

A SIMPLIFIED AGRO-GEOGRAPHICAL DIVISION OF DENMARK

AA. H. KAMPP

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Danish agro-geographical differences are still so conspicuous that a regional division is justified. A simplification from the seven regions into three districts is proposed on account of the administrative reorganisation of 1970.

Dr. Aa.H. Kampp, Cæciliavej 50, Valby, DK 2500.

An agro-geographical division of Denmark into seven soil fertility regions (fig. 1) has previously been worked out (Kampp 1959). It was based on *isodones*: the average yield per hectare for seven important crops (barley, wheat, rye, oats, mixed grain, mangels, and swedes) for the three-year-period 1937-39, and *isodenses*: the areas of barley + wheat as a percentage of the rotation area 1939.

The division has been checked on maps for 1946 and 1962 and on maps from 1907 and 1838. It has also been compared with a map showing soil conditions as far back as 1688, and an attempt was made to compare with medieval and even prehistoric days through marking out the about 1800 parishes in Denmark in 1925 by one dot per parish. This comparison was possible because the division into parishes is supposed to date back to prehistoric times. The through centuries almost unchanged size of the parishes allowed an estimate for the relative density of population which in turn may be supposed roughly to depict the quality of soil.

Up till 1970 specified statistics were available from every parish and these small statistical units were the basis of the agro-geographical division of Denmark. Since that year the parish is, however, no longer a unit of local government, and the up till then existing 1300 municipalities have been amalgamated into 273, a municipality being now the smallest unit for administrative purposes. As moreover many statistical facts which formerly could be had for the 1800 parish units are today only registered for the 14 counties, the possibility of constructing maps as detailed as those on which the seven-region-division was based is definitely ruled out.

During the last decades important changes in Danish agriculture have taken place at an accelerating speed

throughout the country. This period has for one thing seen a change in the agricultural structure, the total number of holdings and farms having declined from about 200.000 in 1960 to about 129.000 in 1974 primarily due to a decline in the number of smallholdings, especially towards the east (Kampp 1971). Moreover the increasing development of mechanisation running parallel with the migration of farm labourers to urban trades has caused a rapidly growing tendency towards rationalisation.

The farming proper is today the smallest branch among the occupational sectors of agricultural production. The branches for supply to the farmers and for processing and sale of the products have grown considerably, so that each person occupied in farming provides occupation for two or three other persons. As an example the distribution of lime and fertiliser in the fields is often undertaken by the supplier just as the feedstuff business takes over the grinding, drying, mixing, fetching and bringing of grain for feeding purposes. The number and size of machine pools have been growing, there is an increasing tendency for the farmers to lease machines in stead of buying them.

Although this development to a certain degree is delayed by conservatism, a great many Danish farms and holdings have been reducing the number of crops and a rising number are approaching the fully specialised production with only few or even one single crop thus adapting the field pattern to a more profitable use of machinery. Likewise it is getting more and more common to give up or to keep only one single form of animal production, so that today more than one third of the holdings have no horned cattle. From 1962 to 1971 a reduction of more than 20% took place and a growing part of the animal husbandry is being concentrated in the larger farms.

Partly as a consequence of this development the cereal areas has increased from 1.277.000 hectares in 1950 to 1.800.000 hectares in 1974. The decrease of stocks of horned cattle up till 1972 and to a very high degree of horses together with the increase of cereal up till 1972 has in spite of the wide-spread use of shortstrawed strains, especially towards the east, caused a growing surplus of straw which is burned in the field when the harvest is over. Of course the ashes give plant nutrients to the soil but no humus, and the strong heat caused by the fire kills part of

