
THE SOIL PATTERN AND TRENDS IN WEST COAST AGRICULTURE SINCE 1964

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Abstract

The physical features, climate and soils of the West Coast are described. Expansion since 1964 of dairy production, sheep and beef cattle numbers, and areas of improved grassland are highlighted, as is the role of the Crown in land development and settlement. While isolation and distance, development costs, river problems, and farmer attitude and knowledge are considered limitations, great scope exists for increased production by the adoption, of more intensive techniques, including horticulture on the best coastal soils, and by development of waste land.

INTRODUCTION

THE dependence of the West Coast on its land is illustrated by the fact that just over one-fifth of the working population is engaged in primary industry compared with 12% nationally. An analysis of this work force highlights the importance of agriculture:

Agriculture and hunting	....	....	46%
Mining	....	....	29%
Forestry	....	....	18%
Fishing	....	....	7 %

This paper describes the soil pattern, farming trends since the 1964 Grasslands Conference, future opportunities and limitations.

DISTRICT DEFINITION AND CLIMATE

The West Coast includes Buller, Inangahua, Grey and Westland counties, and comprises 8.5% of New Zealand's total area. It stretches 560 km in length but averages only 80 km in width. Eighty percent of the region is lake, river, mountain or protection forest, and the Crown owns almost 90% of the total. Farming is

scattered and confined to the recent soils of the river valleys, the low terraces of the Grey and Inangahua valleys, and discontinuous coastal strips. Development is extending on to pakihi land, a popular term applied to vast areas of wet, impoverished high terraces.

The West Coast is traversed by more than 50 swift-flowing major rivers averaging twice the discharge of other New Zealand rivers, a direct reflection of the high rainfall and steep bed gradients. Ample sunshine hours, moderate temperatures, and a well-distributed rainfall are ingredients of an ideal grass-growing climate. Auckland averages 1270 mm of rainfall on 140 rain days. In contrast, Hokitika records 2940 mm, nearly $2\frac{1}{2}$ times Auckland's rainfall on just 27 more rain days, and it boasts nearly 1900 hours of sunshine.

Pasture yields approach data measured in other recognized farming regions.

The Ministry of Agriculture and Fisheries has measured average yields of approximately 8000 kg DM/ha on a recent soil at Kowhitirangi near Hokitika, and 9000 kg DM/ha on a terrace soil at Ahaura in the Grey Valley. Two wet seasons depressed the Kowhitirangi result. A 6-yearly average of 10 920 kg DM was recorded at the Bald Hill Field Research area near Westport on the Addison pakihi soils (Radcliffe, 1975).

SOILS

Since the publication of Gibbs' early work (1950) on the soils and agriculture of Westland, soil surveys at a more detailed scale, 1: 50 000, have been carried out from the Mokihinui River north of Westport to the Hokitika River (Mew and Leamy, 1977). An area of approximately 4000 km² has been surveyed and 89 soils sampled and analysed.

Seven major soil groups have been recognized; their properties and distribution are of prime importance in determining the course of future land use.

RECENT SOILS

Recent soils have only weakly developed profiles and are the least leached soils of the region. They are limited in distribution and, unless protected by stopbanking, are frequently subject to flooding. These soils are generally well suited to grassland farming, and are important in a region that has very little flat land.

YELLOW-BROWN SANDS

These soils are confined to relatively small coastal areas from Karamea to at least as far south as the Mikonui River. Topsoils are moderately well developed, subsoils yellowish brown in colour, with dune sands beneath. Their free-draining properties and sand textures make them suitable soils for horticulture.

YELLOW-BROWN EARTHS

Yellow-brown earths are widespread in the central and northern parts of the West Coast. However, under rainfalls of > 2500 mm other soils become predominant on terraces although yellow-brown earths may be present on sloping country. Chief characteristics of the soils are brown, nut-structured topsoils on friable, well-drained yellowish brown subsoils. Most are strongly leached. These soils are very important for grassland farming in the relatively limited areas where they occur on flat or rolling land (principally in the Grey Valley). Some of them may have potential for horticultural crops.

GLEY SOILS

True gley soils are rare on the West Coast. However, soils classified as gleys do occur on terraces, rolling and hilly land. Related soils occur on some steep slopes. Surface water removal can be enhanced by drainage in shallow and stony soils only. In many areas of rainfall greater than about 2800 mm combinations of soil properties make lateral drainage largely ineffective.

