

Natural Sequence Farming (NSF)

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Natural Sequence Farming is a holistic land management process developed by Peter Andrews in the 1970s at Tarwyn Park, Bylong, in the Upper Hunter catchment of New South Wales. NSF specifically addresses land degradation and biodiversity losses in riparian systems and their disconnected floodplains and valley slopes. It does this primarily by restoring the hydrological functions once associated with the "swampy-meadow-chain of pond complexes", landscape features almost completely destroyed by European agriculture.

NSF can be viewed as a circuit breaker that enables the inherent energy and biological potential still present in the landscape to be harnessed. The implementation of NSF enables the relatively rapid crossing of seemingly irreversible ecological thresholds thereby enabling the jump-starting of the pre-existing and natural self-repair mechanisms needed to address degraded systems.

Water-flow, the watertable, alluvial deposition (i.e. active erosion), plant succession and production are harnessed and manipulated in a sequence of relatively simple actions (Natural Sequence Farming) to:

- Recreate a functional floodplain that drives high levels of productivity (i.e. useable and accessible farm biomass);
- Address and cost-effectively repair significant land degradation within valley floors (e.g. soil erosion, bank collapse, gully formation, floodplain stripping, saline leakage, saline scalds etc.);
- Functionally reconnects the hydrology of drainage lines, creeks and rivers with their adjacent floodplains;
- Enable the underground storage of significant volumes of water along the floodplain thereby allowing plant production to continue during drought conditions (i.e. drought-proofing);

Ameliorate deleterious energy fluxes;

- Redistribute nutrients to all parts of a valley system; and
- Create stable landforms that functionally mimic pre-European "chain of ponds-swampy meadows" complexes once prevalent in valley systems.

The implementation of NSF principles are deceptively simple and to some extent counter-intuitive and takes place in five steps. These are:

Reconceptualizing how pre-European Australian valley systems operated based primarily on an understanding of the "swampy meadow-chain of ponds complex";

- Physically intervening in the floodplain to create:
 - (1) Appropriate small scale, leaky structures in the stream bed to slow down water flow and to facilitate water recharge in the floodplain, thereby mimicking the "dam structures" created by plants such as cumbungi and phragmites masses in the pre-European "chain of ponds-swampy meadows complexes";
 - (2) One or more additional channels through the floodplain running approximately parallel with the stream bed to simulate pre-European multi-channelled floodplains, thereby enabling water to be redistributed across the floodplain to the "break of slope" of the valley floor, and thereby raising the water table across the whole of the valley floor (Yes raising the water table!);
- Harnessing natural freshes or flooding (minor or major) to initiate the processes of sedimentation and plant succession across the floodplain, above and below the leaky structure(s);

- Adaptively managing the process to achieve the stated goals, and to fine-tune structures, assess sediment build up and biomass production; check piezometer levels where appropriate to assess the volume and dynamics of stored water in the floodplain, check salinity levels where appropriate, manipulate vegetation through targeted replanting and/or removals); and
- Harvesting productivity through cropping, haymaking, grazing and encouraging appropriate wildlife, the latter two activities facilitating nutrient reallocation across the valley from riparian zone to valley tops.

Once understood, the underlying principles and the implementation of NSF, whilst very simple to understand and cost effective to introduce, could, if implemented without the appropriate knowledge and training, lead to unwanted outcomes and the exacerbation of land degradation. Furthermore because the NSF process harnesses and manipulates water in the riparian zone there are legal and statutory obligations that may need to be met.

In the presentation, we will also outline the claims that are made about the benefits of adopting NSF, the science and credibility underlying NSF principles and practice, the transferability of the process across the Australian landscape, and briefly describe four case histories where NSF has been implemented.

References

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