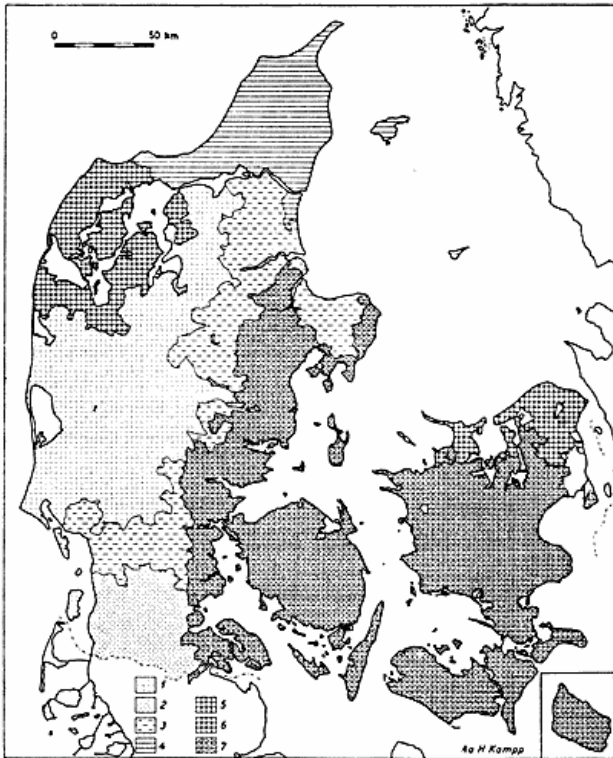


Fig. 1. The division of Denmark into 7 agricultural regions.

De 7 landbrugsregioner

1. West Jylland. *Det landbrugsgeografiske Vestjylland.*
2. South Jylland. *Det landbrugsgeografiske Sønderjylland.*
3. The transitional zones. *Overgangsområderne.*
4. Vendsyssel. *Det landbrugsgeografiske Vendsyssel.*
5. North Sjælland. *Det landbrugsgeografiske Nordsjælland.*
6. North West Jylland. *Det vestlige Limfjordsområde.*
7. East Denmark. *Det landbrugsgeografiske Østdanmark.*

the micro-organisms. For the moment, however, arguments have been put forward with the purpose of diminishing this form of straw destruction, partly because of the danger of fire, the reduced road safety, but also on account of the value of the straw, e.g. as fodder in deficiency regions, as fuel, and as raw product for paper and building materials. However, it does not pay to transport straw over great distances.

The demand of an accelerating agricultural productivity could only be met by an increasing use of fertilisers and the growing control of weeds, plant diseases and vermins by means of herbicides and pesticides with the secondary effects of polluting the soil and consequently changing especially the micro-flora and fauna. For a certain amount of years the potential of the soil may be pressed beyond its natural border of capacity; but it should not be overlooked that such measures on a long view may cause unpredictable consequences.

Rationalisation penetrated earlier into farms than into

smallholdings (fig. 2 - 3) because the farmers were more in favour of innovation and could better afford big machinery. Consequently they were able to produce at a lower cost per area unit. Even if this is the general tendency there will of course be exceptions in the various size groups of holdings.

A remarkable change in crops has taken place above all as far as barley is concerned (fig. 4 - 5). The barley areas have increased from 494.000 hectares in 1950 to 1.455.000 in 1974. (Today barley is in Denmark synonymous with spring barley. Since 1968 winter barley has been prohibited because it is the winter host of Mildew, Yellow Rust and Brown Rust thus diminishing the yield of spring barley). During the first half of this century barley was almost exclusively grown in East Denmark and the Limfjord-region with the main ice margin from the Weichel-ice-age as an agro-geographical borderline (Kampp 1974) which, however, has been

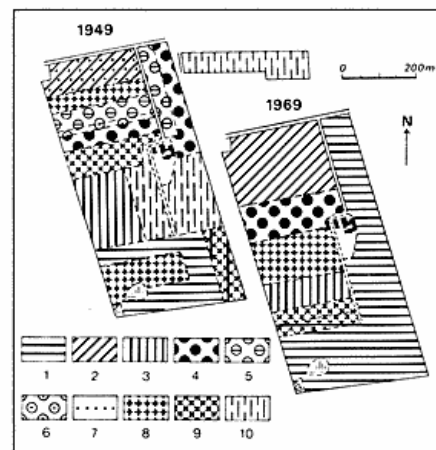


Fig. 2. A single farm (25 hectares) as an example of a relatively early rationalisation. 1: barley, 2: wheat, 3: oats, 4: sugar beets for factory, 5: swedes, 6: fodder beet roots, 7: ley, 8: seed, 9: legumes, 10: permanent grass. 1949: 10 different crops in 14 fields, 1969: 6 crops in 6 fields. Grass and fodder roots are not grown any longer, since the only animal husbandry now are pigs. The meadow has been sold.

Forenkling af Dalmosegårds drift 1949 - 1969, idet hornkvæg, heste og hønser afskaffet. 1: byg, 2: hvede, 3: havre, 4: sukkerroer til fabrik, 5: kålroer, 6: foderbederoer, 7: udlæg, 8: frø, 9: bælgeplanter, 10: permanent græs.

