

Modernizing mechanization in draft animal use for a sustainable peasant agriculture

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Abstract

Prommata International Association was founded by a “peasant-engineer-technician” and great humanist, Jean Nolle (1918-1993). His work aims at improving the efficiency of agricultural work of small farmers in developing countries, by modernizing their draft animal implements. In order to achieve this, farming equipment and draft animal use should be enhanced through agro-ecological practice to improve their living conditions and make their work more efficient. This results in less hardship, faster implementation and a better quality of agricultural work (sowing, weeding, ridging, etc.). Since the people involved are the poorest farmers, draft animals will often be donkeys which are the most affordable choice. As for the implement: the modern tool-carrier, the Kassine, which has proven its value in many countries where it is locally made, has the advantage of being highly flexible, adapted to all kinds of animals (donkeys, horses, cattle) and easy to use for all members of a peasant family. To ensure this, blacksmiths, the southern partners of the association, are trained to make the Kassine according to precise instructions, then the farmers and technicians in their organizations are trained in how to use the new equipment. This training goes well beyond simply using the tool, because it fits into a plan for agro-ecological production that ensures the sustainability of agricultural production. The use of a particular tillage practice in Burkina, “mechanized zai” with draft animals, provides an example of how to work with a Kassine. The ultimate goal is improving working conditions, income and food security for peasant families.

Kurzfassung

Die internationale Vereinigung Prommata wurde von einem "Bauern-Ingenieur-Techniker" und großen Humanisten, Jean Nolle (1918-1993), gegründet. Seine Arbeit zielt darauf ab, die Effizienz der landwirtschaftlichen Arbeit von Kleinbäuer:innen in Entwicklungsländern zu verbessern, indem ihre Zugtiergeräte modernisiert werden. Um dies zu erreichen, sollten die landwirtschaftlichen Geräte und der Einsatz von Zugtieren durch agrarökologische Praktiken verbessert werden, um ihre Lebensbedingungen zu verbessern und ihre Arbeit effizienter zu gestalten. Dies führt zu weniger Entbehrungen, einer schnelleren Umsetzung und einer besseren Qualität der landwirtschaftlichen Arbeit (Aussaat, Unkrautjäten, Eggen, usw.). Da es sich bei den Betroffenen um die ärmsten Landwirt:innen handelt, werden als Zugtiere häufig Esel eingesetzt, die die kostengünstigste Wahl darstellen. Was die Arbeitsgeräte betrifft, so hat der moderne Werkzeugträger, die Kassine, die sich in vielen Ländern, in denen sie vor Ort hergestellt wird, bewährt hat, den Vorteil, dass sie sehr flexibel ist, sich an alle Arten von Tieren (Esel, Pferde, Rinder) anpassen lässt und von allen Mitgliedern einer Bauernfamilie leicht benutzt werden kann. Um dies zu gewährleisten, werden die Schmied:innen, die südlichen Partner:innen des Vereins, darin geschult, die Kassine nach genauen Anweisungen herzustellen, und anschließend werden die Landwirt:innen und Techniker:innen in ihren Verbänden in der Verwendung der neuen Ausrüstung geschult. Diese Schulung geht weit über die bloße Nutzung des Geräts hinaus, denn sie fügt sich in ein agrarökologisches Produktionskonzept ein, das die Nachhaltigkeit der landwirtschaftlichen Produktion gewährleistet. Die Anwendung einer bestimmten Bodenbearbeitungsmethode in Burkina, des "mechanisierten Zai" mit Zugtieren, ist ein Beispiel dafür, wie man mit einer Kassine arbeitet. Ziel ist es, die Arbeitsbedingungen, das Einkommen und die Ernährungssicherheit der Bauernfamilien zu verbessern.

