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

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Abstract:

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 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.

Introduction:

Food is intrinsic to the survival of humans yet more than 820 million people go hungry every day, a fact that underpins the targets of the United Nations Sustainable Development Goal Two (SDG2): End World Hunger (FAO, 2019a). Furthermore, three quarters of those without proper nutrition are the family farmers that grow most of the planet's food (FAO, 2018). However, the population of malnourished people has declined from 1 billion individuals in 1990 to around 800 million today (FAO, 2015), a trend that needs to continue.

Deforestation, water-scarcity, biodiversity loss, soil depletion and greenhouse gas emissions have all been influenced strongly by resource-intensive, high-external input agricultural systems (FAO, 2018; Parreira da Silva, et al., 2023). It is estimated that the world population will reach 9.1 billion by 2050 (Allahyari & Poursaeed, 2020), therefore in order for humans to have a viable existence on Planet Earth in the future, a sustainable food production system must be implemented. The Sustainable Development Goals (SDGs) were adopted in September 2015 as part of the 2030 Agenda for Sustainable Development (United Nations, 2015). They embrace three principal strategies: economic development, social equality, and environmental sustainability (Sachs, 2012). In order to meet these SDGs 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 (FAO, 2019b). The Human Right to Nutrition is a basic human right (FAO, 2019b), and Allahyari & Poursaeed (2020) argue it is unethical and immoral that people do not have access to food.

Sustainable agriculture first came to light in 1980s with one of the first reference points being the emergence of regenerative agriculture as a concept (Harwood, 1990). Defining it can be subjective, however, for the purpose of this paper, it will be defined as the upkeep of food production over a long time period, whilst reversing the effects of conventional agriculture, regenerating the soil and reviving biodiversity, without causing detrimental harm to humans or the Earth (Allahyari & Poursaeed, 2020). It is not simply a shift away from conventional agricultural practices but a significant change in the way we view food production (Allahyari, 2019). Agroecology, the foundations of which are a set of principles rather than practices (Tittonell, et al., 2020), is a synonym for sustainable agriculture as they have parallel end objectives (Allahyari & Poursaeed, 2020).

Syntropic Agroforestry, a method of sustainable agricultural production that mimics the natural ecosystem in order to produce crops (Gotsch, 1995), will be used in this study as an example of an agroecological practice. This is a novel concept, first coined by Ernst Gotsch in the 1980s that began to spread amongst Brazilian farmers in 1993 through practical courses and websites such as 'agendagotsch.com' (Andrade, et al., 2020). Research has shown clear benefits that using this method presents, however a critical review of the efficacy of syntropic agroforestry as a sustainable and successful agricultural method is lacking. Moreover, it is unclear how the efficacy of this approach may vary with climate or whether this approach can be upscaled and applied more broadly across commercial food production systems. The aim of this project is to begin to address some of these uncertainties. The design of syntropic agricultural systems places each plant in the optimal condition for its growth, focussing on the perfect position in space (strata) and succession (time) (Andrade, et al., 2020). This method creates a system made up of stratigraphical layers of vegetation of different densities in all successional stages, resulting in multiple layers of photosynthesis. Photosynthesis is the key to biomass production and thus maximising photosynthesis creates a more vigorous system (Parreira da Silva, et al., 2023). A heat sink is then created between the sparser top canopies and denser lower canopies which maintains soil moisture. (Andrade, et al., 2020). This allows for humans to become part of the strategy of the ecosystem with syntropy at its premise, syntropy being the opposite of entropy, governing the thermodynamic transformations that release energy (Ludovico, 2008).