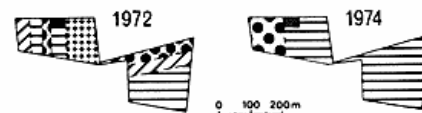


Fig. 3. A smallholding (5 hectares) in the same village as the farm in fig. 2. Here the rationalisation came later than in the above mentioned farm. 1967 it had 9 different crops in 12 fields, and still in 1972 5 in 8 fields, but in 1974 only 2 different crops. Legends as in fig. 2.

Forenklingen på et husmandsbrug i samme landsby som Dalmosegård kom senere, nemlig i perioden 1972 - 75. Signaturforklaring: se fig. 2.

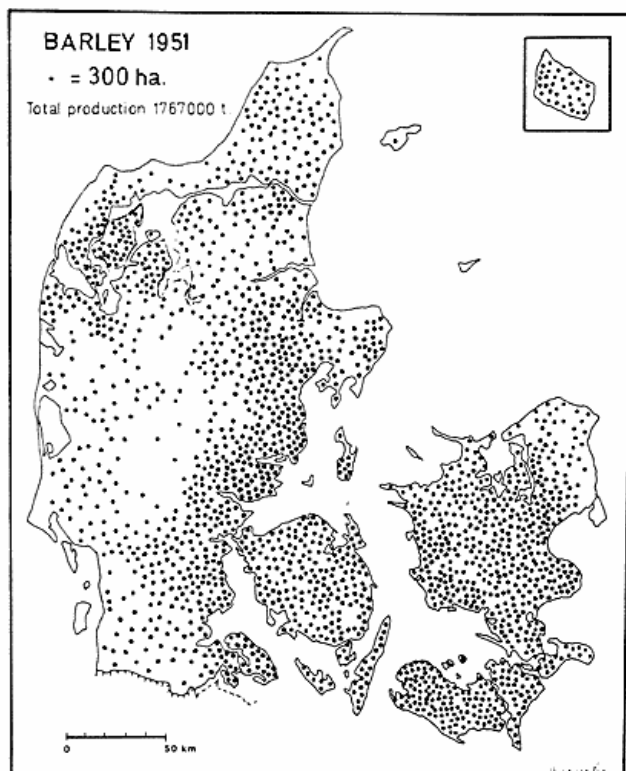


Fig. 4. Barley 1951, dot = 300 hectares. Byg 1951, 1 prik = 300 ha.

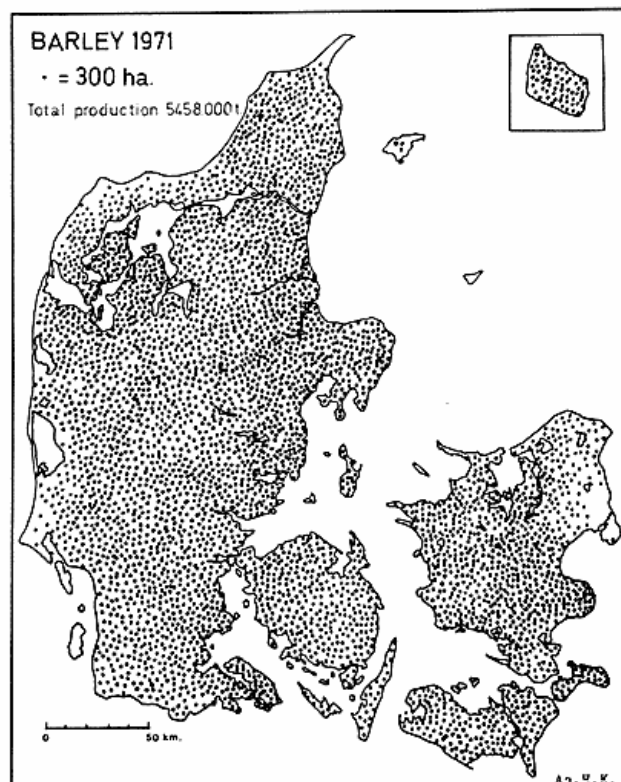


Fig. 5. Barley 1971, dot = 300 hectares. Byg 1971, 1 prik = 300 ha.

gradually eliminated as the fertiliser-technique has been spreading over even the western part of Jylland and new strains of barley with larger yielding capacity also on sandy soils have been developed. A highly contributory cause of the increased barley areas is the growth of pig breeding the number of pigs having been doubled during the last 20 years (until 1972), a development seen all over the country not least in Jylland.

