



Frequently Asked Questions (FAQ) About NSIP

Summary

This is the current information about the National Sheep Improvement Program (NSIP). We are using an informal question-answer format for this document — known as a FAQ (Frequently Asked Questions) — which has an easy-to-read format that is very popular in the computer and Internet world. This FAQ covers information about the NSIP's policies, procedures, contacts, fees, organizational structure, and also about some of the common technical concepts used by this genetic evaluation program. Additional information can be found on the NSIP website (<http://www.nsip.org>) and also at breed association offices, county and state Extension offices, and offices of the Farm Service Agency (FSA).



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What is NSIP?

NSIP — the National Sheep Improvement Program — is a computerized, performance-based program for genetic selection. NSIP is designed to help purebred sheep producers identify the best genetic stock for their breeding programs. NSIP also gives breeders reliable information that they can use to advertise and sell their breeding stock. NSIP uses the most modern, scientifically-proven technology to measure genetic performance. This technology — called EPDs — has been used extensively in the dairy, beef cattle, and swine industries for many years, and is only now being implemented in the sheep industry.

NSIP works through the breed associations, and in certain situations groups of producers, to deliver across-flock EPDs to purebred producers. Breeders use these EPDs to guide them in their selection and genetic improvement programs. A producer who is a member of NSIP receives reports on the genetic values for every animal in a flock, based on the performances of those animals and all the animals that are genetically related to them, over many years and management systems. By using EPDs, a breeder can make genetic improvements efficiently and reliably. EPDs allow a breeder to rank all the animals by genetic value, identify high-producing replacements, and cull poor-producing animals.

What Are EPDs?

"EPD" is short for "Expected Progeny Difference." An EPD is an estimate of the genetic merit of an animal for a single trait. Specifically, the EPD of an animal is *the expected difference between the performance of that animal's progeny and the average progeny performance of all the animals in the breed, for that trait.*

EPDs are derived for each animal in a flock, trait by trait, from the performances of all the relatives in that flock and also in every linked flock for every year.

How Are EPDs Calculated?

First, purebred producers record the performance values for their animals (weights, numbers of lambs born, wool characteristics, etc) and enter all this information into electronic data entry forms. They then send these forms to the breed association offices, where the data is compiled and checked and then sent to the NSIP computer. For each breed, NSIP collects these performance records from purebred flocks across the country, breed by breed. This data comes from sheep reared under many different management systems, year after year after year.

The NSIP computer then identifies the genetic linkages between these flocks and across years — like when rams are sold or traded, or when progeny are distributed into many flocks — and puts this data into one massive calculation for each breed. The NSIP dataset for a breed also includes all the data from previous years, for all the relatives, across generations. The EPD calculations even include data from related traits, because an animal's performance in any trait gives information on how it will perform in a similar trait (for example, a good preweaning weight for a fast-growing lamb suggests it will also have a good postweaning weight). These calculations produce EPD values on every trait for every ram, ewe, and lamb in the system. And these EPDs are recalculated annually (or more often for accelerated flocks), after the performance records from each new production cycle are entered into the computer.

Common Acronyms Used in this FAQ

ASI	American Sheep Industry Association
BLUP	Best Linear Unbiased Predictor
DHIA	Dairy Herd Improvement Program
EPD	Expected Progeny Difference
FAQ	Frequently Asked Questions
FEPD	Flock Expected Progeny Difference
NSIP	National Sheep Improvement Program

How Are EPDs Reported?

An EPD is reported in the normal units of a trait, such as +0.5 pounds (for weights) or -0.3 microns (for wool diameter). It's important to note that *an EPD value is not a ratio or an index.* EPDs are expressed as deviations (+ or -) from the average population value, which is considered to be zero. Therefore, EPDs always have a positive (+) or negative (-) sign in front of them.

The positive and negative symbols don't always mean *better* or *worse* — it depends on the trait. For example, an Weaning Weight EPD of +0.5 pounds is good (i.e. more weight of lamb at weaning), but an Fiber Diameter EPD of -0.3 microns can also be good (i.e. smaller diameter fiber, which is more valuable to fine wool producers). Not only can we compare sheep with positive and negative EPDs, but we can also use EPD values to compare animals who both have positive EPDs. For example, a ram with a Weaning Weight EPD of +1.0 is good, but a different ram with a Weaning Weight EPD of +2.0 is better. EPDs may take a little getting used to, but once you get the hang of them, they give the most objective and reliable estimation of genetic value possible.

Can Rams Be Compared Under Different Management Conditions?

Yes. across-flock EPDs are designed to allow this comparison. The calculation of EPDs uses data from many different flocks, and this procedure is mathematically valid across flocks. This means that a range operation in dry country can use rams from a Midwestern corn-soy crop farm, and that a Midwest farm can identify top-quality range rams reared on sagebrush and rattlesnakes. Of course, on each farm, the groceries and health still have to be good enough to permit good performance, and in particularly stressful environments (such as desert range) there may be unique genetic adaptations that affect performance. But at least EPDs give a producer a clear and reliable report about an animal's genetic potential.