Résumé

L'association Prommata International a été créée par un « paysan-ingénieur-technicien », grand humaniste, Jean Nolle (1918-1993). Ses actions visent à améliorer l'efficacité du travail agricole des petits paysans des pays en développement, grâce à la modernisation de leurs outils en traction animale. Pour y parvenir, il s'agit d'améliorer l'équipement agricole et l'utilisation des animaux de trait dans des pratiques agroécologiques pour améliorer les conditions et l'efficacité du travail de ces paysans. Il en résulte une moindre pénibilité du travail humain, une rapidité d'intervention accrue et une meilleure qualité du travail agricole (semis, sarclages, buttages, etc.). S'agissant des paysans les plus nécessiteux, l'action portera souvent sur l'espèce asine qui reste la plus accessible pour les plus démunis. Concernant l'équipement : la promotion d'un porte-outil moderne, la Kassine, qui a fait ses preuves dans de nombreux pays, où il est fabriqué sur place, présente l'avantage de sa polyvalence, de son adaptation à tous les attelages (ânes, chevaux, bovins) et de son utilisation facile par tous les membres de la famille paysanne. Pour cela, les forgerons, partenaires du Sud de l'association, sont formés à la fabrication de cette Kassine selon un cahier des charges précis qui leur est donné. Les paysans et les techniciens de leurs organisations sont formés à l'utilisation de ce nouveau matériel. Ces formations dépassent la simple utilisation du matériel car elles s'inscrivent dans un schéma de production agroécologique pour assurer la durabilité de la production agricole. La diffusion d'une pratique particulière de préparation du sol, le « Zai mécanisé » en traction animale, au Burkina, illustre un exemple d'utilisation de la Kassine. C'est en définitive l'amélioration des conditions de travail, des revenus et de la sécurité alimentaire des familles paysannes qui est visée.

Resumen

La Asociación Internacional Prommata fue fundada por un "campesino-ingenero-técnico" y gran humanista, Jean Nolle (1918-1993). Su trabajo tiene como objetivo mejorar la eficacia del trabajo agrícola de los pequeños agricultores de los países en desarrollo, mediante la modernización de sus aperos de tiro. Para ello, es preciso mejorar el equipamiento agrícola y potenciar el uso de los animales de tiro mediante prácticas agroecológicas para mejorar sus condiciones de vida y hacer más eficiente su trabajo. De este modo, se reducen las dificultades, se acelera la ejecución y se mejora la calidad de las labores agrícolas (siembra, escarda, aporque, etc.). Dado que se trata de los agricultores más pobres, los animales de tiro suelen ser burros, que son la opción más asequible. En cuanto al apero, el moderno portaherramientas, el Kassine, que ha demostrado su valor en muchos países donde se fabrica localmente, tiene la ventaja de ser muy flexible, adaptarse a todo tipo de animales (burros, caballos, ganado) y ser fácil de usar para todos los miembros de una familia de agricultores. Para ello, los herreros socios de la asociación, reciben formación para fabricar el Kassine según instrucciones precisas, y después se forma a los agricultores y técnicos de sus organizaciones para que sepan utilizar el nuevo equipo. Esta formación va mucho más allá del simple uso de la herramienta, ya que se inscribe en un plan de producción agroecológica que garantiza la sostenibilidad de la producción agrícola. El uso de una práctica de labranza particular en Burkina, el "zai mecanizado" con animales de tiro, proporciona un ejemplo de cómo trabajar con un Kassine. El objetivo final es mejorar las condiciones de trabajo, los ingresos y la seguridad alimentaria de las familias campesinas.



The international solidarity association, Prommata International (P.I.), founded at the end of the twentieth century by Jean Nolle (1918-1993), endeavors to promote modern animal draft as a means to support and develop ecological, farmer-based and sustainable agriculture around the world. Jean Nolle, a “farmer-engineer-technician”, who was also a humanist visionary, worked to make animal draft a way for small farmers to be independent, especially by designing “modern”, innovative and highly flexible agricultural implements¹ that have spread to many countries.

Relaunched in the twenty-first century, our association seeks to pursue the work begun by Jean Nolle and provide small farmers with a response using animal draft and an implement adapted to their needs: a realistic, accessible solution for the poorest farmers that is respectful of people and the environment².

The interest in using animal power in agriculture³

Using animal power along with a tool kit adapted to agro-ecological cropping methods is a sustainable solution to improve the working efficiency of small farmers in agriculturally challenging areas. This approach enables small farming structures to benefit from equipment and techniques that improve the efficiency and productivity of the poorest farmers, resulting in better harvests, both in quality and quantity, and thus improved food security for their families.