Concurrently wheat has become more and more east-oriented (fig. 6) with a continuously increasing yield per hectare. The wheat areas have increased especially in Lolland-Falster after the introduction of shorter and more stiff-strawed strains instead of the traditional ones with the drawback that in the fertile soil they had very long straws and were consequently more easily flattened by showers thus becoming more difficult to harvest.

Simplification of the Division

The original division was primarily started on the basis of an isodone map, but as the yield of the crops are now only statistically calculated for counties an isodone map only shows a rough east-west orientation (fig. 7) illustrating that the direct connection between agriculture and nature has not been reduced to a very considerable degree. It is still possible to depict it cartographically.

The isodense map of 1939 however turned out to be an equally valid basis of a regional division as the isodone map. Maps of 1946 and 1962 showed very few changes and an isodense map 1971 which can be calculated for municipalities (fig. 8) shows that the agricultural pattern has not changed to a degree that would reduce the seven-region-division into only a historical picture of a closed period of Danish agro-geographical conditions. In spite of the altered conditions of distribution of barley and wheat as described above and the much larger figures for 1971 (table 1) the isodense map can still be used as the basis of a division. Of course the larger statistical units

Table 1

Isodense signature no.	1	2	3	4	5
1907	=1,4%	1.5-5.9%	6.0-11.9	12.0-16.4	=16.5
1939	=9%	10-19%	20-27%	28-33%	=34%
1962	=24%	25-35%	36-42%	43-49%	=50%
1971	=44%	45-50%	51-56%	57-60%	=61%

prevent a very detailed division and the isarithmic maps depicting agricultural factors of today are not directly comparable with the old isarithmic parish maps. So it

must be concluded that on account of the administrative reorganisation a reduction of the number of regions is inevitable.

Already in 1964 and later in 1967 and 1975 it has been suggested that for educational purposes a reduction of the seven regions into three districts would be reasonable and it was proposed in such cases to join 1 + 2 into W (West Denmark), 3 + 4 into M (Mid Denmark) and 5 + 6 + 7 into E (East Denmark). If this reduction is compared with the isodense map of 1971 the deviations will be seen to be very few and relatively small (fig. 9), and it seems justifiable for general use to maintain a fusion of the original regions as above. As the most fertile parts of the country consist of region 7 (East Denmark) and region 6 (North-West Jylland) it is proposed to use the terms district I, district II, district III (fig. 10).

Present Distribution of some Crops and Animal Husbandry

Even if the borders of the regions/districts appear to be still (at least nearly) unchanged there is a change in their contents owing to the altered distribution of crops and livestock and new strains and breeds. The alteration in the geographical distribution of barley and wheat has already been mentioned. The rye areas have been strongly reduced, especially on the light soil in I where it used to be dominating in spite of much larger yield per hectare in III. The oat areas have been diminished by one half because of the nearly total disappearance of work-horses and are now mainly found in I where the climate is more humid. The west-oriented dredge is combine-hostile and the areas now nearly decimated (Kampp 1975).

The growth of seed, legumes, vegetables and fruit has

Tabel 2

District no.	I	II	III
Total area in thousand ha	1130	920	2110
Agricultural area 1951	743	692	1618
1962	788	711	1610
1971	772	623	1521
Increase 1951-1962	45	19	÷8
1962-1971	÷16	÷88	÷89
1951-1971	29	÷69	÷97
Rotation area 1951	646	594	1432
1962	683	609	1457
1971	687	540	1208
Increase 1951-1962	37	15	25
1962-1971	4	÷69	÷249
1951-1971	41	÷54	÷224
Average isodense 1971	41.1	44.6	57.2
Pigs per km ² agricultural area 1971	253	264	290

