Examining the Success of Syntropic Agroforestry as a Sustainable Agricultural Method for Achieving UN Sustainable Development Goal Two

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Introduction:

To meet Sustainable Development Goal Two (SDG2), there is a requirement for adaptation of local agricultural practices that foster human health and productivity, maintain environmental sustainability, and allow for social stability and the promotion of rural livelihoods. Sustainable agricultural practices such as syntropic agroforestry, a method which mimics the environment in order to produce food, have the means to achieve these targets. This study aims to assess whether syntropic agroforestry is a sustainable agricultural method and if it could be applicable in temperate regions on a larger scale. Key implications that came across in both the survey and literature were the increased amounts of labour, management and therefore time the method requires, with higher levels of skill, knowledge and training necessary for effective implementation. It also questions whether if this could be done, the method could have a part in achieving the targets of SDG2. It was found that the shortfall of government funding and policy was complicating the success of the method with the main challenges it presents being time, skill and increased labour.

Research Objectives:

- To what extent is syntropic agroforestry a sustainable method of producing high-yield crops?
- Would syntropic agroforestry be applicable on a large scale in temperate regions?
- Could syntropic agroforestry have a part in achieving the targets of SDG2?

Methodology:

The methods used in conducting this research were split into two elements. The first was a primary survey consisting of a mixture of 26 open and closed-ended questions. This survey was shared with a Facebook group, The Syntropic Agriculture Community, consisting of over 20,000 members.

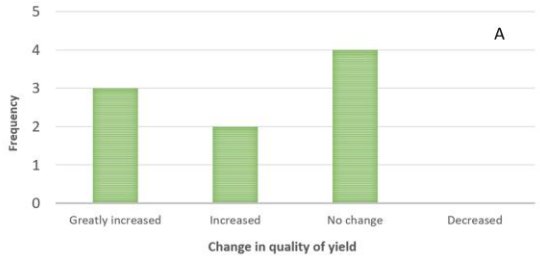
The second method was the use of secondary literature through academic journal articles discussing the method and agroecological concepts generally. Further study of data, policy and legislation around SDG 2 was also conducted to assess the third research question.

Results:

A total of 11 participants answered the survey with 64 percent of participants identifying as male. These participants were widely distributed with 10 different countries recorded. The open-ended questions lead to conclusions about the benefits and challenges of the method. Reoccurring challenges included time and labour intensity, with only 18 percent of participants stating that the syntropic method was less labour intensive than conventional methods. Also, the increased knowledge and technical skills required, which was a voiced concern throughout the survey responses and secondary literature. It was however voiced by one participant that these challenges are to be expected as the method is in the stages of research and development. 82 percent of participants felt this method could be used on a commercial scale with 91 percent of participants stating that they will continue to use this method in the future, and 10 participants agreeing it is sustainable under a changing climate. In terms of benefits, reoccurring themes were biodiversity and soil fertility with 91 percent of participants having positive responses. Furthermore, 45 percent of participants stated environmental reasons such as this as motivation for applying the method as well as carbon sequestration, sustainability and afforestation.

Figure 1

Figure 1- Graphs to show change in quality and quantity of yield, indicating whether the use of syntropic agriculture as a method has been beneficial to the growing system.
A- Figure 4a portrays the change in quality of yield of the participants since using the method of syntropic agroforestry. It was very interesting to note that no participants stated that their quality of yield had decreased while 44 percent said they had observed no change in yield quality. 33 percent of participants had a greatly increased quality of yield and 22 percent stated that it had increased but not greatly.
B- Figure 4b portrays the change in quantity of yield. It is of note to point out that like with Figure 4a depicting the quality of yield, Figure 4b also had no participants stating that their quantity of yield had decreased. Once again 44 percent of participants recorded no change.



