

# The Vetiver System for Soil and Water Conservation in Ethiopia: The Case of Anno Agro-industry PLC, Gobu Sayo District<sup>1</sup>

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## *Introduction*

Anno Agro-industry is a commercial private farm that has been in the business of production and dissemination of improved crop seeds over the last 15 years. Its ownership is shared among five friends who pulled their knowledge and resource to establish the farm.

This company focuses on generating income through the multiplication and dissemination of improved crop and livestock technologies to farmers. High emphasis is placed on the promotion of sustainable land use and training of farmers on the use and application of improved agricultural practices. The promotion of sustainable land use is achieved through soil and water conservation and maintenance via the use of crop field terraces with vetiver grasses, forest development, crop rotation and manure use.

The company also targets creation of job opportunities for surplus rural and urban labor. Women and youth in the area have been exploiting this opportunity to enhance their economic status. Many students from nearby villages and towns have been benefited from jobs in this farm during school vacation. Farm households use this farm as model farm for improving their agric business as well as wage provider.

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### *Location and Climate*

The farm is physically located in Eastern Welega Zone of Gobu Sayo District at 260 km along the turmeric road connecting Nekemte town to Addis Ababa. The altitude of the land under this farm ranges between 1700-1900masland the mean temperature is around 26°C while its annual mean rainfall is 1200mm. The climate is suitable for the production of cereals, pulses, oilseeds, fruits and vegetables. All species of livestock also do well under such agro-ecological zone.

### *Objective and Enterprise Mix*

The objective of Anno farm is to produce and disseminate crop and livestock technologies through the promotion of sustainable land use. It puts high emphasis on water and soil conservation and training of farmers on improved agricultural practices to achieve this target. The following comprise the company's current enterprise mix: Whereas the ground work for some has already been done, preparation for making them operational for others is underway.

1. Production and distribution of seeds of improved crop varieties
2. Production and dissemination of in-calf  $F_1$  crossbred heifers (Friesian X Horro)
3. Production and distribution of milk and milk products
4. Fattening of cattle and sheep
5. Honey production, processing and marketing
6. Fruits and vegetable production and marketing
7. Forest development and maintenance

Whereas execution of enterprises indicated under items 1, 2, 7, 8 and 9 is going on, at present, preparation is underway to take the rest onboard soon. In all our activities high emphasis is put on sustainability of agricultural business undertaking.

## ***Conservation of Soil and Water in the Context of the Ethiopian Agriculture***

A fast human population growth of close to 4 % per annum over the recent decades has put agricultural land under an intense pressure. This has not only caused a considerable decrease in the size of crop plot available for each household but has also extended agricultural practices beyond its conventional niche. Agriculture has expanded to traditional bottomland grazing areas and high hills and cliffs of forestland with steep slopes with least suitability for crop farming (Figure 1).



Figure1. Crop farming on slopes and valley bottom grazing lands (Ethiopia, 2008)

The overall negatives consequences of the expansion of crop farming into fragile territories led to soil degradation due to erosion, deforestation and overgrazing with a resultant lowered land productivity. This national menace has compelled Anno Agro-industry to take up the issue of addressing the development, maintenance and

promotion of natural resources. The company has committed itself to serve this purpose through crop field terracing and forest Development

### ***Crop Field Terracing***

Land under the current use of Anno farm was abandoned by the then Wellega State Farm due to poor soil fertility and productivity stemmed from mono-cropping of maize that depleted soil nutrients and water/wind erosion which washed off top soil and fed it to nearby rivers.

Anno harvested frustrating crop yields in the first two cropping season following its land acquirement 14 years back. There was a clear landmark that unless something was done urgently to improve the soil fertility status the company would continue losing money in operating under that circumstance.

One of the alternatives sought to prevent further loss of soil fertility via erosion had been to revert to terracing of field crops with vetiver grass (Figures 2 and 3). Global experience shows several advantages of using vetiver grass on crop field terraces. It is capable of resisting silts and retarding runoff allowing water to slowly absorb into the soil. Its strong fibrous root system that penetrates deep into the soil forms a tightly knitted network that binds underground soil together and retards water flow assisting the water to seep into the soil (Chaipattana Network, 1996). Vetiver hedgerows are known to preserve 25-70 % water to the advantage of the crop field. Since vetiver grass root system grows more vertically than horizontally, it does not compete for more space with crops planted in the field with the hedgerows.