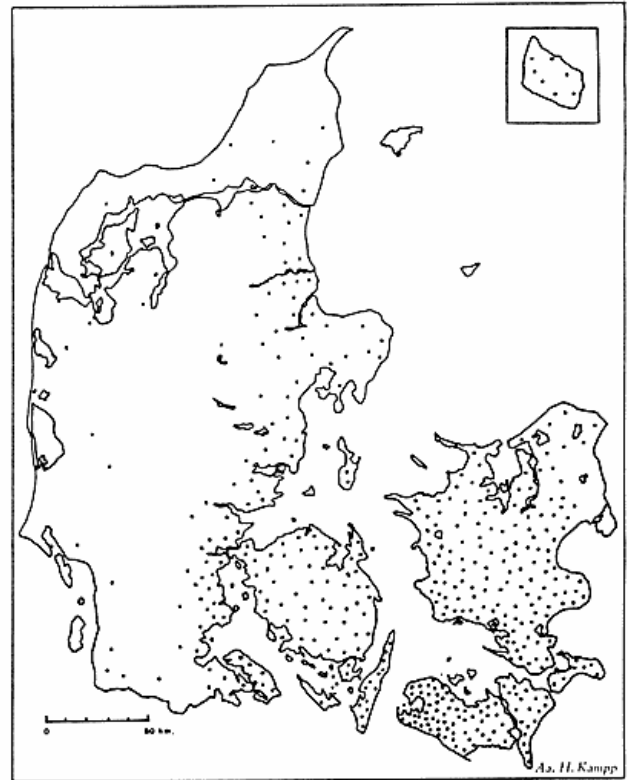


Fig. 6. Wheat 1971, dot = 300 hectares. Hvede 1971, 1 prik = 300 ha.

nearly exclusively taken place in III. While sugar beet for factory are only grown in III the fodder beets (fodder sugar beets, sugar beets for fodder and swedes) as well as potatoes are chiefly found in I and II. Spraying against weed and sowing of one-germed seed have replaced weeding and thinning of the root fields.

The total agricultural area increased during the period 1951-1962 except in III, the rotation area everywhere; 1962-1971 the agricultural area decreased in all three districts, especially in III and II, while the rotation area if anything was stagnant in I but decreasing in II and chiefly in III (table 2).

The trend of the distribution of dairy cows which has taken place is continuing. The reduction that started in III about 30 years ago was still going on at least till 1972 while there till recently has been an increase in I and II. The number of pigs has been increased especially in I and II, but in 1973 a decrease started.

An advantage of the reduction of the seven regions into three districts for illustrative purposes is that while the seven regions were too detailed to be seen on small scale maps of larger territories it is possible to illustrate the differences of fertility of the Danish soil on maps of e.g. Scandinavia and Northern Europe when using the three-district-division.

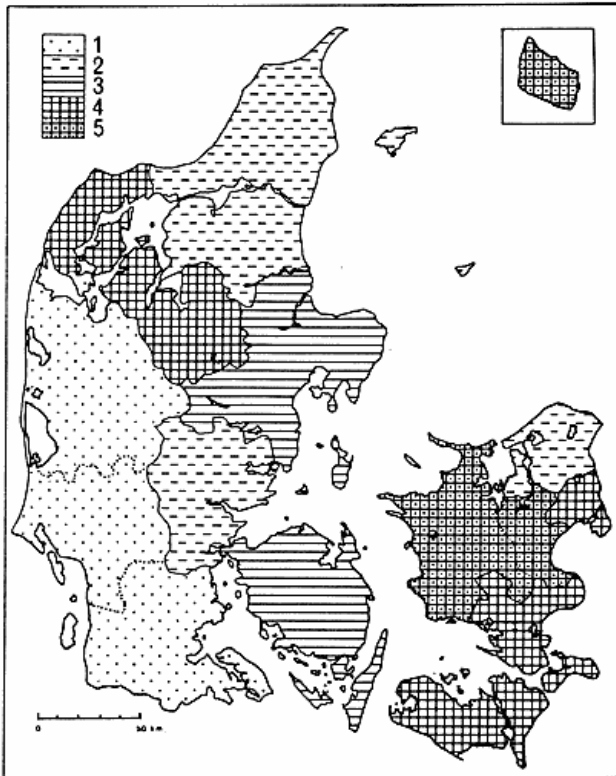


Fig. 7. Isodone map, based on county statistics 1971. 1: 7-11, 2: 12-20, 3: 21-23, 4: 24-25, 5: 26-35.

