AN AGRO-ECOLOGICAL SURVEY OF NATAL

By J. A. PENTZ, Professional Officer, Estcourt.

A knowledge of the vegetation, soil and climatic conditions, altitude and topography of the country will enable one to group together areas with certain types of condition and so divide it into *regions*. This is the first step in such a survey of land use potentialities, which may be termed an agro-ecological survey.

Within a region there may be variation in the vegetation and many different communities may be classed together, but the general type will be the same. For example, the dry thorn- and bushveld may vary from the Acacia-Boscia-Euphorbia-Aloe veld at Weenen to the Combretum-Dombeya-Spirostachys veld in Zululand, but, in the main, it is still the dry thorn or bush region, with but small differences in soil and climate. Within the regions climatic conditions will remain the same, but different soils may occur which give rise to different vegetation communities within the region. Where both soil and climatic conditions change, the vegetation changes more markedly and a new region occurs.

However many regions there may be in any country, they can all be classified into three different categories, *viz.*, those suitable for extensive, semi-intensive and intensive farming.

Before proceeding further, it would be well to define what is meant by regions suitable for extensive, semi-intensive and intensive farming.

Regions suited for extensive farming only are those in which it is necessary to have large tracts of land to farm upon, due to the fact that climatic conditions, cover and type of vegetation, and topography make it necessary for the farmer to *rely entirely on his veld for his farming*. His soils may be fertile, but climatic conditions so unreliable that he cannot depend on arable production to supplement his veld : *i.e.* his system of farming will have to be one in which he relies entirely on his veld, and he must have enough to carry his stock through the worst seasons. If the area is reduced he either has to overstock and damage his veld, or to apply a more intensive system which will be unstable due to the unreliability of climatic conditions. Where, in such an extensive region, there may be opportunities of producing crops due to irrigation possibilities or other specialised conditions, the crops so produced should not be regarded as a means of increasing his carrying capacity, but rather as a method of improving the nutritional plane of the stock carried.

In regions suited for semi-intensive farming, soil and climatic conditions are such that the farmer need not rely entirely on his veld for his production, but he can supplement his veld by intensification of certain portions of his farm. These portions are limited, first of all, by the amount of available arable land, and, secondly, by the level of fertility it is possible to maintain in the soil. Most people look upon any land that is reasonably level and free from stones as arable land, although it may be only a foot in depth with a highly erodable subsoil or broken in profile at a very shallow depth. Here good arable land is defined as land that is reasonably level and free from stones, with a deep continuous soil, unbroken in profile and not highly erodable.

In intensive regions the climatic conditions are such that intensification of the farming is necessary if the farmer is to maintain his stock in good condition all the year round. In these regions there is a great deal of arable land, though it may be poor in fertility. Provided that fertility is not only maintained but built up, intensification of the farming is possible. Due to climatic conditions with high rainfall and mists, the soils in these regions are low in fertility and, when cultivated, soon lose what organic matter they have, their structure is destroyed and they powder. The main need of these soils is the building and maintenance of the organic matter, which can be done by means of compost or, in some areas, green manuring.

The proportion of veld to arable land in this intensive type of farming will be comparatively low, as the veld is of little value for much of the year. The degree of intensification to which the region can be developed will be determined by the level of fertility which can be built up and maintained in the soil.

A further subdivision of the potentialities for particular farming systems within an extensive, semi-intensive or intensive farming region must be based on a knowledge of the requirements of different types of livestock crops, fruit, timber, pastures, etc.

Detailed surveys of the vegetation, soils and agro-economic conditions, together with research, will give the key to the management of veld, crops, pastures and stock within the farming systems prescribed for the different regions.

The writer, in this initial survey of Natal, divides the province into eight regions—two suited to extensive, three to semi-intensive and three to intensive farming. If reference is made to the accompanying map, it will be seen that these regions are also classified according to eight broad veld types, viz.:—

(1) Coastal evergreen bush (intensive farming).
(2) Dry thorn- or bushveld (extensive farming).
(3) Tall grassveld (semi-intensive farming).
(4) Highland sourveld (intensive farming).
(5) Temperate forest (Ngongoni veld) (intensive farming).
(6) Temperate forest in broken country (Ngongoni veld) (intensive farming).
(7) Open bush, sandy (semi-intensive farming).
(8) Sandy sourveld (extensive farming).