Mulching from vetiver grass leave cuts adds more fertility to the soil through naturally balancing the organic content, plant nutrients and microorganisms. It has been estimated that mulching cuts from 4-month old vetiver grass on average provides 1.29 N, 0.15 S, 0.20 P, and 1.3 % K, respectively of the weight of dry grass (Chaipattana Network,1996).



Figure2. Maize Seed Field Terraced with Vetiver grass (Anno Farm, 2008)



Figure3. Close View of Vetiver Grass in Crop Field Following Maize Harvest (Anno Farm, 2008)

Anno farm built a terrace of about 270 km in its crop field over the last decade to halt soil erosion and it will continue this task until fields with some slopes are all covered. Apart from its use as erosion preventer, vetiver grass has been a sustained income generator for the company. People purchase the cut virtually year round for; thatching hut roofs, green mats for festive and fill for mattress and pillows. Though not practiced here in Ethiopia, vetiver grass leaves can also be used for handcraft weaving like baskets, winnowing baskets, trays, hats, lady's bags, belts, picture frames, lampshades and many other household utensils in various countries (Chaipattana Network, 1996). Vetiver grass has extensively been used in the perfume industry, bio-fuel, pond filter, compost making and mushroom culture.

### ***Forest Development and Maintenance***

Anno owns around 40 ha forestland (Figure 4) consisting of indigenous and introduced tree species, which is protected from the intrusion of animals and humans.



Figure4. Protected Forest Land (Anno Farm, 2008)

The company has been enriching its forest land with mango trees (Figure 5), bananas (Figure 6) and coffee trees (Figure 7) to add more value to its ecological and economical worth.



Figure5. Mango Seedlings Planted into the Forest Area (Anno Farm, 2008)



Figure6. Banana Trees Planted into the Forest Area (Anno Farm, 2008)



Figure7. Coffee Trees in Forest land (Anno, 2008)

### ***Implications of Forest Development on Anno Farm***

Anno farm benefited from developing and maintaining forestland in so many different ways. As a result of erosion prevention and improvement of rainfall water percolation deep into the soil, ground water recharging and spring flow have been enhanced greatly (Figures 8 - 11). The forestland has served as wildlife sanctuary for those animals on the verge of extinction from the area. It has substantially contributed to the maintenance of ecological balance for the microflora and fauna in the area and laid a foundation for the future development of Eco-tourism in East Welega Zone. Moreover, this forestland has met the construction requirement of Anno farm and can be turned into a sustained potential income generator via direct sale of forest and honey products.





Figure8. Water oozing out as a result of forest development



Fig 9. Sustained supply of water  
For drinking year-round as a  
result of forest development



Fig10. Provision for irrigation  
due to continuous flow  
of springs



Fig11. Man freely harvesting the gift of nature in the dry period

## Conclusions

The fast population growth on the finite land resources continuously makes it difficult for developing countries to produce enough to feed their population. Attempt to produce enough quite often relied on the horizontal expansion of agricultural practices with huge irreversible ecological degradations stemming from deforestation, overgrazing, and soil erosion. This scenario has culminated in poor land productivity with negative economic, social and political implications.

Commercial farms have a pivotal role in reversing the gloomy situation if they are well integrated with their surrounding farming communities. They can be a source of; knowledge, technology and income. It was with this motive that Anno Agro-industry started commercial farm operation in East Welega Zone of Oromiya Regional State. This company now multiplies and disseminates improved technologies of crop and livestock to farmers and strives to train them on improved agricultural practices including sustainable land use. It emphasizes forest development and crop field terracing with vetiver grass to conserve soil and water resources. The company has been able to create ample job opportunities for rural setting in general and women and girls in particular. It also generated a substantial revenue for itself and the nation. It has achieved a commendable result in its effort to promote environmentally friendly agric business.

## References

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