over to livestock from such remunerative crops as wheat, tobacco, lucerne, cotton and fresh and dried fruit.

The intensive vine and fruit-growing area of the Western

Cape Province is clearly demarcated. It is plain, moreover, that further territorial expansion is hardly possible; rather are tremendous inroads currently being made on the available land by developing urban centres and additional highways. The chances of animal production superceding the traditional forms of land-use are therefore remote, although a fair degree of integration (dairy cows, slaughter sheep, draft horses and mules) has always been practised.

The potential of peri-urban small-holdings is closely linked with the supply of, primarily, water, and secondarily, electricity. No doubt if these conveniences are available, possibilities exist for intensive animal production (dairying, pigs, small-scale fattening of steers) but the financially highly successful enterprise — in a long-term sense — tends to be the exception rather than the rule. On the one hand it can be postulated that small-holdings are not settled in the first place with a view to contributing significantly towards the essential agricultural output. On the other hand, with our rapid rate of urban development such enterprises are often completely engulfed before they can really make a measurable impact. Of course, however, there are deviations from this broad generalization, though we cannot rely upon them for our future needs.

This brings us therefore to the semi-intensive cropping regions. In broad terms these may be defined as firstly the traditional wheat-growing, winter-rainfall districts of the Western Cape Province (Swartland, Rûens), and secondly the summer rainfall, so-called maize triangle of the central inland plateau (Zeerust-Carolina-Ladybrand). The latter, of course, is not restricted solely to maize, but includes also winter wheat and a variety of summer cash and fodder crops. The common factors involved are: manageable-sized farm units which encourage intensive agricultural practices and optimal land-use; a relatively high proportion of arable land all of it though not suitable for cash cropping; an animal feed production potential in the form of either natural grazing, odd bits of land ("uitvalgrond"), or the byproducts of cash crops; a relatively reliable and stable rainfall pattern whether it be concentrated in winter or summer; a temperate climate which poses no problems of adaptation to livestock; a fair proximity to major urban markets, and good possibilities for fodder-crop production be it in a rotation (grass leys, dryland lucerne, lupins), or purposefully grown (teff, babala, silage crops).

Though it would appear that the most realistic potential for intensified animal production is to be found in the semi-intensive cropping regions, one should not overlook two additional ecological regions which as yet have remained comparatively unexplored. Firstly one must take cognizance of that vast region commonly referred to as the Drakensberg Grazing Area, situated on both aspects of the escarpment in question and including much of the Midlands of Natal. The outstandingly favourable feature is climate: particularly its high and generally reliable rainfall, but also the mild summer temperatures. On the debit side, however, there is the general lack of soil fertility and severe winter nutritional depressions in the natural grazing. But the solution to these problems lies in intensification of farming methods on a very broad front, involving types and breeds of livestock, along with veld management and radical pasture improvement — the latter including both the importation of superior species as well as artificial manuring.

Secondly one must look at the coastal belt with its temperate climate, local markets (holiday trade), reasonably good moisture conditions, but oft localized soil fertility problems — the latter, though, usually surmountable. But whereas in the Drakensberg area animal production is a basic feature of the

agricultural pattern, here an integrated animal economy is usually required.

Potential

The traditional intensive forms of animal agriculture have been dairy, egg and pig production. As urban centres developed, due to the perishable nature of fluid milk, dairying was probably the first to intensify radically. This occurred in the shape of so-called peri-urban units which were virtually no less than milk-producing factories. Cows in milk were purchased, all feed was bought in, day-old calves were slaughtered and manure disposal was a constant cause of concern to the entrepreneur. Next came peri-urban piggeries their economy often relying on a ready supply of swill or garbage collected cheaply or free from mine compounds or large establishments such as hospitals. The wash water often irrigated small patches of green fodder in a frantic effort to dispose of manure waste. Though eggs are less perishable than milk, egg-producing small-holdings also soon entered the arena, the chicken manure being sold to city gardeners and adding to the gross income.

