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FARMING AT THE EDGE

IS THE FARM PROSPERING AND WHY ?
A METHOD TO SPOT GOOD OR WEAK PERFORMANCE AND TO DO "BENCHMARKING".

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Abstract:
In Swedish agriculture "mixed farming" is common. The manager may choose among several crops, with or without livestock production, or to produce services to other farmers or to customers outside the farm sector. Farmers with diversified production feel the need to know which enterprises that do really contribute to farm profitability on the whole even if gross margins appears to be rather good.

With our method we evaluate the economic result of the most recent year in cooperation with the farmer. We analyse the profit and loss account based on farm records on quantities and monetary information. Revenues and costs are allocated to the enterprises where they belong. The systematic approach includes even farm enterprises that produce "internal products" i.e. feed production, straw production etc. This procedure is implemented, not only for the easily found variable costs, but also for labour, machinery and energy costs as well as for for buildings and some other capacity costs. We use definitions of gross margin 1, gross margin 2, etc in steps down towards finally computing the rate of the return on investments.

The system produces results both on the farm business- and enterprise level on many key numbers regarding economic and technical efficiency.

In the end we undertake "benchmarking actvities" individually (with the farm-staff) and with groups of farmers through organized workshops. This method has been in use since 1949 with 120 customers currently utilising the system.

Introduction

In Swedish agriculture "mixed farming" is common. On one farm you may find wheat, sugar beets, and hogs or as well milk production and ley for silage production, included in the rotation. You may or may not have drying and storage facilities for grain. You may also have/not have storage and processing facilities for potatoes. In addition, the farm may produce services to other farmers or to customers outside the farm sector. Farmers with highly diversified production envision a need to know what enterprises really contribute to farm profitability on the whole. It is not only the question of "the enterprise gross margin".

One example could be potato growing and processing. The receipts may be 3200 E (Euro) per ha, the variable costs may be less than 1200 E per ha and thus the gross margin would be 2000 E per ha, which could be well above other crops on the farm. But when you examine labour requirements of 50 hours per ha (including processing) at a cost of 14-16 E per hour, tractor costs of 400-500 E per ha, special field machinery around 250 E per ha, special indoors processing machinery around 50 E per ha and finally basic equipment for 80 E per ha. After adding up the various cost categories and you reclaim some imputed interest on your "working capital", let's say 70 E, we end up with "fixed costs" at the level of 1700-1800 E per ha. Consequently, the final economic result of the potato enterprise is not better than for other crops. However, the potatoe entreprise is more risky and requires more intensive management efforts in comparison with other crops.

What is our method?

All businesses have an official bookkeeping system. Many businesses have identified some kind of "departments" or "profit centres" within the bookkeeping system with the intention to provide a kind of "result" for each of them. Of course they normally only include external transactions and thus the results shown may be far from the truth. Difficulties to value costs incurred or the expected values of products in storage add to the difficulties.

The intention of our "Result analysis" is to show the real result during a full year of production, not necessary from an official auditors point of view. Furthermore, we estimate and allocate the internal receipts and costs to each enterprise with the highest level of accuracy that we regard as feasible. An example is feed production. Finally we are able to produce key measures of economic and technical efficiency that point towards strengths and weaknesses in the business: Normally, we may propose changes in collaboration with the owner and/or manager.

We have to work with both monetary measures and quantities. We work together with the farmer (or the manager) on the farm. They have the possibility to see the analysis "evolve on the screen" and to react during the process on for example misleading, deficient or false data.

One part (the main part) of the system is an Excel program with many spreadsheets linked to each other in a "fully interlocking system". So when you "put a number" in one cell it is "impacting" everything in the model.

Products and "inputs".
Of course we put in all information about the products, the receipts and revenues, changes in inventories of grain, animals of all kinds, silage, hay and so on. In terms of different "inputs", the use of seed, fertilizer, manure and chemicals is evaluated by the system in order to reveal "overuse" or "under use". Similarly, and maybe even more interesting, we value the cost of feed consumption if the farm has livestock production. The complete production system of whatever it may be, of milk, meat, heifers-ready-to-calf, piglets and hogs are estimated with good precision with the help of many "formulas for control". When the "correct number" is established, we compare feed consumption and appropriate measures of feed conversion on an annual basis. We are then able to adjust the quantity of dry matter produced of different kinds with the inventory of silage, silage acreage and so on until the customer (the farmer) and we with our competence and experience are satisfied with the implied amount of overuse of feed displayed in our management system. Of course we work with all available information from university research.

Labour.
We allocate labour use to some main headlines. These headlines relate to work with the crop and livestock enterprises, work affiliated with service and maintenance of equipment and work with enterprises outside the farm, i.e. custom work of many kinds. Within those main headlines, we develop subordinate headlines, which provide more details when needed or claimed for. One example may be straw baling or manure spreading which in our system are regarded as separate "enterprises" that do not belong to either of the categories of crop or livestock enterprises.