RESUME

Formålet med inddelingen af Danmark i 7 landbrugsregioner (Kampp 1959) var at give en oversigt over landbrugets geografiske forskelligheder i Danmark. Denne inddeling blev konstrueret på grundlag af kort efter statistik fra 1930'erne og senere sammenholdt med kort fra »forhistorisk tid« til 1962. At den stadig må gælde, fremgår af en sammenligning med isodonekortet fra 1971 (fig. 8).

Men efter den administrative ændring af Danmark 1970 gives ikke længere så detaljeret statistik og altså heller ikke mulighed for at tegne så detaljerede kort som før.

Der er tidligere (Kampp 1964) til undervisningsformål foreslået en tredeling i W, M og E, som bl.a. af hensyn til det vestlige Limfjordsområde her foreslås fremtidig kaldt I, II og III. Med den forhåndenværende grove statistik vil man ikke længere kunne gøre status over dansk landbrug i 7 regioner, som dog må anses med stor sandsynlighed stadig at gælde. Samtidig må det fremhæves, at det vil være ulige lettere at arbejde med kun 3 distrikter, og at det utvivlsomt vil være nødvendigt på kort i lille målestok at nøjes med en tredeling.

Regionernes (distrikternes) udbredelse er stort set uændrede, men deres indhold forandres stadig (tabel 2), blandt andet på grund af rationalisering. Den generelle rationaliseringstendens har også gjort sig gældende i en forenkling af den enkelte landbrugsbedrift, som det ses af eksemplerne fig. 2 og 3.

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Amtsisodonekort 1971.

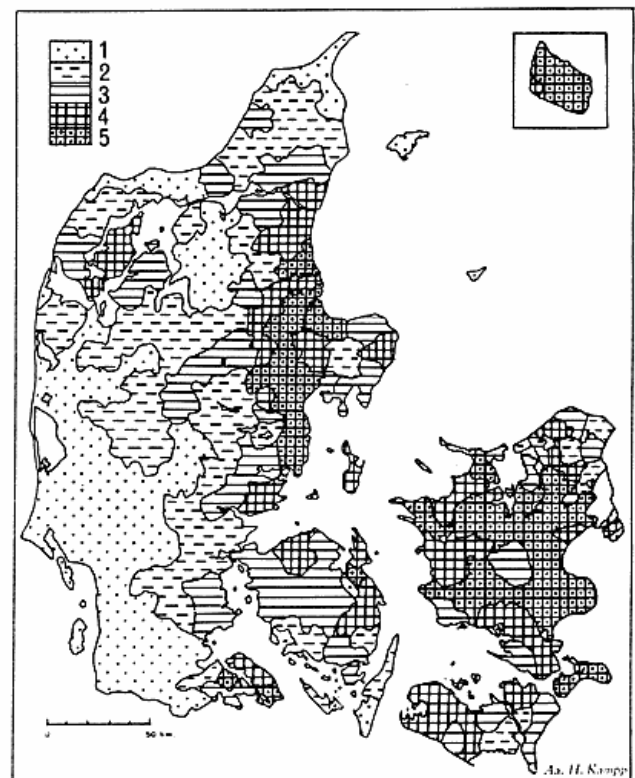


Fig. 8. Isodone map based on municipality statistics 1971. 1: 14-44, 2: 45-50, 3: 51-56, 4: 57-60, 5: 61-79.