Rapid post-war urban development caused a noticeable change in the above pattern. The tendency has since been for the dairy farmer to set up his unit farther away from the markets where at least the roughage requirements can be met, and where labour problems are less acute. This has been facilitated largely by improved transport to the consumer centres. Pig producers too have left the outskirts of the cities, though we find them not quite so far afield, particularly in the case of specialized enterprises. Poultry units on the other hand have intensified completely and they now include a branch which previously was non-existent, viz the broiler industry. It is obvious though that broiler production is rapidly becoming the sole domain of but a handful of large concerns operating at a high overall level of efficiency. The significance of the broiler in our current meat economy is reflected by an increase in annual production over the past six years from below 10 million to well over 50 million birds. This contrasts sharply with the traditional farm-grown Sunday chicken of times gone by. With regard to egg production a limit has been placed on the size of individual enterprises in an effort to stem the tide somewhat — at least for the present.

Future trends

Looking at the future it seems imperative that one should distinguish between specialized intensification and integrated intensification of animal production. With regard to the former the trend in the poultry industry appears clear cut. Big units will probably expand further while small units will inevitably disappear except for the occasional producer catering either for a select clientele (who is prepared to pay more for the fresh farm-grown product) or for the somewhat isolated (holiday traffic) community. The impact though, of the latter is negligible. Here the economy balances on a knife edge and this demands the application of scientific principles at the highest conceivable level with regard to breeding, nutrition and disease control — apart from purely economical factors such as costs and marketing. The poultry manure will no doubt become increasingly important in the overall economy, either for use as ruminant feed or to be sold to city gardeners following composting.

The pig industry, though still to a fair degree integrated with other branches of agriculture, will in years to come probably follow the pattern outlined for poultry. One of the

largest intensive indoor fattening units in the world is actually in operation in this country, and the indications are that others will soon follow the example. Likewise, in view of the narrow profit margin, long-term success is virtually impossible without continuous performance testing, feed evaluation and disease control. It is imperative however for our local per capita consumption of pig meat to be stepped up. More often than not, the fear of a glut in the pig market looms ominously over the heads of producers and clearly discourages investment of big capital in this branch of animal agriculture. Here moreover, the disposal of waste presents an even greater threat than poultry or dairy waste because pig manure, particularly in the form of slush, is desiccated and subsequently composted with greater difficulty.

While the trend in the dairy industry appears to be away from a factory-type unit, optimal sizes — as in the case of other enterprises — will in all probability increase so as to obtain best returns from the capital invested. Indeed, apart from the usual biological problems such as breeding, feeding and health, insufficient capital for the expansion and consolidation of his herd in terms of modern requirements is probably the biggest obstacle which confronts the enterprising dairy farmer. Intensification here implies up-to-date facilities and efficient milkers, as well as intensive pastures and feeding systems aimed at minimizing stress or energy wastage in the lactating cow.

A world-wide trend in dairying of recent years has been towards dual-purpose animals of high milking potential (eg Friesian), but capable also of producing a calf which can effectively be fattened. It has in fact long been argued that in a given herd, provided the reproductive rate is optimal, only two-thirds of the female stock be bred purposefully with a view to replacing aged cows. The remaining one-third, obviously the poorest producers, could therefore comfortably be bred to a beef-type bull, the offspring of which should be suitable for fattening. In the long term this system of beef production from dairy herds could clearly significantly augment the supply of red meat and should not be overlooked in the formulation of a future policy for the livestock industry. On the other hand the success of such a proposition is plainly dependent upon a realistic price incentive, not only for the breeder but also for the eventual feeder.

As yet intensification of beef production poses problems which require solution before the industry stands much chance of becoming firmly established. These do not constitute deficiencies in the biological aspects of production, but rather in the economics of such propositions in relation to those of the more extensively orientated beef industry. In terms of realistic future consumer trends there can be little doubt however that feedlots, such as practised in the USA, will have an increasingly important rôle to play. In terms of sound agro-ecology however, one would prefer to see them develop as an integral branch of semi-intensive agriculture, utilizing home-produced grain and roughage, and with the manure offal being returned to the land where it obviously belongs.

Lastly, to complete the picture, the sheep enterprise. Here intensification points in the first place to lamb production, with wool and skins virtually as by-products. Thus far the economics of batteries have been somewhat shaky due to high capital investment on the one hand, against a relatively low turnover on the other. The latter is essentially a biological problem which revolves around the stepping up of fertility and fecundity (multiple birth rate), though one can be rectified through use of the correct breed or the

application of hormonal therapy. Capital investment, contrarily, is related to the price which the end-product realizes in open competition with other types of meat. In this regard we are faced with the fact that lamb is not only very nearly oversupplied, but is in surplus the world over. Intensification of lamb production should therefore rather be directed towards a production system which involves the efficient utilization of home-grown feed or of local by-products.