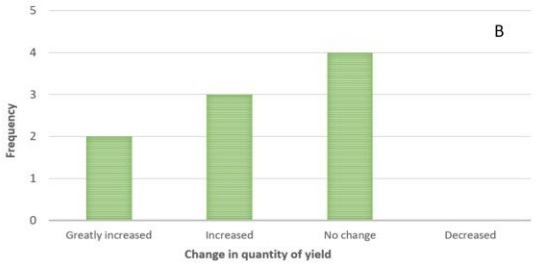
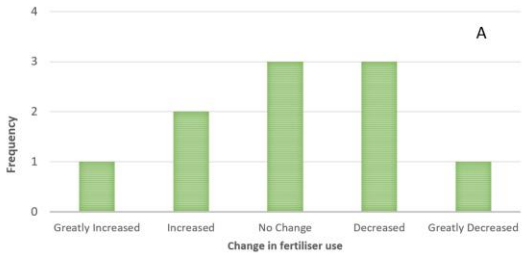


Figure 2



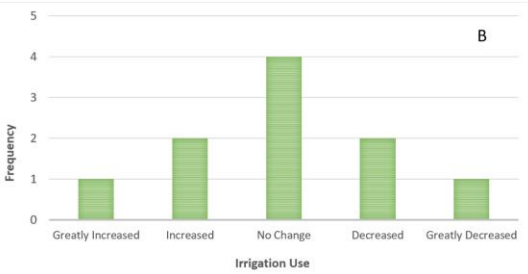


Figure 2- Graphs to show whether changes in water consumption through irrigation and fertiliser usage have changed to indicate whether the method allows the system to be sustainable with lower external inputs.
A- Figure 5a shows the participants change in fertiliser usage. This was interesting when compared to the water usage graph (Figure 5b) as there was a less even spread between the increased and decreased usage. 30 percent of participants experienced no change however, 30 percent experienced a decrease in fertiliser usage. Like Figure 5b, 10 percent of participants stated that it either greatly increased or decreased, and 20% said it just increased but not greatly. Overall, more participants said it decreased than those that said it increased by 10%.
B- Figure 5b shows the participants change in water consumption through irrigation use. This was widely varied, however the largest proportion of participants (40 percent) said they experienced no change. The number of participants that said it increased/decreased was the same at 20% and 10% of participants said it either greatly increased or decreased.

Conclusion:

In conclusion, as much as agroecological methods could be the future for agricultural systems, more research, development, and funding is needed to apply syntropic agroforestry methods feasibly and sustainably on a large scale. Syntropic agroforestry could help achieve targets 2.3, 2.4 and 2.5, however for any agroecological method to achieve targets 2.1 and 2.2, more government funding and policy is needed to apply the methods on a large scale (Tittonell, et al., 2020). There are many benefits of the syntropic method to the user including personal satisfaction and the possibility for economic benefits (Gotsch, 1995), however it isn't realistic for this to be seen on a large scale in temperate regions without financial backing and support from governments (Tittonell, et al., 2020). It was clear when reading the longer responses from participants that time, labour intensity and skill were the key challenges this method presents which is something that academics such as Andrade, et al. (2020) also recognise. Despite this, there are many apparent benefits when applying this method to agricultural systems (Gotsch, 1995 & Parreira da Silva, et al., 2023) and it has the means to be a sustainable method of producing high-yield crops over time with more development and innovation of technology to allow it. Future generations, without nurturing the environment and encouraging climate-resilient agriculture, will struggle to feed the growing population (FAO, 2019b) and for that reason, on the ground research in areas where the syntropic method is more prevalent such as Brazil is necessary and would be beneficial.

Tittonell, P. et al., 2020. Agroecology in Large Scale Farming—A Research Agenda. *Frontiers in Sustainable Food Systems,* VTittonell, P. et al., 2020. Agroecology in Large Scale Farming—A Research Agenda. *Frontiers in Sustainable Food Systems,* Volume 4.
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Andrade, D., Pasini, F. & Rubio-Scarano, F., 2020. Syntropy and innovation in agriculture. *Current Opinion in Environmental Sustainability,* Volume 45, pp. 20-24.
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