Can Rams Be Compared Between Different Breeds?

No. An EPD in one breed *cannot* be compared to an EPD from another breed. Across-flock EPDs are calculated *only* within a breed. Each breed database is independent from all other breed databases, and the numbers are not commingled.

What About Commercial Producers?

EPDs are only calculated on purebred animals. EPDs are *not* calculated for commercial flocks. Commercial producers do not join NSIP directly. Commercial producers, however, can really benefit from NSIP because they can purchase rams (and ewes) from NSIP purebred flocks that have precisely the improved traits that they need.

Because EPDs are provided on a trait-by-trait basis, commercial producers can decide what traits they need for their operation and then use NSIP to find rams and ewes that excel in those specific traits. The Breed Associations publish "Sire Summaries" — in printed form and on their websites — which are genetic catalogs that list all the NSIP sires in that breed, trait by trait. These sire summaries often include lists of "trait leaders," which is convenient for quickly identifying top genetics. Commercial producers can study these sire summaries and easily find the best sires and dams which carry the improved traits for their own operations

What Are FEPDs?

FEPDs are the same as EPDs except that all the data is derived from a single flock. The "**F**" stands for "**F**lock." FEPDs do not use across-flock data. For over 10 years, NSIP calculated FEPDs for producers.

When NSIP first began, across-flock analyses for sheep were not feasible because there was not enough good information on identifiable genetic linkages between flocks. NSIP calculated FEPDs to serve producers and provide them with the best genetic information that was available at that time. For ten years NSIP calculated FEPDs as part of its program to collect data for the development of across-flock EPDs.

In contrast, across-flock EPDs provide far more information about genetic value than FEPDs because they are derived from many flocks and over different management systems. Additional information about FEPDs is provided on the NSIP website.

NSIP currently calculates only across-flock EPDs for producers.

What Traits Does NSIP Evaluate?

Maternal Traits:

NSIP evaluates all individual animals within a flock for three very important maternal traits: (1) number of lambs born per ewe lambing, and (2) maternal milk, and (3) Milk+Growth. To obtain an accurate evaluation of genetic merit for each of these traits, producers record information on all ewes exposed for breeding and all lambs born in each production cycle.

Growth Traits:

NSIP evaluates growth for three possible weights: weaning weight, postweaning weight, and yearling weight. Farm flocks and range flocks are analyzed differently because their weighing schedules are so different. Farm flocks receive 60-day weaning weights and 120-day postweaning weights. For farm flocks, the cutoff point between weaning weight and postweaning weight is 90 days. Range flocks receive 120-day weaning weights and yearling weights. Some range flocks also chose to take 60-day preweaning weights, and those weights are used in their genetic analysis. NSIP accepts generous time windows around each age to weigh lambs, so that any flock can arrange convenient weigh dates to fit its management schedule.

Wool Traits:

NSIP calculates EPDs on three wool traits: grease fleece weight, fiber diameter, and fiber length. These measurements only need to be taken once during an animal's lifetime, usually at a year of age. These measurements must be taken on a full year's growth of wool. A producer can also record codes for face cover and skin folds, although no EPDs are calculated on these traits.

Carcass Traits:

Carcass traits are still under development but will be incorporated into NSIP very soon. These traits will be fat thickness, ribeye area, and an index trait called the "Carcass Value Trait", which will be calculated from the age of a lamb, the weight of the lamb, ribeye area, and fat depth between the 12th and 13th ribs. Producers will record values for these traits either from direct measurement of the carcass or from ultrasound measurements on the live animal.

Accelerated Traits:

For those breeds using accelerated lambing systems, NSIP is working on two important traits: date of first lambing, and lambing interval. Currently, implementation of these two traits are still under development.



Does NSIP Accept Electronic Data Entry?

Yes. In fact, NSIP *only* uses electronic data entry. All producers enter data onto specially-designed, easy-to-use spreadsheets. These spreadsheets look very much like the traditional paper forms — i.e. they have rows and columns. However, these computer forms also do automatic error-checking, so that the spreadsheet catches typos and other data errors when they are first entered, which makes these errors very easy to correct. If a producer doesn't have a computer or prefers to avoid doing data entry, they can have a friend/relative/neighbor do it or make arrangements with the personnel at the breed association office to do this for them. After producers enter their data, they send the file via the Internet (or just mail a diskette) to the Breed Association office.

NSIP calculates EPDs for a full array of traits that can fit the needs of most sheep producers.

How Does NSIP Work?

NSIP works hand-in-hand with the breed associations. Performance data flows from farms and ranches to the breed association offices and then to Virginia Tech University, where the actual EPD calculations take place. The EPD results then flow back to the breed association offices and then back to the individual farms and ranches. This means that there is no central do-it-all NSIP office. (This style of organization is similar to the well-known DHIA system that has been functioning successfully in the dairy industry for many years).

