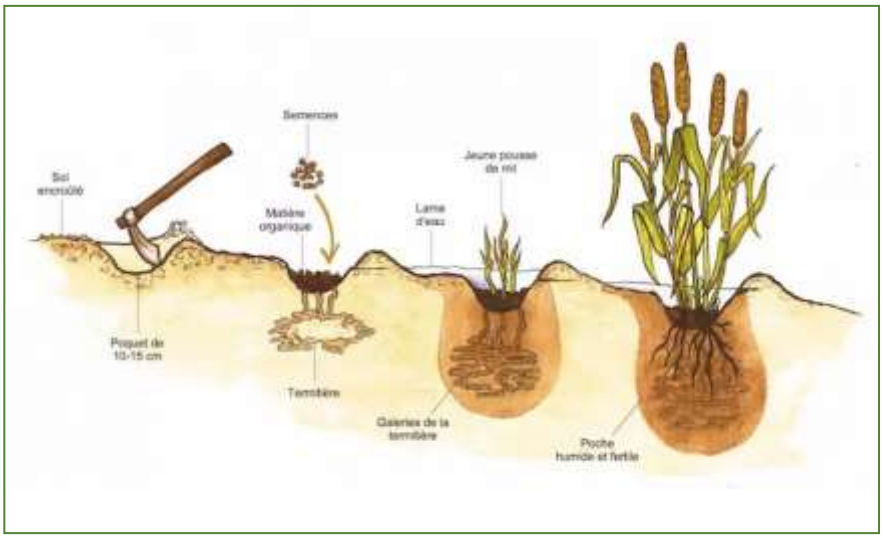
IMPLEMENTING THE ZAI TECHNIQUE OF BURKINA FASO TO RESTORE DEGRADED DRYLANDS

The web page of the Center for International Cooperation in Agricultural Research for Development has published an article presenting the Zai agricultural approach as the technique capable of attracting today the attention of researchers and decision-makers who are looking for new ways of adapting agriculture to climate change and not only in Africa.



ZAI is a farming technique to dig pits in the soil during the dry season to catch water and collect compost.

The article of CIRAD explains that the technique is traditionally used by farmers in the Sahel Region to restore degraded drylands and increase soil fertility. The idea of sowing seeds in the middle of the dry season in a field strewn with holes comes from a centuries-old expertise of the inhabitants and the Zaï revolutionary agricultural technique made them masters in the art of capturing rain. Oral history tells that in ancient times the technique was used by families with very small areas and poor land, before having been abandoned in the 1950s, a period marked by abundant rains. But in the very dry decade of 1970-1980, with the advance of the desert, Yacouba Sawadogo, a farmer from Burkina Faso chose to recover the Zaï technique, thanks to which he managed to revitalize and reforest 27 hectares of degraded land in the village of Gourga.

The creative recovery of this traditional technology, together with the filling of pits with manure and compost to provide plant nutrients, has achieved very significant results to improve agricultural production in Burkina Faso. ZAI holes help improving the yields of trees, sorghum, and millet by more than 500%.

The article highlights that behind its apparent simplicity, Zaï is in reality based on complex ecological mechanisms. The technique consists of concentrating water and manure in order to promote the growth of crops in a context where rain is as rare as random. To do this, during the dry season farmers prepare pockets, that is to say holes 10 to 15 cm deep and 20 to 40 cm in diameter to place organic fertilizers and sow cereals (millet or sorghum).

When the rains arrive, the amended pocket fills with water and releases nutrients that attract termites of the *Trinervitermes* genus. These insects dig galleries through which water infiltrates deeply, and via their droppings, they transform the organic matter which then becomes assimilated by plants. This process results in the formation of a moist and fertile pocket where the plant develops its roots. Some authors claim that with zaï, millet and

sorghum yields can reach 1500 kg of grain per hectare compared to less than 500 kg per hectare in normal conditions.

In addition to being economical and bringing good yields, Zaï also encourages the return of trees to the fields. Pockets tend to trap the seeds of many tree species, the latter being transported by the wind, runoff water and droppings from livestock. When the rains arrive, shrubs develop spontaneously alongside cereals, in the rich and humid environment of the Zaï holes.