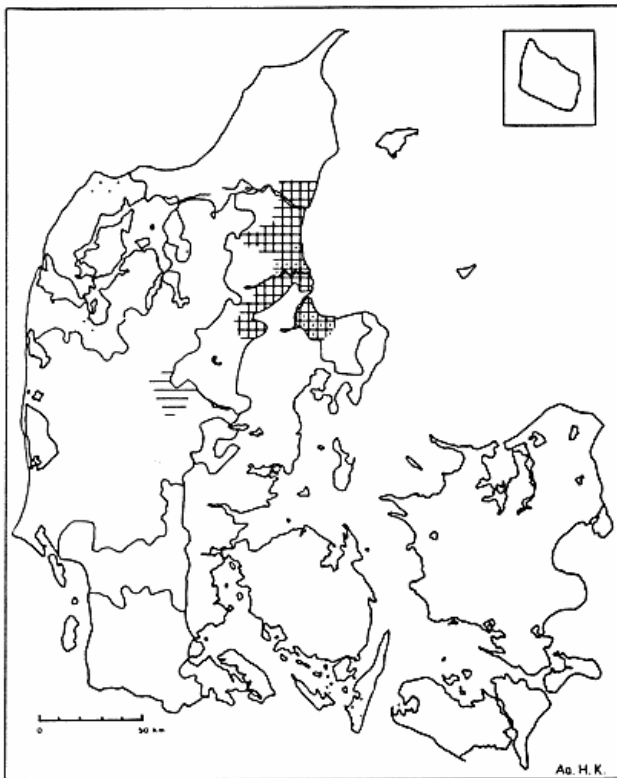


Fig. 9. Isodense deviations 1971.
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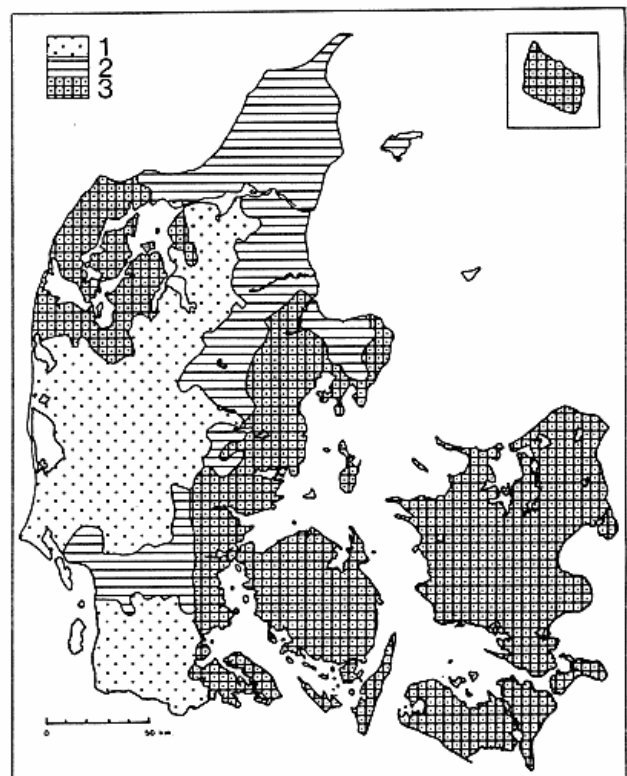


Fig. 10. The simplified agro-geographical division of Denmark.
Den landbrugsgeografiske tredeling af Danmark.