The descriptions of these regions, together with discussion on their classification, is given below.

(1) COASTAL EVERGREEN BUSH.

This veld is typical of the coastal area from sea-level to an altitude of 1,000 to 1,500 feet. Where it is intersected by river valleys, there is a change to coastal thornveld. As a whole, the veld, which was once dense bush, is now characterised by clumps of evergreen bush with grassland between. The soils vary from poor sandy soils on the hill slopes to deep red and black alluvial soils on the lower lying areas. The rainfall is fairly well distributed throughout, increasing from south to north.

As a whole this region has been regarded as suited primarily for the production of sugar. A certain amount of fruit and vegetables are produced, and timber is assuming importance in the north. While, as a whole, stock farming has not been regarded as of any importance in this region, it is worth while noting that a good deal of milk has been produced in the neighbourhood of the towns for a long time.

As stated above, the limiting factor in any region of intensive farming is the maintenance of soil fertility and stability. This region has the climatic, soil and topographical conditions suitable for intensive farming, but the question of maintenance of fertility is becoming a matter of great importance.

Throughout the world to-day, there is doubt as to whether it is possible to maintain stability of soils under systems of crop mono-culture. As sugar is a perennial, the land is ploughed only at long intervals for re-establishment of a crop, and there is therefore not the quickly apparent deterioration that occurs with mono-culture of annual crops. Nevertheless, adverse effects have been noticed, and these have led to the application of different methods in order to maintain production. Throughout the sugar belt changes in the method of crop production are appearing. The introduction of new types of cane and the application of much fertilizer, the use of green manure, trashing and the fallowing of land, all point to attempts to maintain continued high production, which depends on the fertility and stability of the soils.

With the introduction of the sugar quota, much land which had dropped below the required level of fertility was thrown out of production, so that not only was the production restricted to the better soils, but the reduction in acreage made it possible to devote more attention to the maintenance of their fertility.

With the less productive cane land thrown out of use, the question arises as to whether that land could not be used for other purposes : (1) to supplement the cash returns from the land and (2) to build up fertility so that, with suitable subsidiary lines, it might be possible to bring such land into cane

production once again and thus, by means of a rotation of cane, stock and crops, develop a balanced system with a high level of production.

In an initial survey of this nature, it appears that sugar will always be the main line of production in the region. The maintenance of fertility, by means of a balanced system in which dairy cattle, carried on pastures, and other fodder crops, crops and legumes as subsidiary lines all play a part in a rotation with cane, should ensure continuity of production at high level.

For the purpose of this paper it is not intended to go into detail with the descriptions of the other seven regions, together with their potentialities for different types of farming. A brief summary of the regions and the recommended likely systems is given below.

(2) Dry Thornveld or Bushveld.

Distribution as shown on accompanying map. Altitude varies from the coast to over 3,000 feet. Rainfall is low and badly distributed. Grasses are tall and provide good grazing all the year round. Topography is very broken and rough.

This country is suitable only for extensive farming with cattle and should be developed for breeding of beef cattle with sale of young stock to semi-intensive areas.

(3) Tall Grassveld.

This veld type occurs at 3,500 feet to 4,500 feet and its distribution is shown on the map. Rainfall is fair, but distribution is poor and hail is common. The country is undulating but, except for occasional pockets of deep red and "black turf" soil, the soils are shallow, greyish-brown, overlying shale. They are extremely erodable. There are few trees in this veld type and the grasses are useful for eight months in a year.

With the rainfall and soil conditions, this area is suited only for semi-intensive farming. The vegetation makes it unsuitable for sheep, but it is excellent country for the growing-out of beef cattle.

It is considered that the main policy should be the growing-out of steers, bred elsewhere, with such sidelines as will be determined by the amount of arable land available.

(4) Highland Sourveld.

This region stretches all along the foot of the Drakensberg, as shown on the map, and ranges from 4,500 feet to 6,000 feet.