GLEY PODZOLS

Many wet-land profile forms are currently grouped as gley podzols. However, for practical purposes, it is important to distinguish soils which are stony almost to the surface from those which have approximately 70 cm of fine-textured material over stones. Zones of iron enrichment are formed in about 50% of profiles, commonly at the interface of fine- to coarse-textured material and below. The gley podzols are intensely leached. They are widely distributed on pakihi land from Karamea through to Ross.

PODZOLS

Podzols are characterized by bleached horizons close below the soil surface which are not saturated with water for long periods. Commonly beneath the bleached layer there are pans, with yellowish brown layers beneath. Natural nutrient status is very low. The podzols are of relatively minor extent.

ORGANIC SOILS

Organic soils, consisting of more than 60 cm of organic material on alluvium or other inorganic deposits, are relatively uncommon, but occur in part under pakihi vegetation.

FARM STATISTICS

As at June 1979, 1128 farm holdings occupied 1 717 689 ha. Part-time farmers feature near Greymouth and Westport and occupy 60% of the holdings on the broad coastal strip between Westport and Mokihinui.

The area of improved pastures and crops totalled 141 820 ha, an 89% lift since 1964.

Livestock trends are illustrated in Fig. 1.

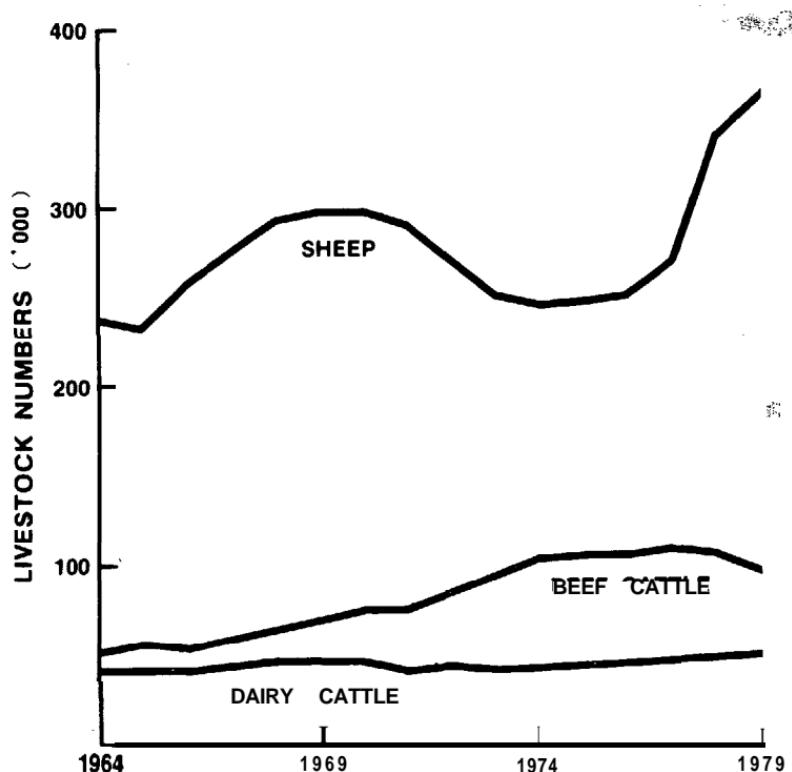


FIG. 1: *Livestock trends, 1964 to 1979.*

The most significant trend has been a 49% lift in sheep numbers since a 1974 trough due to:

- a higher return per stock unit than from the breeding cow.
- less pugging damage than from cattle on developing pakihi soils.
- the impact of the Livestock Incentive Scheme

DAIRY PRODUCTION

Dairying is the main farming type on the recent soils between Karamea and Whataroa.

Major reorganization has taken place in the industry since 1967 when six dairy factories were operating. All milk from Whataroa to Inangahua Junction, a distance of 320 km, is now collected by tanker and processed into butter and spray milk powder at the Westland Coop: Dairy Co. at Hokitika. A smaller roller powder and butter factory at Karamea services the Buller region.

Apart from a setback caused by the last two unfavourable seasons, progress by the two companies has been spectacular. In 1977-8 Westland's 193 suppliers produced over 3 $\frac{1}{2}$ million kg of milkfat, a 100% increase on the 1968-9 season, an average increase of 12 $\frac{1}{2}$ % per year for 8 years. In 1978-9, Karamea's 76 suppliers exceeded 1 million kg of milkfat, a 53% lift since 1971-2 the first season Buller farmers supplied Karamea.

