

**IRRI national phase applications for ‘Increasing Hybrid Seed Production through Higher Outcrossing Rate in Cytoplasmic Male Sterile Rice and Related Materials and Methods’ (1st HO)**

Background: Rice female lines containing the High Outcross trait show a dramatic increase in hybrid rice seed production. This innovation reduces the cost of hybrid rice seed production and will thus enable development of a new generation of hybrid rice varieties that are more affordable to farmers. The trait was discovered in a wild relative of rice, *Oryza longistaminata*, originally collected by Indian scientists from Mali, and subsequently transferred from India to IRRI in 1978.

Potential benefit to smallholders: Smallholders are often unable to benefit from conventional hybrid rice varieties. Although they typically out-yield inbred varieties by 15-25%, the yield advantage does not carry through to farm-saved seed, forcing farmers to purchase new seed every year. This, combined with the high cost of hybrid rice seed, makes hybrid rice production a high-cost venture that is beyond the reach of many smallholder farmers. By reducing the cost of hybrid rice seed production, the HO trait will make hybrid rice varieties more affordable, enabling a larger number of smallholder farmers to grow hybrid rice varieties and reap their benefits. This in turn will enable hybrid rice seed producers to target a wider range of geographies to reach more smallholder farmers. IRRI’s control of this technology will ensure that no single private sector company gains control of this trait, and will enable IRRI to implement a responsible dissemination strategy, optimized to suit the specific legal and seed production infrastructure of each target geography, to ensure that farmers benefit from greater availability of lower cost hybrid rice seed.

Key rationale for maximizing global accessibility and impact: Overall the technology is promising; however, it is only at proof of concept stage and a patent is required to incentivize investment in co-development and field trials to demonstrate that it will indeed generate the needed return on investment in various agro-climatic conditions. It is clear however that it is not in IRRI’s mandate or capacity either to prove to national authorities in the target geographies that the hybrids developed by IRRI are sufficiently novel, distinct, uniform and stable to qualify for registration as cultivars, or to prove to the satisfaction of national authorities and potential licensees that they have sufficient value for commercial use to justify their commercial release. That responsibility must be taken on by downstream research and development organizations.

To provide incentives, IRRI anticipates providing time-limited, geographically limited licenses to organizations to exploit the technology.

Dissemination strategy, including global access and communications plans: Detailed dissemination plans are premature because the HO technology is still at proof of concept stage; however, it is clear that, pursuant to IRRI’s IP Commercialization and Communication Policy, IRRI will ensure nonexclusive, royalty-bearing, commercial licenses for private companies, with a commitment to impact assessment and acceleration according to IRRI’s [Intellectual Property, Commercialization, and Communication Policy](#). NARES partners will be provided access pursuant to royalty-free licenses for use in R&D and breeding with a commitment to impact assessment and acceleration. Licenses will ensure that the patent is not enforceable against native traits in landraces or material available through an SMTA under the MLS.

Additionally, a portion of any royalties generated by the patent will be paid into the BSF of the International Treaty, at the rate specified in Article 6.7 of the SMTA. This will be done not only when the SMTA is applicable but also in cases where the licensed product is not strictly subject to the provisions of

the SMTA. Details regarding the PCT application (PCT/ IB2016/053294) that gave rise to these national applications are available on WIPO's [Patentscope database](#). Additionally, IRRI's communications concerning specific patents, licenses, and other commercialization activities are available in Annex 1 of IRRI's [Intellectual Property, Commercialization, and Communication Policy](#).