The rainfall is high, well distributed and mists are frequent.

The country is undulating. The soils, though poor, are deep and continuous and not easily erodable, though wind erosion may occur on played-out lands.

The veld is useful for about five months in the year.

Provided that fertility is built up and maintained, this area is suited to highly intensive farming.

The policy for this area should be a development towards dairying, with a sound balance between arable and non-arable, stock crops and pastures.

(5) Temperate Forest Region ("Ngongoni" veld).

The altitude range of this region is from 4,000 feet. The country is undulating. The soils are mostly red, deep, continuous and fertile. They are not easily erodable.

The rainfall is good and well distributed, and mists are a feature of this region.

Although it is suited to the production of wattles and timber. its climatic, soil and topographical conditions make it potentially a region of intensive farming. Just as mono-culture with sugar in the coastal areas will probably give way to a more balanced system with sugar as a main line, so should highly intensive diversified farming, with a balance between timber, crops and stock, become the farming policy for this region.

(6) Temperate Forest ("Ngongoni" veld) in broken country.

This region is similar to the last, except that the rainfall is lower and the country is very broken, with far less arable land.

Due to this fact, the country cannot develop as intensively as the last named, and can be regarded as only fit for semi-intensive farming. Whereas in the temperate forest area timber and wattles will be the main line of production with subsidiary balancing lines of stock and crops, here it is likely that the main development will be towards semi-intensive livestock farming, with production of timber and crops as subsidiary lines in suitable areas.

(7) Open Bush, Sandy.

This veld occurs between 2,000 feet and 3,000 feet.

The country is undulating. The soils are low in fertility, very sandy and highly erodable.

The rainfall is fair, 20 inches to 30 inches, with a fair distribution throughout the summer months. There are fairly big variations in climatic conditions from east to west.

The natural pasture is poor and is useful only in the summer.

Most of this region is occupied by natives, except for patches in the north, near New Hanover and Wartburg.

Owing to the nature of the soils, this area cannot be regarded as potentially suitable for intensive farming, but, with its rainfall and topography, could probably be developed to semi-intensive systems of a diversified nature.

(8) Sandy Sourveld.

This veld occurs between 3,000 feet and 4,000 feet.

This region is fairly flat. The soils are poor, shallow and sandy. In parts they are badly drained, with hard-pan formation of laterite or "ou-klip." On the whole they are very subject to erosion both by water and by wind.