This study aims to address three research questions: (1) To what extent is syntropic agroforestry a sustainable method of producing high-yield crops?; (2) would syntropic agroforestry be applicable on a large scale in temperate regions?; and (3) could syntropic agroforestry have a part in achieving the targets of SDG2? A primary survey will be carried out to investigate the first-hand experiences and perspectives of farmers, researchers, and hobbyists. This data will be collected alongside secondary data collated and synthesised from research articles, policy reports and legislation in order to gain a critical understanding of the current knowledge and understandings of both syntropic agroforestry and 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 created using Microsoft Forms and shared with a Facebook group, The Syntropic Agriculture Community, consisting of over 20,000 members. The aim of this was to develop an understanding of peoples' personal, hands-on experiences of syntropic agroforestry as a method of sustainable agriculture. It also enabled the collection of quantitative data assessing the technical benefits and/or challenges of the method, and how individuals had been able to utilise it. The questions asked for people's opinions on whether the method was advantageous over conventional agricultural methods, but also recorded whether it had changed the yield of their crop or altered their use of water through irrigation and fertilisers. A copy of the survey can be found in the appendix of this paper.

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 in order to assess the third research question.

Results:

A total of 11 participants answered the survey. On the first release of the survey, six participants responded, however when uploading the survey again a week later, a further 5 answered- 4 of which were the only females to answer the survey. Not all 11 participants answered every question as not all were farmers or growers of their own syntropic systems.