Specifically: Purebred breeders collect performance data on their farm or ranch and enter that data into data-entry spreadsheets on their own computer, or have someone else enter it for them. These spreadsheets have been developed by NSIP and are supplied to all the breed association offices and breeders. Producers then send their completed spreadsheet to their respective breed association. People at the breed association office combine all the files into a single large spreadsheet file. They do additional checking of the data (especially registration numbers) and then send the breed data on to Virginia Tech for genetic evaluation. At Virginia Tech, geneticists run the complex software to calculate EPDs. They also archive all the NSIP databases in a secure mode. The specialized EPD software (BLUP = Best Linear Unbiased Prediction) calculates the genetic values for each animal and each trait. After these EPDs are calculated, the results are sent back to the breed associations. The breed office then uses these results to publish the breed sire summary and other genetic documents for the breed. It also sends genetic reports back to the individual breeders. Most of this work is done over the Internet. NSIP oversees and coordinates the entire process. NSIP also develops new procedures and traits; it tests improved data collection and data evaluation techniques; it maintains the databases for security and archival purposes, and it coordinates genetic research with the data.

The NSIP main office is located at the ASI headquarters in Englewood, Colorado. NSIP clerical and bookkeeping tasks are performed there.

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What Role Does a Breed Association Play in NSIP?

Breed Associations play a pivotal role in the NSIP genetic evaluation process. The association office tracks all breed members who are in NSIP and acts as the focal point for the final data checking and assembly. It sends NSIP producers the data-entry spreadsheets. It collects the completed spreadsheets, compiles them into a single breed spreadsheet, does additional error-checking on the data, and works directly with NSIP and Virginia Tech to assure accuracy and integrity of the data. After the EPDs are calculated, the breed association processes the results and sends the genetic reports back to the individual breeders. The Breed Association office publishes the breed Sire Summary, and also publishes other genetic documents that are derived from the EPD results, including lists of trait leaders. The Breed Associations also collect fees from producers for joining NSIP.

How Can A Producer Join NSIP?

Simple. A producer submits an Enrollment Form to the NSIP office. This Enrollment Form is a very easy-to-fill-out form that asks a few questions about contact information, breed, and flock size. Send this form to the NSIP office along with your payment.

Enrollment forms can be obtained from this website, the NSIP office, breed association offices, any office of the Farm Service Agency (FSA), and Extension offices.

The NSIP Website:

<http://www.nsip.org>

All purebred producers with registered animals can join NSIP. Calculation of across-flock EPDs, however, is dependent on the establishment of good across-flock genetic linkages. NSIP is currently working closely with six breeds to calculate across-flock EPDs. These breeds are Targhee, Suffolk, Polypay, Dorsets, Hampshires, and Columbia. Producers in other breeds will receive across-flock EPDs if enough flocks join NSIP so that good genetic linkages can be established. NSIP will help facilitate this. If the breed association office cannot act as a collection point for data, then the group of breeders needs to find someone else to do this role. Again, NSIP will facilitate this. There are people in the sheep industry already doing these tasks

How Much Does NSIP Cost?

The NSIP fee structure is very simple and reasonable. Annual fees are based on two things: (1) a flock charge *plus* (2) a charge per each breeding animal in the flock. The flock charge is \$50 flock. The breeding animal charge is \$1.25.

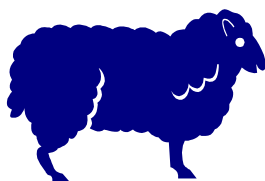
NSIP defines a breeding animal as an adult ewe or a ewe lamb that will be part of the breeding flock or a ram that will be used to sire lambs. On the Enrollment Form, a producer counts all animals, male or female, that were used in breeding during the past year.

Producers enroll only purebred animals with registration numbers. They also enroll any ewe lambs or ram lambs used for breeding that will be registered but have not yet been assigned registration numbers.

For example, a purebred producer with 97 breeding ewes and three breeding rams would pay a total NSIP fee of \$175.00.

(= \$50 flock charge plus \$1.25 x 100)

This producer would send a check for this amount together with the completed Enrollment Form to the NSIP office.



When Are Fees Determined?

At enrollment. On the Enrollment form, a producer lists the number of breeding animals and pays the *sum* of the ewe and flock charges.

Who Pays Whom?

Breeders pay their NSIP fees directly to the NSIP office. Payments are submitted together with the completed Enrollment Form. The NSIP office will mail producers a receipt for their payment.

Does NSIP Have a Website?

Yes. <http://www.nsip.org>

Where is the NSIP Office?

NSIP
6911 South Yosemite Street
Englewood, CO 80112-1414

Phone: 303-771-5717
Fax: 303-771-8200
Email: info@nsip.org

The NSIP Website:

<http://www.nsip.org>

Where Can I Get More Information?

Purebred producers:

Contact your Breed Association or the NSIP office or website. Also, all the offices of the USDA Farm Service Agency (FSA) have enrollment forms.

Commercial Operations:

You may want to discuss NSIP and performance-based genetic improvement with the source of your purebred breeding stock.



NSIP
6911 South Yosemite Street
Englewood, CO 80112-1414



WE'RE ON THE INTERNET
WWW.NSIP.ORG

NSIP Topics Covered in this Brochure



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