

# *Index figures*

## **E-9**

### **Dutch production index (INET)**

#### ▪ **Introduction**

In the world of cattle breeding, selection based on milk production traits, plays an important role. The tools used to assist the selection procedure are the cow and bull indexes for fat and protein. The breeding values for the number of kg of fat and kg of protein are combined to create a single figure: the Dutch production index or Inet. The way in which these breeding values are combined to create the Inet rating is such that selection based on Inet leads to increased profitability in milk production per cow.

The Inet figure is calculated according to the following formula:

$$\text{Inet 2024} = 3.0 * \text{BV kg fat} + 4.3 * \text{BV kg protein}$$

BV stands for breeding value in the formula. The figures 3.0 and 4.3 are called the Inet factors. For example: Imagine a bull has the breeding values +15 and +20 for kg fat and kg protein respectively. The Inet of this bull is equal to  $3.0 * 15 + 4.3 * 20 = 131$  euro. The same formula is applied to cows.

#### ▪ **Significance of INET**

In breeding the central focus is to produce more highly productive and profitable cows through selection. The Inet rating indicates what can be expected from the progeny in extra net yields per lactation if a certain cow is mated with a certain bull. To give an example, we will mate a bull with an Inet of 400 euro with a cow that has an Inet of 200 euro. A calf resulting from this match is expected to have an Inet of 300 euro, which is 100 euro more than its dam. In other words: the calf is expected to yield a net milk production income per lactation of approximately 100 euro more than its dam.

The Inet factors indicate the net yield per kg fat and kg protein provided through breeding the production per lactation for fat or protein is increased by one kg. Selective breeding that results in an increased production of one kg of fat, without a similar rise in the production of fat and protein, will yield € 3.00, with € 4.30 for one kg of protein.

#### ▪ **Calculation model**

The economic weighting factors are determined by calculating the difference in farm income, when a marginal increase in production per cow takes place, while all the other conditions remain unchanged. The situation (milk price) likely to apply in eight to ten years is taken as the basic assumption in this calculation. The marginal increase in production per cow is the result of the marginal increase of the genetic capacity of the cow for higher production. So, what does an increase in the breeding value of a cow of one kg fat or protein represent at a dairy farm?

When determining the new Inet it is important to consider what is likely to change in the coming years. Important factors are the milk price the farmer receives and the feed cost.

### *Costs for energy and DVE*

The calculation model calculates the energy and protein required for milk, fat, and protein. To produce fat, only energy is required, producing protein requires energy and protein. The feed costs kg fat or protein are calculated as (energy requirement)\*price of energy)+(protein requirement/DVE)\*(price of/DVE). Per kg fat and protein respectively 5.9 and 3.0 kVEM energy is required and for 1 kg of protein 1.56 kDVE is required.

To calculate the feed costs, a price for medium-priced A-pellets of 18 euro/100 kg is assumed and a price ratio of 6 between kDVE and kVEM : 1. This results in a price of 1 kVEM of € 0.107 and a price of 1 kDVE of € 0.639.

### *Milk price in the future*

The results of decisions made about breeding now, will only show in eight to ten years' time, so when considering the significance of the Inet we must estimate what milk will be worth eight to ten years ahead.

The average advance for 1 kg fat granted by FrieslandCampina in the period 2009/2010 was € 3.11, and € 5.43 for protein. The advance price is on average 95% of the final payment price, with that the average price for fat and protein totals respectively at € 3.27 and € 5.72. This corresponds to a milk price of 32 euro cent/litre with 4.2% fat and 3.4% protein.

The Long-term forecast dairy farming panel, which includes banks, accounting firms, LTO, ZuivelNL, RVO, DLV Advise and Wageningen UR, expects an average milk price up to and including 2032 of 38.50 euros per 100 kilos of milk (*Long-term forecast milk price. (n.d)*).

Regarding the payment system, Friesland Campina has indicated that the price ratio of protein: fat: lactose will be 6:4:0. This was 10:5:1 in recent years. There is no payment for kg of milk. However, there are still several surcharges on the milk, which are per kg of milk.

The payout at DOC is the same for protein and fat (1:1 ratio).

At Cono the price ratio of kg protein: kg fat = 7:3.