SHEEP FARMING

Sheep farming predominates on the terrace soils in the Grey and Inangahua Valleys where rainfall is a comparatively low 1520-2030 mm. Average stocking rates are 10 stock units/ha with the higher-stocked farms carrying up to 18 stock units/ha.

Maintenance fertilizer application rates are 250 to 500 kg of superphosphate or 22% potash sulphur superphosphate/ha per year with 2.5 t of lime every 3 years. A few farmers traditionally grow brassica crops to supplement winter-feeding, but the emphasis has switched to rationed all-grass wintering.

Romneys are the dominant breed, but the hardier Perendale is favoured on developing country and the Coopworth on more easily developed land. The average lambing is 92 to 95% but flock performances range from 75 to 130%. A poor lambing is a reflection of insufficient ewe liveweight at tupping and under-feeding of the ewe at lambing.

BEEF FARMING

Beef farming is the most widespread farming type. The largest beef holdings are found in South Westland where the cattle graze extensively over riverbed runs. Breeding cows come through the winter in forward condition and the good-quality calves offered at the Whataroa April sales command keen competition,

High freight costs and limited access to killing facilities across the Alps during the autumn peak have discouraged diversification into beef finishing, except for suppliers to the local butchers' trade. But the recent establishment of a regional abattoir and export packing house at Kokiri near Greymouth this year will provide an incentive to farmers, particularly on the river flats and terraces in the Grey and Inangahua Valleys, to fatten beef.

Demonstration beef units on recent soils at Kokatahi and Hari Hari have shown 400 kg/ha/yr of beef is possible under intensive management.

DEER FARMING

Deer farming is in its infancy and no large herds are yet established. Most farmers are content to build up numbers gradually by helicopter capture or trapping, rather than by outside purchase.

HORTICULTURE

Horticulture and market gardening have only a minor role but interest is increasing. Transport Nelson Ltd has planted 19 ha kiwifruit on recent soils at Karamea. Other farmers are growing kiwifruit, potatoes, tamarillos, blueberries, strawberries and nursery stock.

MAF Research Division is evaluating blueberries on two sites in the Grey Valley.

LAND DEVELOPMENT

Land development is spearheaded by the Crown. 88 000 sheep and 11000 cattle are run on 16 800 ha of a total 33 500 ha divided amongst 21 settlement blocks. Until the advent of the Land Development Encouragement Loan Scheme, private development was minimal.

The Department of Lands and Survey has pioneered large-scale pakihi development. Because of the high cost involved, private farmers have developed parcels of pakihi adjoining established home bases on recent or terrace soils.

Research has led to the development of compound fertilizers containing P, K, S, Cu, Co, B and Mo for development and P, K, and S for maintenance.

The difficult swampy terrain, often pimpled with timber, gorse and morainic boulders, usually precludes ground preparation for sowing. Consequently, the lime, seed and fertilizer are applied by air. Surface drainage is an essential prerequisite, and, where ground conditions permit, rootraking to remove timber and gorse before sowing allows easier control of surplus pasture growth after establishment.

Basic ingredients of pasture mixtures are Manawa ryegrass, Nui ryegrass and Huia white clover. Red clover is optional, as are cocksfoot and timothy but they are costly.

Dairying on pakihī soils is under trial on three units at Cape Foulwind, and one at Bell Hill.

Other land development is largely associated with drainage of peat swamps and improving native pastures extensively farmed on river flats. Development of cutover bush has largely been out of the question because of the high cost, although the Land Development Encouragement Scheme rekindled interest.

LAND SETTLEMENT

Up until 1975, few farmers were settled by the Department of Lands and Survey on their development blocks. Since then 23 dairy and sheep farmers have been settled between Mawheraiti and Whataroa under long-term and quick settlement policies and a further 8 are to be settled this season. The latter policy, recently implemented, involves the purchase of sheep properties by the Crown, subdivision into dairy units, and settlement within two years. Such a policy has obvious spin-off benefits for small rural communities facing economic and social decline. Six families at Whataroa in South Westland and 4 families at Totara Flat in the Grey Valley were settled by this scheme.

LIMITATIONS TO INCREASED PRODUCTION

Farmer attitude and knowledge of new techniques, isolation and distance from processing facilities, land development costs, river problems, and the lack of a regional land-use plan are considered the main barriers to increased production. A somewhat insular attitude of established farmers has hindered rapid progress, but people from outside the region, who have arrived because of high land values or drought incidence elsewhere, or are settlers on

Crown developments, have helped progress. A high rate of change of extension services personnel has not helped progress and of necessity they have concentrated on mass methods.