We can also emphasize that this is equally applicable for some family farms in Europe, especially those dedicated to market gardening, tree farming and wine production⁴.



Figure 1 – Ridging potatoes with the Kassine, France

Effective use of animal draft supposes being able to utilize a series of specific tools to carry out the main tasks of the agricultural cycle, from soil preparation to harvest. For example, this can involve sowing a field at the end of the dry season which requires people to do a lot of work, when it is done manually (as with the traditional practice

of *zaï* in Burkina Faso, see below). When *zaï* is mechanized thanks to animal draft developed with the Kassine over recent years in Burkina Faso, field preparation before the rainy season is faster, more efficient and above all, requires less investment in human effort⁵.



Figure 2 – Working in a greenhouse with a Kassine

The same is true of hand weeding of crops (often carried out by women) to aerate the earth so that it does not crust up and will retain moisture better... Without animal draft, this kind of work requires entire days of demanding manual labor that often has to be done in a very short time. Once again, using draft animals with appropriate implements makes it possible to weed and earth up crops faster and with less fatigue for the farmer.

The donkey, the working animal of the poor

Donkeys, those modest equids, are the most affordable draft animals for poor families and there are often many donkeys in the countryside in African countries like Burkina Faso and Mali.



Figure 3 – Rudimentary homemade harness, Burkina

1 Nolle 1986.

2 Prommata International, URL:<https://www.prommata-international.fr> [09-03-2022].

3 Lhoste et al. 2010; Id. 2013.

4 Prommata, URL: <http://prommata.org/> [09-03-2022].

5 Barro et al. 2005.

Furthermore, donkeys are frequently used for draft transport and too rarely for working the soil, which remains mainly manual labor. These donkeys are all too often poorly cared for and trained (“trained with the stick”), poorly harnessed, overworked and frequently beaten, when they are such friendly animals that require so little and are very good workers.

The farming implements peasants have are often poorly adapted to these small animals and do not work well because they are poorly maintained.

In fact, simple and robust donkeys that are inexpensive and easy to care for seem to be the “draft animals of the poor” most adequate for modest families. They make work easier, most especially for women who handle transport (water, wood, etc.) and work in the fields. The work of Prommata International and its partners has demonstrated the interest in such improvements in several sub-Saharan African countries involving:

- Good stockbreeding practices, in training and handling donkeys to improve work
- Improving harness and equipment for tillage, especially using the simple and inexpensive collar made by local craft people to replace the unwieldy breast collar presently used
- Developing farming equipment appropriate for this modest draft animal



Figure 4 – Donkey at work with a Kassine wearing an appropriate homemade collar, Burkina

Improving the equipment: promoting a modern tool-carrier, the Kassine

The Kassine is a flexible carriage inspired by the *kanol* and the *houe-sine* (*sine hoe*), two inventions made by Jean Nolle. The Kassine was designed and fine-honed by the Association Prommata and has been sold since 1994 to European market gardeners working with animal draft. The Kassine has also been adapted, introduced and tested in various countries of the South and, using diverse implements, makes it possible to do fieldwork. This poly-cultivator is made in Burkina by blacksmiths trained by Prommata.

Various tools can be made and used with the Kassine: subsoiler tine, moldboard plough, ridger, furrow opener, springy tines cultivator, etc.

- The simple way the Kassine is designed enables small workshops to make, maintain and repair it easily and locally
- Standardized design enables component and tool exchange among users and joint purchase by several families of some tools. For the workshops involved, standardization encourages joint ordering of raw materials, hence at the most competitive prices. Standardization is a guarantee of product quality and long-lasting implements
- Flexibility: in both North and South, farmers’ tool needs are many, depending on the work to be done and the technical itineraries adopted. It is possible to add tools to the Kassine gradually and hence to improve equipment over several seasons. The most expensive tools can also be purchased and utilized by several families (for example, furrow opener disks...)

This kind of equipment is also appropriate for some family-run farms in Europe that usually work with equids, especially in market gardening.

Important advantages of the Kassine for developing countries

In small farms in the South, the Kassine can be used with various draft animals that farmers may have. It enables them to carry out most tillage work, formerly done by hand, with less fatigue and can be used by all the farming family.