In Senegal, researchers from the Senegalese Institute of Agricultural Research (ISRA) and the National Institute of Pedology (INP) are currently carrying out tests to evaluate the quantity of carbon sequestered in the soil thanks to Zaï. Their first results show that in the treated plots, the carbon stock per hectare increases by 52% compared to the control plots. Promise of generous harvests and provider of ecosystem services, the Zaï definitely has everything to seduce.

The only problem is that this technique requires a significant amount of manual work and significant investments. At a rate of 4 hours a day, a single man with his daba will have to dig for 3 months to develop one hectare. What's more, it will be necessary to make or buy 3 tons of manure to improve the pockets.

The article of CIRAD presents the aspects on which research is working to improve the application of the Zaï technology, in particular to reduce the workload for farmers to make it more efficient and viable. Agronomists and local farmers are also working to combine cereals with legumes in the same pockets and are testing Zaï on new crops, such as corn, cotton, watermelon and horticultural crops such as eggplant.

In 2010, the filmmaker Mark Dodd created a documentary, based on Yacouba Sawadogo's experiences, called *The Man Who Stopped the Desert*. In September 2018 Yacouba Sawadogo has been recognized by the 2018 Right Livelihood Award, widely known as the Alternative Nobel Prize. Yacouba Sawadogo was recognized by the Jury *for turning barren land into forest and demonstrating how farmers can regenerate their soil with innovative use of indigenous and local knowledge*. In 2020 Yacouba Sawadogo has been recognized by UNEP as Champion of Earth.

The ZAI system fulfils three functions: soil and water conservation and erosion control for encrusted soils. In particular, the advantages are that it:

- captures rain and surface/ run-off water;
- protects seeds and organic matter against being washed away;
- concentrates nutrient and water availability at the beginning of the rainy season;
- increases yields;
- reactivates biological activities in the soil and eventually leads to an improvement in soil structure;
- The manure applied to the pits contains seeds or bushes. This helps the regeneration of the vegetation on fields treated with pits.

Once rediscovered in Burkina Faso, the Zaï technique quickly spread beyond its original cradle to Mali, Senegal, Niger, Kenya and other countries of the Sahel Region. In the 1980s, several local and international organizations also began to develop projects supporting local farmers in the implementation of this technology as part of the fight against desertification in the

Sahelian territories weakened by the great drought. Present in the Yatenga region since 1982, a team of agronomists from CIRAD have already described the Zaï technique as a promising way of land restoration.

CIRAD is a French prestigious agricultural research and international cooperation organization working for the sustainable development of tropical and Mediterranean regions. Their work has one final aim: to help build capacity in tropical and Mediterranean countries to adapt, learn and innovate, in order to achieve the sustainable development goals (SDGs). Achieving those goals calls for appropriate innovations, in other words a major contribution from science. CIRAD has chosen to focus its research on six main fields: *Biodiversity* – biodiversity as a lever of development and resilience; *One Health* – an integrated animal, plant and ecosystem health approach, in connection with public health; *Agroecological transitions* **-** developing agroecological transition engineering; *Food systems* – supporting the transition to more sustainable, inclusive food systems; *Climate change* – helping all farming systems in the global South adapt to climate change; *Territories* **-** territory based approaches to leverage sustainable, inclusive development. CIRAD also acts as a scientific and technical authority on most tropical agricultural value chains.

To know more

Article CIRAD – la technique du zaï au Sahel

CIRAD website

Territory based-approaches - CIRAD

Pour une approche territoriale au dévéloppement – CIRAD 2020

Yacouba Sawadogo en Facebook

Zai holes in howtopedia.org

Yacouba Sawadogo in Wikipedia

Zai Video in Wikipedia

The man who stopped the desert video in Youtube

Yacouba Sawadogo recognized by the 2018 Right Livelihood Award

Yyacouba Sawadogo 2020 UNEP Champion of Earth.

ZAI in iwmi.cgiar.org

Article in worldwatch.org

Article in theflieldstheyflow.blogspot

Article in krackenscape.blogspot

Article in sustainabilityquest.blosgpot

ZAI Pit Systems in echocommunity.org