Conclusion

While a somewhat uneasy equilibrium is at present being maintained in terms of animal products — with a real danger of overproduction in the mutton field as against a possible outlet overseas for beef — long-term planning must also bear in mind possible future trends. Intensification inevitably leads to a regulated flow of products because production is geared to a system in which the vicissitudes brought about by seasonal effects are eliminated. This of course demands a constant exploration of avenues of sale and the exploitation of new markets. And so far as the surpluses of our livestock industry in particular are concerned, there is but one logical market, viz the continent of which we constitute but the southern tip. Inevitably this can materialise only after political stability returns to the rest of Africa and sanity prevails.

In order to make best use of our animal products and of their saleability, we shall have to devise systems of marketing which will dispose in the form of fresh meat, those portions required as such, along with the means to process and to can everything else with a view to producing *inter alia* a tasty tinned product of quality protein, at the lowest possible cost. This you will concede can be achieved only if the efficiency of the primary producer is at maximum level, thus incorporating all scientific knowledge available to the industry. This is obviously where fertilizers enter into the picture, for intensification of animal production and the highest conceivable returns from the land go hand in hand.

I not only offer the fertilizer industry my most sincere wishes for all its future endeavours, but I beg of you also your continued support in our efforts to save a growing world from hunger.

Opsomming

INTENSIFIKASIE VAN DIEREPRODUKSIE IN SUID-AFRIKA

Ofskoon met die stigting van die halfwegstasie aan die Kaap, die uitmeest van 'n kompanjetuin en die oprigting van 'n duiwehok te Coornhoop die grondslag gelê het vir intensiewe landbou en diereproduksie, is dit spoedig gevolg deur heel ekstensiewe vorms van grondgebruik en wel by wyse van trekboerdery. Teenwoordig kan die landboustruktuur van die Republiek egter duidelik ingedeel word in ekstensiewe, semi-ekstensiewe, semi-intensiewe en intensiewe boerderygebiede. In hierdie bespreking word die aandag meer bepaald aan die laasgenoemde twee onderverdelings gewy.

Die term semi-intensief is van toepassing op die belangrikste saaistreke van beide die winter- en somerreëgebiede, onderskeidelik dus die koringproduserende distrikte van die Westelike Provinsie asmede die Hoëveldse mieliedriehoek. Intensief, daarenteen, behels besproeiingsplase en klein-hoewes wat om die groot stedelike sentra van die land gelê is.

Sover dit pluimveeproduksie betref is dit duidelik dat

die kleinskaalse onderneming vinnig besig is om te verdwyn namate die bedryf oorgeneem word deur enkele baie groot braaikuiken- en — ofskoon in 'n geringer mate uit hoofde van 'n permitstelsel — selfs eierproduserende eenhede. Voorts skyn dit asof varkproduksie in dieselfde rigting begin stuur, dog stadiger vanweë sekere inherente probleme van die betrokke bedryf. Die suiwelnywerheid, aan die ander kant, het in 'n ruim mate weg beweeg van die omstedelike gebiede en word toenemend beoefen waar 'n groot gedeelte van die benodigde voerbehoeftes wel geproduseer kan word en arbeid meer geredelik beskikbaar is. Betreffende beesvleisproduksie sal die intensiewe vetmesting en afronding van osse in die toekoms noodsaaklik wees indien aan die steeds toenemende aanvraag voldoen moet word, maar dusver het suiwer ekonomiese oorwegings die grootskeepse

onderneming daarvan aan bande gelê. Laastens word beklemtoon dat die skaapvleis-situasie huidig grens aan oorproduksie en intensifikasie van die bedryf moet derhalwe met groot omsigtigheid geskied.

Indien Suid-Afrika in die jare wat voorlê sy markte wil uitbou, veral op die vasteland van Afrika wat eintlik 'n natuurlike afset bied, sal groter aandag op die prosessering van dierlike produkte toegespits moet word. Maar om dit ekonomies te regverdig sal dit noodsaaklik wees om die primêre produksie van sodanige kommoditeite op die hoogste peil van doeltreffendheid te plaas. Dit behels noodwendig intensifikasie, en intensifikasie is afhanklik onder meer van optimale grondbenutting met inbegrip van doeltreffende kunsmatige bemesting.