Important progress can be made on small family farms, thanks to proper utilization of draft animals along with a flexible implement like the Kassine.

It has been introduced and tested in many countries in the South such as Algeria, Burkina Faso, Madagascar, Mali, Morocco, etc. In some countries like Burkina Faso, it is made locally by blacksmiths and is increasingly utilized and appreciated by small farmers, especially for its flexibility⁶.



Figure 5 – Tilling soil in Morocco

6 Prommata International, URL: <https://www.prommata-international.fr> [09-03-2022].



The advantage of the implement is its being adapted to all kinds of animals (donkeys, horses, cattle) and is easy to use by all members of the farm family.

Designed to last for years, the Kassine is sufficiently robust to be pulled by powerful animals (such as a pair of oxen) for harder work. All draft animals can be hitched to it, providing the tools are adjusted to their draft power. A donkey alone can also do all the tasks involved in fieldwork, but the success and quality of work are linked to the choice of tool, appropriate adjustment of the handlebar and the notch bar, the pressure on the handlebar and good harness for the animal's comfort.

In the African Sudano-Sahel and Sahel regions, working animals are mainly zebus, donkeys and horses (particularly in Senegal). Purchasing a pair of cattle is an important investment and often out of reach for small farmers. Cattle also require more food than donkeys, which is a problem on small farms.

Farmers should choose the sex of their draft animals according to their objectives: female, male, gelded or ungelded. For cattle, oxen (castrated males) are often preferred, but using cows for light work has many advantages. For equids, especially donkeys, males are rarely gelded in Africa.

Cooperative partnership practices

Our partner blacksmiths in the South are trained to make the Kassine according to the precise specifications provided them.

Prommata International thus carries out know-how-sharing and training for partners so they can make the animal draft equipment locally that is aimed at farmers in these countries. Our training missions enable mechanic-solderers as well as future training staff to produce implements appropriate to their country's farmers.



Figure 6 – Blacksmiths making a Kassine, Burkina

Traceability and quality monitoring of Kassines made by the workshops are an essential aspect for success in promoting this tool-carrier.

Farmers and technicians in their organizations are trained to use this new material.

It is paramount to emphasize training the producers. With optimized use of animal draft thanks to an implement appropriate to users' needs, it is possible to reconcile increasing cultivated surfaces and decreasing working time.

Another important point is also improving animal harness and tillage equipment. The simple and inexpensive collar made by village craftsmen can replace the unwieldy breast-collar that is currently used.

Farmers, training agents in their organizations and agricultural technicians are also trained in agro-ecological practices founded on crop-livestock association, using animal draft as well as modern equipment appropriate to their needs, thus representing the following advantages:

- Reducing hardship involved in the manual work presently done (cropping activities, various transport tasks...)
- Speeding up some work such as sowing, weeding, ridging, transport, etc.
- Improving tillage practices (mechanized *zai*, weeding, earthing up, etc.)
- Producing and using organic matter necessary to keep the soil fertile thanks to quality composts and manure

An example from Africa: “mechanized *zai*” in Burkina Faso

The example of encouraging mechanized *zai* using animal draft in Burkina Faso demonstrates the advantages of using the Kassine.

Traditional *zai* is dibble tilling done by hand in Burkina Faso. This technique requires around 300 hours/hectare of work, that is, some 40 days of work during the hottest time of the year (at the end of the dry season)



Figure 7 – The author trains the local population in the use of the equipment

Equipping the animal-powered Kassine with a tine enables farmers to efficiently cross-mark the ground, a technique we call “mechanized zaï”. When this is carried out on a larger surface, where power and endurance are required, the Kassine is only effective when pulled by a pair of donkeys.

This tillage method considerably improves much-needed water and soil conservation.

To conclude, several goals can be met using this modern tool-carrier, the Kassine:

- Firstly, improving working conditions of peasant farmers by replacing some manual work with draft animal power
- Further, enabling agro-ecological practices that improve soil life and structure to provide better harvests
- Finally, improving sustainability of agricultural production

This truly aims at improving working conditions, income and food security for peasant families.

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