Soaring freight costs limit farmers' net returns. Fertilizer is supplied from Richmond, Nelson, and Hornby, Canterbury. Addington is the main outlet for store sheep and cattle, and until this year, when the Kokiri abattoir opened, fat cattle were freighted to Nelson, Christchurch or Dunedin. Fat lambs and works ewes are still slaughtered outside the region. It is well known that, when there are industrial disputes and peak demand, distant customers suffer most.

Rapidly rising land development costs are a deterrent. Even the \$250/ha Land Development Encouragement Loan does not now meet the grassing down costs, except for oversowing unimproved river flats, and river erosion and aggradation are particular problems. Because rivers are short and valleys narrow, few properties fringe each river. Compared with other regions, rating potential is low and the cost to individual farmers to provide flood protection is high.

There are suggestions of competition for land between farming and forestry, but there is great scope for the complementary development of both. In the past, timber extraction has outpaced re-planting and regeneration, resulting in large tracts of cutover land left idle, but the government's 1978 West Coast forest policy has halted that. Its major objective is to perpetuate State indigenous forests as natural and managed stands.

Because land suitable for production is limited, there is a pressing need for a regional land-use plan to accommodate farming and forestry needs and other uses and to be a blueprint for future orderly development of State-controlled land.

FUTURE OPPORTUNITIES

Great scope exists for increased production in two ways:

- (1) By development of waste land.
- (2) By adoption of more intensive farming techniques,

A 1972 Land Use Capability Survey published for the National Water and Soil Conservation Organization revealed 399 850' ha were suitable for farming. Only 47% of this area is presently used for farming. An exercise recently completed for the West Coast United Council revealed a potential of nearly 9 million stock units, an 8-fold increase on 1979 data. Broadly, recent soils are con-

sidered to have a potential of up to 22 stock units/ha, terrace soils 20 stock units/ha, and pakihi soils 15 stock units/ha.

Half the area considered suitable for agriculture is in pakihi, but at present only 6% of these soils are developed. Given adequate fertilizer maintenance, subdivision and drainage, and intensive rotational grazing, established pastures on pakihi soils will yield 9-11 000 kg DM/ha annually.

Drainage of wet land offers scope for increased production. A survey undertaken by Westland' Catchment Board revealed 150 000 ha could benefit from the West Coast on-farm drainage policy announced in the 1978 budget. The policy, based on a pilot scheme on the 774 ha Kongahu Swamp at Karamea, allows a 1: 1 grant on a suspensory basis for approved on-farm works associated with major drainage schemes. Unfortunately, progress is currently hampered by a shortage of government funds. There is, however, a great range of wet-land types, from peat swamps to areas with soils that do not drain laterally. Hence planning for different drainage techniques is of importance. Development of "dry" unimproved river flats and terrace soils offers the best potential and best returns for a lower cost than improving wetlands.

There are still large tracts of land in South Westland supporting native pasture, where substantial production increases would be gained from simple oversowing programmes.

Given flood protection and adequate drainage, the river valleys are potentially high producing. The Kokatahi-Kowhitirangi valley south-east of Hokitika is an example of farmers taking advantage of the soil potential, drainage, and flood protection. Farmers must be encouraged to support whole river or whole catchment schemes instead of intermittently having to finance the local share of stopgap measures carried out on a piecemeal basis.

The best soils must be preserved for food production. Currently the West Coast is almost entirely dependent on Nelson, Blenheim and Christchurch for its fruit and vegetables. A Lincoln College study commissioned by the West Coast Regional Development Council concluded that the climate and some soils were conducive to the production of fruit and vegetables for local consumption and for winter and spring markets elsewhere in the South Island, and for nursery stock, glasshouse production, blueberries and cranberries.

Substantial production increases would stem from wider adoption of more intensive techniques on existing farmed land includ-

ding better pasture management through more subdivision and use of the electric wire. Closer matching of lactation length of cows and stocking rate, and selection of appropriate lambing and calving dates to better fit the seasonal pattern of pasture growth are important. A better understanding of stock requirements over the winter-early spring period, block-grazing of beef steers and heifers, and attention to increasing ewe liveweight to a minimum 55 kg for tupping, will all contribute to improved per-animal performance and farm output.

CONCLUSION

Agriculture expanded rapidly through the 1960s, flagged in the early 1970s, and has spurted since. Given fair prices for products, a continuing influx of young farmers, adoption of up-to-date techniques, enhanced extension and research backing, and government financial support in productive fields, farming will continue to play a dominant role in the West Coast economy.

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