How do we obtain information on labour use? One system of collecting information is daily recording of the labour use. If that is not "in place", we initiate an interview, which begins with the total annual work load measured in hours for the employees and for the farmer himself. That makes the "framework" of the labour use. Then we continue the interview on well-defined work assignments so and so and proceed to other works less well defined. All is combined with our experience of "what is normal". Given that all information is handled within the "interlocking system", the labour cost will be allocated to one headline or another and will be "scrutinized" by the farmer or us until the key numbers on labour productivity appears reliable and believable.

Machinery.
The cost of machinery consists of four "headlines": fuel (or energy), maintenance (labour cost for maintenance and external costs for maintenance), costs of capital (depreciation and interest on capital) and finally "others", that is mostly tax and insurance, but could even be machinery hired.

We request an inventory of the machinery system on the farm. We ask for the year it was bought and the nominal price of purchase. We value the items in our system, following a depreciation scheme of ours. We "group them" in tractors, combines, grass- or silage machinery, sugar beet-, potatoes-, irrigation-, or manure machinery and livestock-machinery. According to the acreage of each type of crop on the farm (or livestock enterprise) our system allocates the machinery costs to the appropriate enterprise. For customers who belong to our managerial system year after year, we continue to update the information on all the available machinery.

Concerning fuel, electricity, external maintenance costs and so on, our procedure is similar to that for labour, already mentioned. That means that we start with obtaining information " on the total amount". Then we allocate the use according to "records" or other facts if available, an interview or to "normal use" following our experience. The system forces the total to be allocated to something; nothing will "disappear".

For buildings, drainage systems and other fixed assets our procedure, shortly, is alike the already described method but inventories or assets, which do not "belong to" anything, are not allocated, and as a result left in a column for "Common".

Administration and common costs.
A headline for administration and common costs is used for the cost of manager, of farm cars, telephone, bookkeeping, staff-education or other staff-costs, etc. For this kind of costs we also have key numbers.

The final result.

In the previous sections some details were provided about how the system works - how we work.
It ends up in tables for enterprise performance and overall performance. We use the definitions of gross margin 1, gross margin 2, etc in steps down towards the final result. We also calculate the rate of return on investment (i.e. rate of return on total assets) and other common economic key numbers.

We receive infromation concerning technical efficiency of different kinds, labour productivity and as "sub results" we get costs of machinery for different crops, for tractors and so on. The results and the key numbers are stored in an "Access"-database. I would like to show those of you who are interested in details about our work, at a special "session" with the computer, how the system works and to get comments on it. I mean both the ideas of allocating revenues and costs, the layout of tables and of the computer formulas and other things. Some examples of tables are provided within this paper.

"Benchmarking".
One "main product" for our customer is that he/she obtains information about the performance of the farm and our commentary on the realized result. Another main product is the "benchmarking" information. The method we use provides consistently defined results pertaining to the gross margin of all enterprises as well as a multitude and of efficiency measures. The next step is to compare the farm records over several years and to compare the records with other farms which we actually do. We produce tables and graphs showing the performance over years and for the last year compared to other farms and trends over a number of years for a group of comparable farms.

The next step is the "valuation" of the deviations and the trends and so on and to "draw conclusions" on the basis of this information and finally for the farmer to make decisions concerning future actions. All this is a "separate thing" and is not described within the content of this paper. We have meetings, workshops, with farmers who as a group discuss the performance. We also organize workshops with the staff on individual farms, discuss the performance of the last year and prospective future developments of the business.

I will add that although our "analysis" is constructed for valuation of "the last year" it also suits well for making budgets for alternative production plans for "next year" or the future. Doing so, the system reveals if you try to use unbelievable efficiency rates in your calculations. You may also compare the anticipated alternative result with the historical results.

Special note.
The method was developed during the late forties and the first "analysis" was made 1950 on 26 individual farms in Sweden. The following 20 years it was performed on the same number of farms or a decreasing number thereof. During the 70-ties we modernized the calculations but kept some of the "main rules" or -definitions so results and key numbers are to some extent comparable backwards in time. The number of analyses performed increased to 40-50 per year. From 1983 I transformed the system to a computerized model using Microsoft Multiplan and from that on, the number of performed analyses increased further. The limit in the latter days is mainly due to the question of "the intentions of our organization" and its policy with the staff and so on. Nowadays we have around 120 customer per year in the system.

Some biographical notes:
Master of Science in Agricultural Science. Graduated at The University of Agriculture in Ultuna / Uppsala 1966.
Member of The Royal Swedish Academy of Agriculture and Forestry (1996).

Since 1968 in the Association of Employers in Agriculture and Forestry as consultant to farmers and responsible for the development of the methods used in the consultant group. We work "on demand" and charge the customers, which are professional commercial farms.

The author is a farmer himself and for many years elected member of the auditor-team in some of the larger agricultural cooperatives in Sweden.
Has attended all the IFMA-conferences held (from 1971 and onwards).

Example No 1: Benchmarking over

Performance in plantgrowing, overall.