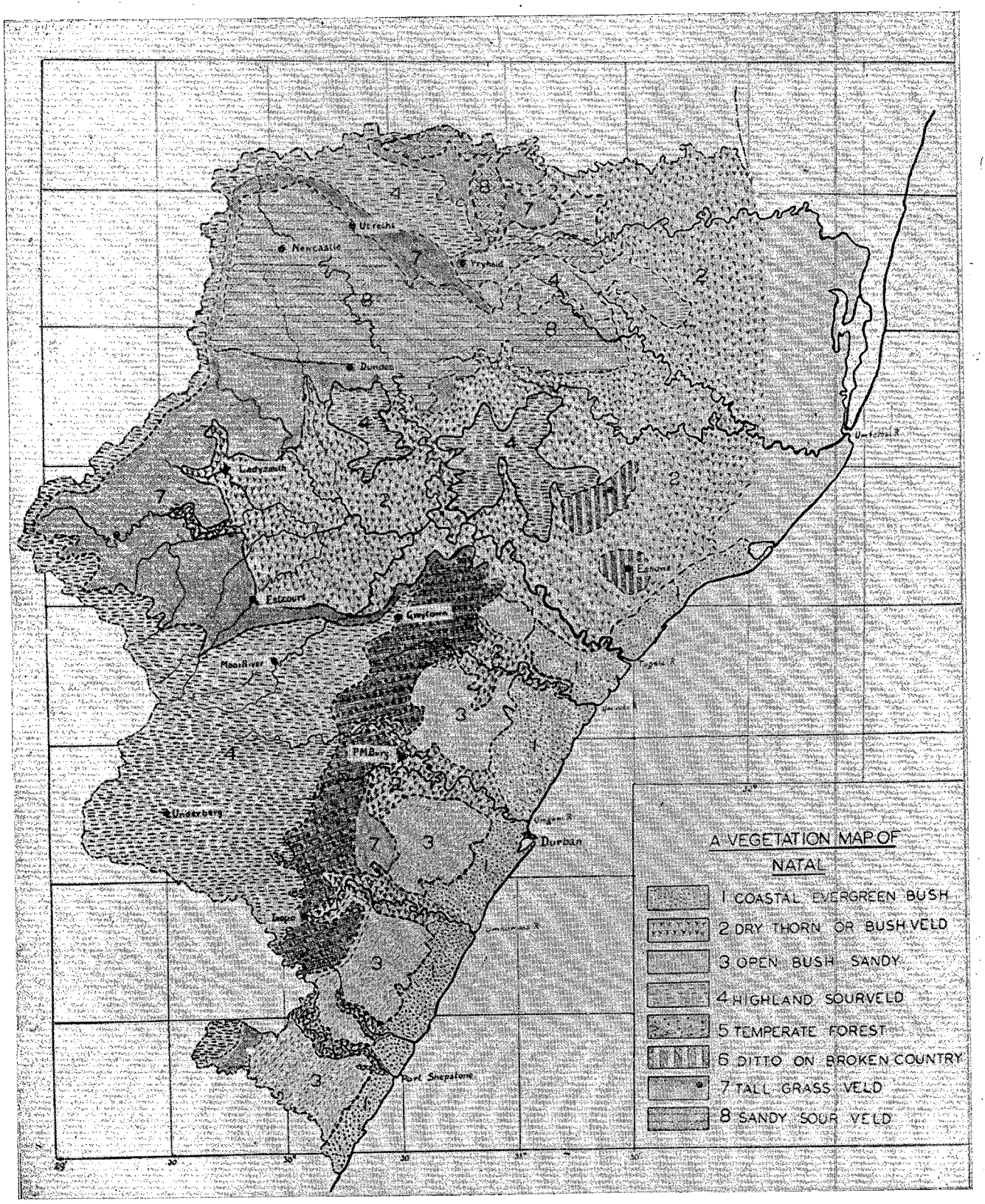
The rainfall ranges from 25 to 35 inches, with poor distribution. Hail is frequent.

The vegetation consists of poor grassveld, which becomes unpalatable as the season advances, though, given big enough areas, stock can be carried throughout the year on the veld. There is not sufficient good arable land even for semi-intensive farming, and, with the rainfall distributed as it is, this area is potentially only suitable for extensive cattle farming.

The above description of the potentialities of the main farming regions of Natal is merely of a preliminary nature. There is still a vast amount of work to be done with regard to the details on the systems of farming to be applied in the various regions.

It is maintained, however, that a regional survey of this nature, dealing with the potentialities of the land, should be the real basis of any work aimed at the stabilisation of farming in this country.

(For Discussion see end of next paper—"Building and Maintenance of Soil Fertility in the Highland Sourveld of Natal.")



Region	*System of farming.*	*Main line of farming.*	*Subsidiary and supporting lines.*
1	Intensive...	Sugar	Dairy cattle for factory milk, fodder crops, tropical fruits.
2	Extensive	Beef cattle weaners ...	——
3	Semi-intensive ...	Ditto, growing out... ...	Dairying, pigs and poultry, fodder crops, veld hay.
4	Intensive...	Dairying	Poultry, pigs, potatoes, fodder crops, veld hay.
5	Intensive...	Cattle and timber	Dairying, pigs, poultry, crops, fodder crops.
6	Semi-intensive ...	Beef breeding...	Wattle and timber, pigs, poultry, growing and fattening of weaners, crops and fodder.
7	Semi-intensive ...	General farming	Beef, dairying, various crops and fodder crops, pigs, poultry, tropical fruit in places.
8	Extensive	Beef ranching...	Fattening where fodder crops possible, pigs, poultry.

ERRATA.—Region 3 in map is Tall Grass Veld and corresponds to 7 in text.
Region 7 in map is Open Bush Sandy and corresponds to 3 in text.