At Arla the ratio of protein: fat is 11:10 in 2018.

At Aware there is no constant price ratio for protein versus fat.

The ratio between protein and fat price is not known for the other dairy companies.

In Flanders, the largest dairy processor is Milcobel. There is no negative land price for a kg of milk and there is a fixed price ratio between kg of fat and kg of protein of 1:1.

The calculation of the Inet factors assumes price ratios for lactose, fat, and protein of 0, 4 and 6. The protein : fat ratio of 6:4 reflects the higher valuation of protein compared to fat at most dairy companies.

In view of the information above, the following points have been assumed in the calculation of the Inet factors:

- the milk price is 38,5 eurocent per kg milk, with 4.2% fat and 3.4 % protein.
- the ratio for lactose : fat : protein price is 0 : 3 : 4.
- this results in a price for 1 kg lactose of € 0,00, 1 kg fat of € 4.14, and € 6.21 for 1 kg protein.

## ■ Results

Based on the energy consumption and the protein demand from feed to produce lactose, fat and protein, the feed costs are respectively 0.47, 1.14 and 1.93 euro per kg lactose, kg fat and kg protein.

The yield per kg lactose, kg fat and kg protein are 0,00, 4.14 and 6.21 euro respectively. This results in a net yield per kg lactose, kg fat and kg protein of -0.47, 3.00 and 4.28 euros respectively.

The feed costs for lactose per kg of milk amount to 2.1 eurocents per kg of milk. The marginal yield of 1 kg of milk with standard contents is therefore 0.25 euros.

Given that there are various allowances, such as quantity allowance, grazing allowance, sustainability allowance, VLOG allowance, etc., the feed costs per kg of milk to produce lactose are more or less reimbursed by the various allowances.

When the (feed) costs are deducted from the proceeds, the net proceeds remain for fat and protein:

$$\text{Inet} = 3.0 * \text{FW kg fat} + 4.28 * \text{FW kg protein}$$

After the rounding of the weightings, the Inet per August 2024 will be as follows:

$$\text{Inet 2024} = 3.0 * \text{BV kg fat} + 4.3 * \text{BV kg protein}$$

The spread of the new Inet is 143 euros and is 14% larger than the current Inet (125 euros). To maintain the same response for NVI milk target as with the current Inet, the weighting of the new Inet must be adjusted from 0.37 to 0.32. For NVI dual purpose, the new weighting factor for Inet is 0.285 (is now 0.33). The key figures used in the Inet formula are clearly shown in Table 1 and Table 2.

**Table 1.** Key figures for calculation of Inet-factors

Variable	Inet 2015	Inet 2024
Milk price (euro/kg milk)	0,32	0,385
Fat content	4,20	4,20
Protein content	3,40	3,40
Lactose content	4,53	4,53
Ratio price protein:fat:lactose	10:5:1	6:4:0
Price per kg protein, euro	5,38	6,21
Price per kg fat, euro	2,69	4,14
Price per kg lactose, euro	0,54	0,00
Price A-pellets per kg, euro	0,18	0,29
Ratio price kDVE:kVEM	6	4,5
Price kVEM, euro	0,107	0,193
Price kDVE, euro	0,639	0,869

**Table 2.** Result of applying the key figures of Table 1 to the results for the weighing factors for Inet.

Variable	Inet 2015	Inet 2024
Weighing factor kg protein in Inet	4,1	4,3
Weighing factor kg fat in Inet	2,1	3,0
Weighing factor kg lactose in Inet	0,3	0,0
Marge kg milk (revenue minus feeding costs), euro	0,25	0,25
Spread of Inet	125	143
Response %fat (with selection on only Inet)	0,00	+0,03
Response %protein (with selection on only Inet)	0,00	0,00

## ▪ References

1. *Agrimatieprijzen*. (z.d.). Agrimatie. Consulted on June 3rd 2024, on <https://agrimatie.nl/agrimatieprijzen/>
2. *Langetermijn verwachting melkprijs*. (z.d.). Foodagribusiness. Consulted on June 3rd 2024, on <https://www.foodagribusiness.nl/langetermijnverwachting-melkprijs-e-3850/>