# Support Document to Respond to the FSC Public Consultation

# Interpretation on CRISPR and the Definition of GMO (INT-STD-01-001_19)

## FSC PUBLIC CONSULTATION

CONSULTATION ON THE INTERPRETATION OF THE DEFINITION OF GENETICALLY MODIFIED ORGANISM (GMO) (INT-STD-01-001_19) – ENGLISH

FSC has received several informal inquiries regarding the definition of GMOs in the FSC Principles and Criteria (FSC-STD-01-001 V5-3), suggesting a lack of clarity with respect to modern genetic engineering technologies such as CRISPR-based gene editing.

Link to public consultation : https://consultation-platform.fsc.org/en/consultations/?82726

### Consultation question:

Do trees whose genome has been edited using CRISPR-based technologies fall within the FSC definition of a 'Genetically Modified Organism'?

### FSC P&P Conclusion:

Yes, the definition of a Genetically Modified Organism also encompasses organisms whose genetic material has been altered through modern gene-editing technologies such as CRISPR. The element of the definition that mentions "altered in a way that does not occur naturally" is understood as referring both to the resulting genomic change and to the process used to induce it; therefore, any genetic engineering technology falls within the scope of the GMO definition.

### Background

This document develops a science-based reflection that **dissents from the conclusion reached by P&P** on CRISPR and the GMO definition currently under public consultation (INT-STD-01-001_19).

- The FSC policy on genetically modified organisms (FSC-POL-30-602, 2000) establishes that GMOs are those organisms in which structural changes have been induced through techniques such as recombinant DNA, direct insertion of foreign DNA, or unnatural cell fusions.
- The same document clarifies that techniques such as in vitro fertilization, natural genetic transfer processes, polyploidy induction, mutagenesis, or cell fusions equivalent to traditional breeding are not considered GMOs, even though some of these processes (such as mutagenesis induced by radiation or chemicals) are artificially induced and do not occur spontaneously in nature.
- The definition under consultation proposes that **CRISPR-edited trees should also fall into the GMO category**, interpreting that any genetic engineering technology represents a process "that does not occur naturally." This interpretation directly contradicts the current policy and the broad acceptance CRISPR enjoys in other disciplines, such as human therapeutics, agriculture, livestock, and others.
- Additionally, several regulatory frameworks distinguish between:
    - **Transgenesis** (introduction of foreign DNA).
    - **SDN1-type gene editing,** which causes point mutations without insertion of external DNA, considered equivalent to natural mutations or those induced by conventional techniques.

## Scientific Basis of the CRISPR-Cas9 Method

- Mutagenesis is the process of inducing changes (mutations) in the genetic material of an organism. Traditional tools (such as radiation or chemical mutagens) generate random changes. CRISPR-Cas9 systems do the same, but in a very precise and targeted way.
- Organisms edited with **CRISPR without introducing foreign DNA** are indistinguishable from those that occur naturally or through conventional mutagenesis tools.
- The current FSC policy (FSC-POL-30-602) explicitly states that **mutagenesis is a technique not considered GMO.**
- In many applications, CRISPR simply induces small deletions, insertions, or point mutations in very specific and targeted locations. The final product represents a

variant obtained through a high-precision breeding process using advanced mutagenesis tools.

## Considerations for FSC Policy Review

- The current GMO policy is more than 25 years old; during this period, science, regulation, and global governance have advanced significantly.
- The interpretation under consultation offers an opportunity to review whether modern precision mutagenesis techniques such as CRISPR-SDN1 should be treated the same way as transgenics.
- An updated framework could:
    - Recognize the differences between transgenesis and gene editing without foreign DNA.
    - Align FSC policy with emerging regulatory practices globally.
    - Facilitate access to tools that strengthen resilience, sustainability, and efficiency in the forestry sector.

## Benefits of CRISPR Gene Editing (SDN1*)

CRISPR-Cas9 technology is transforming multiple fields beyond silviculture, from correcting genetic diseases and developing cancer treatments in medicine, to creating crops more resilient to climate change and sustainable biotechnology solutions. These applications demonstrate its role as one of the most impactful scientific innovations of our time.

*SDN: Site-Directed Nuclease

## Environmental Benefits

- **Climate change adaptation:** clones more resistant to droughts, heat waves, and water stress, enabling sustained growth and carbon capture in extreme climate scenarios.
- **Greater health resilience:** resistance to pests and diseases reduces pesticide use, protecting workers, ecosystems, and water bodies.
- **Ecosystem protection:** possibility to generate floral sterility or control seed viability in species such as pines and eucalypts, reducing risks of invasion in high conservation value areas.

- **Reduced pressure on native forests:** higher productivity in limited areas reduces demand for fuelwood and other products from natural forests.
- **Optimized carbon cycle:** sustaining vigorous growth under climate stress strengthens the role of plantations in climate change mitigation.

### Social Benefits

- Contribution to the cultural and economic security of communities depending on forest species now threatened by pests and climate change.
- Inclusion of small producers and nurseries through breeding cooperatives, distributing the benefits of genetic innovation more equitably.

### Industrial Benefits

- The same gene-editing tools can be used to improve wood characteristics relevant to pulp and paper production.
- These improvements could allow:
    - **More efficient industrial processes,** reducing water, energy, and chemical consumption in pulping and bleaching.
    - **Lower environmental footprint of the industry,** aligning with FSC sustainability principles.
    - **Added value across the production chain,** making forestry production more competitive and responsible.

For the reasons stated above, we believe **the consultation question should be answered by rejecting the preconception that all use of CRISPR technology is transgenic**. DNA-free CRISPR mutagenesis (SDN1) is not transgenic.

Let us support the use of DNA-free CRISPR mutagenesis for more climate-resilient plantations with greater social and environmental benefits.

Let us support the incorporation of non-transgenic biotechnological tools into forest genetic improvement.

Let us support the use of DNA-free CRISPR mutagenesis in forest genetic improvement.

Apoyemos el uso de mutagénesis con CRISPR, libre de AND, en el mejoramiento genético forestal

**Summary**

| **FSC-POL-30-602**<br>**What counts as GMO** | **Why CRISPR SDN1 is NOT GMO** |
|---|---|
| **Recombinant DNA techniques** (e.g., plasmid vectors introducing engineered DNA) | CRISPR SDN1 is completely DNA-free, using ribonucleoproteins. No recombinant DNA is used or inserted into the trees. |
| **Direct introduction of foreign DNA** into the genome | SDN1 does not introduce foreign DNA. The only change is a small mutation created by the tree's natural cellular repair process (NHEJ). |
| **Unnatural cell fusions** (fusion of cells from different taxonomic families or otherwise unnatural events) | CRISPR SDN1 requires no cell fusion. Delivery methods do not create fused organisms. |
| **Structural genetic changes not occurring naturally** | The actual mutations in SDN1 are generated by the plant's **natural cellular repair process (NHEJ)**, the same pathway that causes **spontaneous natural mutations.** |
| **Explicit FSC exclusions** (mutagenesis, in vitro fertilization, polyploidy induction, etc.) | **SDN1 is precision mutagenesis**: CRISPR only cuts DNA; the **mutation is induced by natural cell repair**, making it equivalent to other FSC-accepted mutagenesis methods. |

The FSC public consultation closes on September 28.

To participate, please go to:

Link to public consultation: https://consultation-platform.fsc.org/en/consultations/?82726