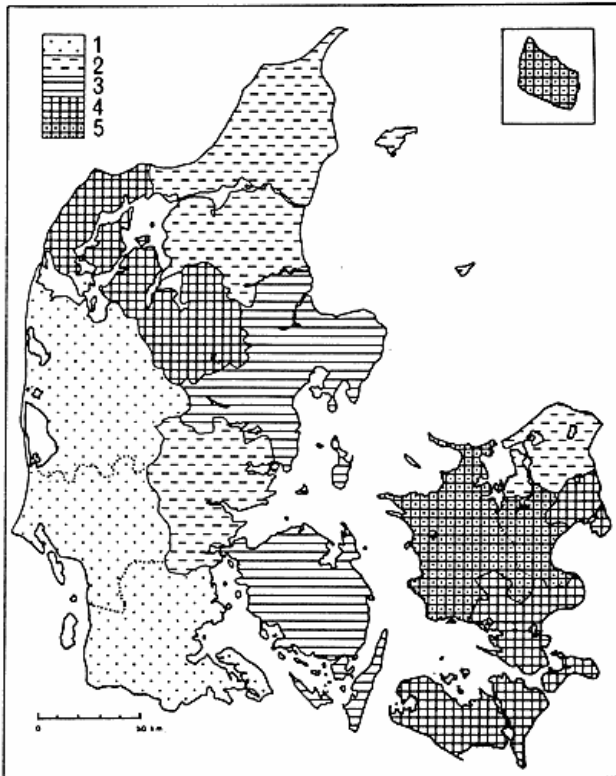


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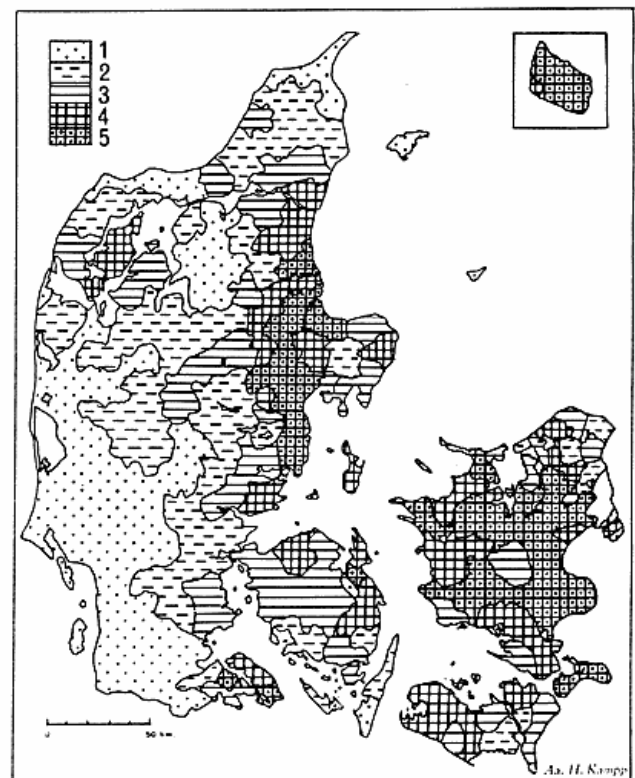


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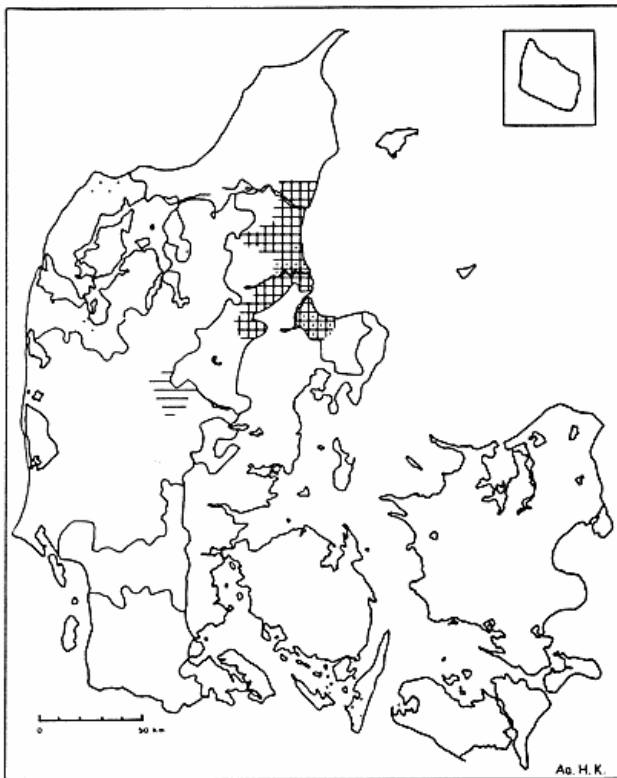


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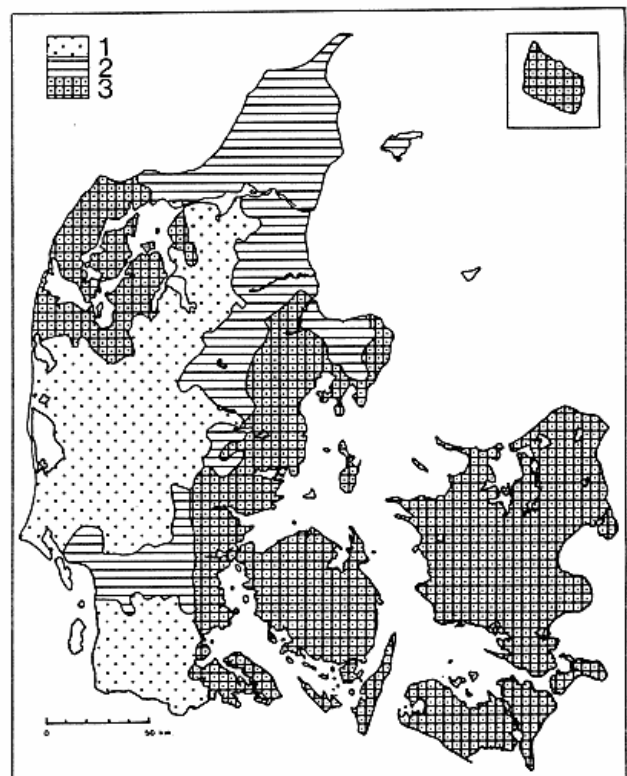


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