	Farm 1	Farm 2Normally
	8 farms & average	
Total no of hectars	790 1010	
Revenues		
From production	5470	7240

From EU areapayment		2240	2540
Total revenue		7710	9780
Costs			
Seed		400	560
Plantnutrients		890	750
Pesticides		340	510
Miscellaneous		370	270
Interest on working cap		220	170
Sum of costs 1		2230	2260
Gross margin 1	**5490**	**7530**	
Labour cost		940	1430
Tractor cost		1260	1000All costs included
Cost for special machinery		500	800 All costs included
Cost for basemachinery		760	620 All costs included
Contractwork		170	480
Sum of costs 2		3640	4340
Sum of costs 1+2		5860	6590
Gross margin 2	**1850**	**3190**	

Another example could be a table over individual crop-enterprises - benchmarking.

As well as over livestock-enterprises, i.e. milkherd in total, milkcows separtely, production of heifers, hogs overall and sows or hogs separately. As well as over manureutilization and -spreadingcosts.

Example No 2: Benchmarking over

Tractors, utilization and costs.

	Farm 1	Farm2 Normally
	8 farms & average	
Total no of hectars	790 1010	
Number of tractors for fieldwuse		
Per 100 hectar	0,8	0,9
Out of them, over 130 hp	0,4	0,6
Out of them loading-machin	0,2	0,2
Average-size, hp		
All tractors	139	144
All but loading-machin	146	155
No of hp per 100 hectar	112	133
Asset value of tractors		
E per hectar of land	160	184
Average-age, years	8 7	
Utilization of tractors		
Hours per year per tractor	610	920

Maintenance costs		
All maintenance, E per tractor	2830	1920
Out of that, "farmlabour"	*490*	*600*

Costs per hour of tractoruse		
Energy and lubrication	10,0	6,1
Maintenance	4,7	2,1
Depreciation and interest	8,0	5,5
Others	10,5	0,2
Total	23,3	13,9

We do also provide tables for combiners, sugar beet machinery, silage machinery, etc but with less detail and over labour productivity, hours per ha, per cow, for maintenance and so on.

Example over "farmspecific tables".

B-farm

RESULT FOR THE COWHERD at farm: Year 2001

Milkproduction Tabell 4.1

	RESULT FOR THE HERD				RESULT PER ANIMAL			
	Milkcows 287	Heifers 116	Meatprod.	Hela besättning.				Total herd
	Totalt	Totalt	Totalt	Totalt	per cow	per heifer	per calf	per cow
Milkquantity, 4%	2 448 400			2 448 400	8 530			8 530
Revenues of milk	7 127 000			7 127 000	24 800			24 800
Sold animals	710 800	1 528 700		648 000	2 500	13 200		2 300
Balance-change	37 800	-187 800		-150 000	100	-1 600		-500
Out of that price		1 100		1 000				
Sum of revenues	748 500	1 340 800		498 000	2 600	11 600		1 700
Others								
Premiumpayment	93 800			94 000	300			300
Total of Revenues	**7 969 300**	**1 340 800**		**7 718 000**	**27 800**	**11 600**		**26 900**
COSTS								
Animals	1 491 600	100 200			5 200	900		
Concentrate	1 958 700	237 400	29 500	2 226 000	6 800	2 000		7 800
Feed grain	207 900	99 000		307 000	700	900		1 100
Silage and likewise	840 900	169 500		1 010 000	2 900	1 500		3 500
Grassing	17 100	49 000		66 000	100	400		200
Misc. and straw	794 000	41 600		836 000	2 800	400		2 900
Sum of inputs	3 818 500	596 600	29 500	4 445 000	13 300	5 100		15 500
Interest herd capital	199 200	102 500		302 000	700	900		1 100
Interest on work.cap	43 800		1 400	45 000	200			200
Sum of interest	243 000	102 500	1 400	347 000	800	900		1 200
Sum of Cost 1	*5 553 100*	*799 200*	*30 900*	*4 791 000*	*19 300*	*6 900*		*16 700*
Gross margin 1	**2 416 200**	**541 600**	**-30 900**	**2 927 000**	**8 400**	**4 700**		**10 200**
Labour cost	1 652 300	482 400		2 135 000	5 800	4 200		7 400
Tractor cost	114 000	20 100		134 000	400	200		500
Machinery cost	25 000	4 400		29 000	100			100
Contract work								
Sum of Cost 2	*1 791 400*	*506 900*		*2 298 000*	*6 200*	*4 400*		*8 000*
Sum of Cost 1+2	*7 344 500*	*1 306 100*	*30 900*	*7 090 000*	*25 600*	*11 300*		*24 700*
Gross margin 2	**624 800**	**34 700**	**-30 900**	**629 000**	**2 200**	**300**		**2 200**
Buildingsinventory?								
Maintenancework	289 500			289 000	1 000			1 000
Maintenance others	406 400	75 500		482 000	1 400	700		1 700
Deprec. & Interest	295 900	12 000		308 000	1 000	100		1 100
Gross margin 3	**-366 900**	**-52 700**	**-30 900**	**-451 000**	**-1 300**	**-500**		**-1 600**
Deprec. on quota	7 500			8 000				
Interest on quota	219 900			220 000	800			800
Gross marg 3 after cost for quota	**-594 300**	**-52 700**	**-30 900**	**-678 000**	**-2 100**	**-500**		**-2 400**