



NSIP Fact Sheet
NSIP-006-01

How To Use EPDs to Select Sheep

Here are some practical examples of using EPDs to choose animals for replacement, purchase, and culling.

A Preliminary Example:

Let's say that you have two rams with EPDs for 60-day weaning weight of +3.0 and +1.0 pounds, respectively. Both EPDs are better than the breed average, which is assumed to be zero. Which ram is better? You can correctly conclude that the first ram is genetically better for weaning weight than the second ram. You can also conclude that its progeny are expected to weigh, on the average, 2 pounds (= 3.0 - 1.0) heavier at 60 days of age than the other ram's progeny.

Remember: EPDs do not predict absolute performance. EPDs are used for comparisons and for ranking. The actual weights of your lambs will depend on breed, nutrition, health, and a myriad of other factors. The bottom line is that high EPD sires and dams will increase the rate of genetic improvement.

Decisions, Decisions, Decisions...

Here is an NSIP genetic evaluation of seven animals in a farm flock (In farm flocks, the two NSIP growth traits are 60-day weaning weight and 120-day postweaning weight). This breeder wants to sell breeding stock to other flocks. Let's look at the selection decisions for three different buyers who come to this farm to choose new breeding stock:

Animal ID	MATERNAL				GROWTH				WOOL	
	% Lamb Crop		Maternal Milk		Weaning Wt		Postweaning Wt		Grease Wt	
	EPD	ACC	EPD	ACC	EPD	ACC	EPD	ACC	EPD	ACC
Ram A	-10.2	.10	+2.0	.18	+1.1	.18	+5.9	.29	+0.9	.39
Ram B	+6.6	.22	-1.7	.25	-1.7	.09	-3.1	.08	+0.5	.31
Ram C	-1.1	.30	+0.7	.20	+0.3	.11	+2.3	.18	-0.7	.44
Ewe A	+13.0	.25	+3.1	.24	+0.3	.19	+6.0	.19	+0.4	.41
Ewe B	+16.7	.18	-1.6	.21	-0.5	.16	-2.2	.23	+0.8	.41
Ewe C	+1.1	.10	+2.4	.13	+1.7	.11	+4.0	.19	+0.2	.18
Ewe D	-10.4	.08	-0.9	.11	-1.1	.09	-3.7	.24	-0.9	.23

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Flock A:

Situation: Producer is satisfied with lambing percentage (already = 220%) but wants to improve milk production and growth rate.

- ◆ Choose Ram A because of its high EPDs for maternal milk, weaning weight, and postweaning weight. We would expect Ram A to sire fast-gaining lambs that grow well before and after weaning, relative to the breed average, and also to sire daughters that produce above-average weaning weights for their lambs.
- ◆ Which ewe to select? This choice is somewhat more difficult (and typical) because each ewe has its own advantages and disadvantages. Ewe A is a potential choice because of her positive EPDs for maternal milk, weaning weight, and postweaning weight. But she also has a high EPD for % lamb crop. This producer may not want the higher prolificacy **C** it depends on his willingness to manage the additional lambs. Ewe A has high EPDs for maternal milk and postweaning weight, and a small but positive EPD for weaning weight. This combination of EPDs, together with a positive EPD for % lamb crop suggests that the progeny of ewe A will produce more lambs and also extra pounds at weaning. Her relatively low EPD for weaning weight suggests that her lambs do not have a high genetic potential for preweaning growth, although their genetic value for postweaning growth is high.
- ◆ Ewe C is another possible candidate because of her high EPDs for maternal milk, weaning weight, and postweaning weight, and her near zero EPD for % lamb crop. However, the accuracies of her EPDs are relatively low (compare these accuracies with those of Ewe A). Therefore we could expect larger changes in her EPDs as more information becomes available.
- ◆ Choosing a replacement ewe in this situation is difficult, but ewe A is probably the better choice.

Flock B:

Situation: This flock has good weaning weights and growth rates, but needs improvement in lambing percentage and grease fleece weight.

- ◆ This situation is almost the exact opposite of Flock A, so our choices are going to be different.
- ◆ Ram B is probably the ram of choice for this situation. Even though his EPDs for % lamb crop and grease fleece weight are small, both are positive with relatively good accuracies. Ram B is the only ram that has positive EPDs for the *two traits* that this producer wants. There is, however, a trade-off (as usual). Look at his EPDs for the weight traits. Ram B may have a negative impact on growth rate in this flock because his EPDs for both weight traits are negative.
- ◆ Ewe B is probably the best ewe for this flock. She has the largest positive EPD for % lamb crop and grease fleece weight of any of these ewes. Her slightly negative EPDs for growth would probably not be a major concern in this situation.
- ◆ Also look at Ewe A. She has positive EPDs for % lamb crop and grease fleece weight, although they are smaller than those of Ewe B, (especially for grease fleece weight). Ewe A does have slightly higher accuracy values than Ewe B, so we could be a little more

confident of her EPDs. Ewe A also has positive EPDs for the growth traits. Depending on the growth rate already observed in the flock, this may or may not be beneficial. This producer has noted that growth rate is currently not a concern.

- ◆ Based on her EPDs and this flock's needs, Ewe B is probably the ewe of choice for this flock.

Flock C:

Situation: This flock has serious production problems. It needs a general overall improvement in total productivity.

- ◆ This flock is different than the previous two examples. The producer is not satisfied with general production levels and wants to improve production in all three areas: maternal, growth, and wool. The goal here is to select animals that have high EPDs in as many traits as possible with reasonable accuracies.
- ◆ Rams: Of course, none of these rams are positive for *all* traits. We need to judge the tradeoffs...
- ◆ Ram A has a negative EPD for % lamb crop but this EPD has a low accuracy associated with it. Therefore, we can expect some change in the EPD for this trait. We can conclude that this trait's current EPD may not be a reliable indication of his progeny's potential for % lamb crop. On the good side, this ram has high EPDs for maternal milk, weaning weight, and postweaning weight, especially compared to the other two rams. Also, his EPD for grease fleece weight is positive with a fair level of accuracy. The other two rams have two or more negative EPDs. Based on these EPD values, Ram A best meets this flock's needs.
- ◆ Ewes: Two of these ewes (Ewe A and Ewe C) have positive EPDs for all traits. This is an exceptional situation **C** we do not generally encounter animals with positive EPDs for all traits. If possible, this producer should buy both ewes as replacements. However, if he had to make a choice (eg. not enough money to buy both animals), he may be better off with Ewe A. This ewe has higher EPDs than Ewe C for all traits except weaning weight, and her accuracy values are also higher. These accuracies indicate that the EPDs for Ewe A are based on more performance records than those of Ewe C.

Culling Decisions:

- ◆ Ram C was not chosen as a possible sire in any of the example flocks. He has a negative EPD for grease fleece weight and near-zero EPDs for % lamb crop, maternal milk, and weaning weight. His EPD for postweaning weight is only slightly positive. In comparison to the other two rams in this flock, Ram C is the poorest.
- ◆ Ewe D does not a good genetic value. She has negative EPDs for all traits. Also, these EPD values are large negatives compared to the rest of the sheep. Her accuracy values are rather low, and therefore her EPDs may be expected to change as more information is collected on this flock. However, her set of very negative EPDs is an overriding reason to cull Ewe D (or not select her if she were being considered for purchase).