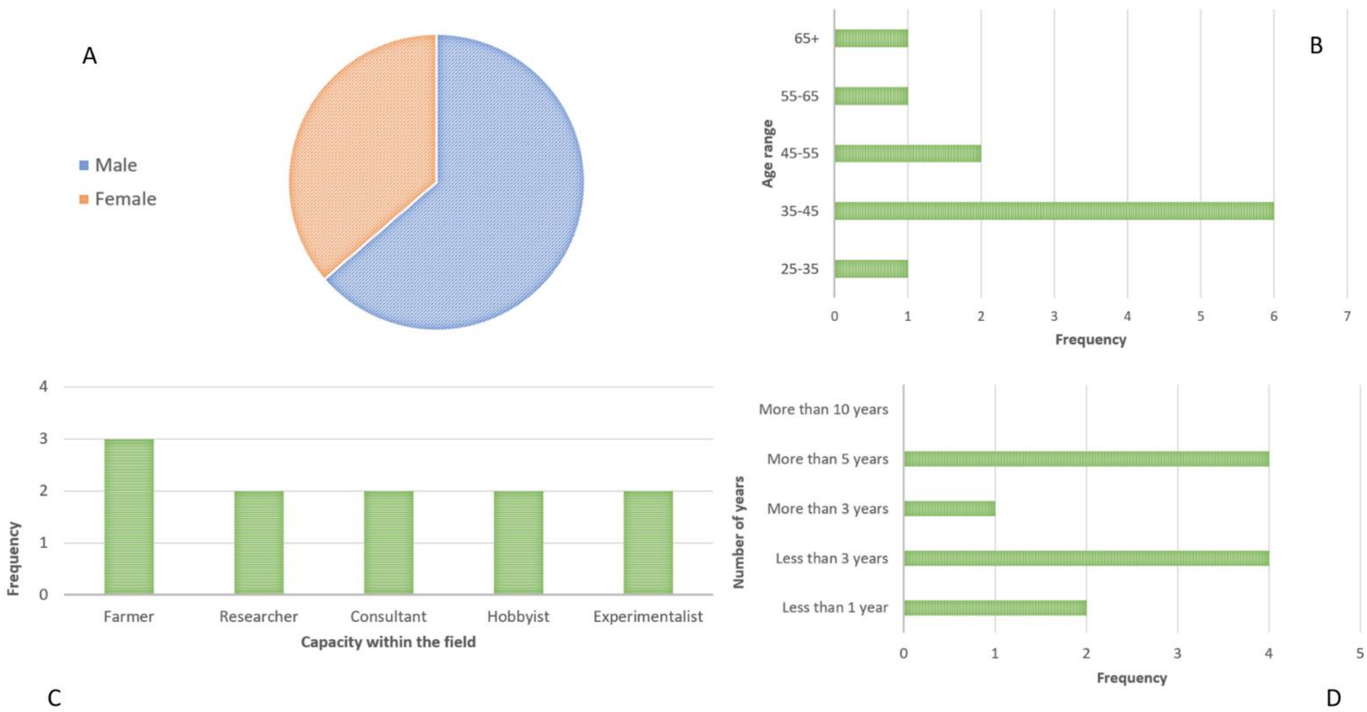


Figure 1- (a, b, c and d) show the background context of each participant to give more insight into the position they are in as a participant answering the survey. In the results for Figure 1c, one participant stated that they would fit multiple categories however they most identified with being an experimentalist, so for the purpose of this study and to avoid unnecessary complication they were categorised as such. Only one person had worked in the field for more than 3 years and less than 5 years and they identified as a consultant and designer of syntropic systems (Figure 1d). A- depicts the proportion of males and females that answered the survey, with the result being 64 percent male participants and 36 percent female participants. B- shows the ages of participants answering the survey. The modal age range was 35-45 with 55 percent of participants in this range and only one participant in each of the ranges 25-35, 55-65, and 65+. C- shows the proportion of participants in different occupations within the field of syntropic agriculture with 'farmer' being the largest proportion at 27 percent but only by 9 percent with the other four categories each having 19 percent of participants. D- depicts the number of years participants have been working in the field of syntropic agroforestry, with the largest number of participants working in the field for either more than 5 years or less than 10 years; 0r less than 3 years but over a year, each at 36 percent.

When asked whether they had instruction on how to use the method (through literature and workshops), 82 percent of participants answered that they had instruction versus only two participants who had not.

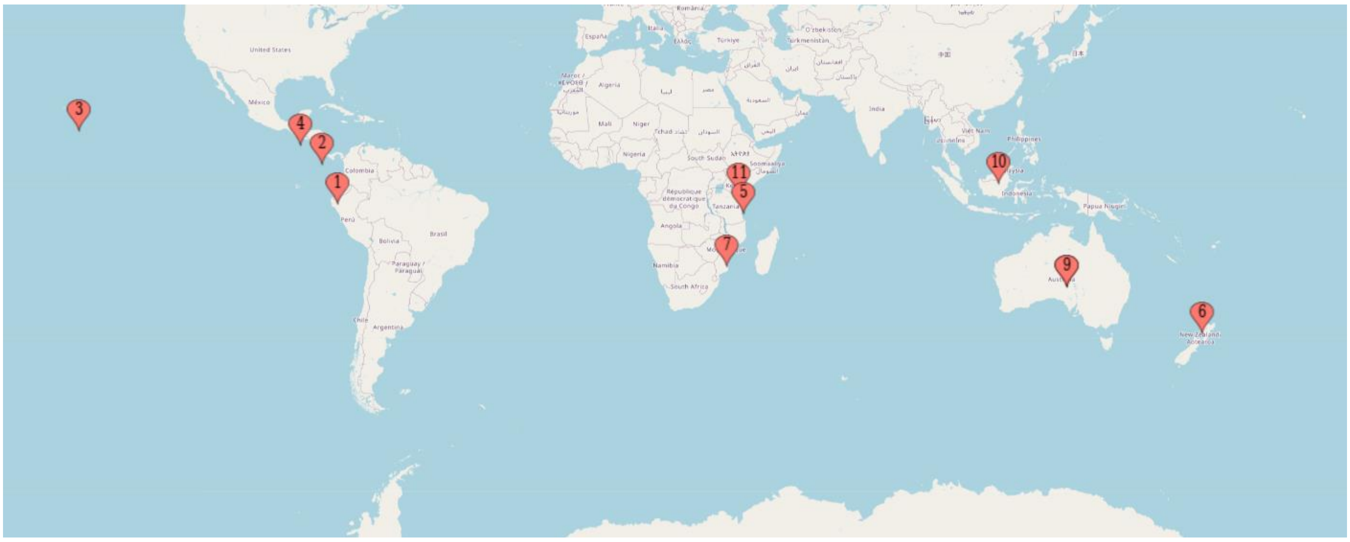


Figure 2- a map depicting the location of each of the participants who answered the survey. The numbers represent the identifying number of each participant. There was a large dispersal of locations with most participants being in the southern hemisphere. It is of note that no participants who answered the survey were based in Brazil.

The survey then moved on to ask more technical questions to gauge an understanding of how the method had been beneficial to each participant's individual agricultural system.

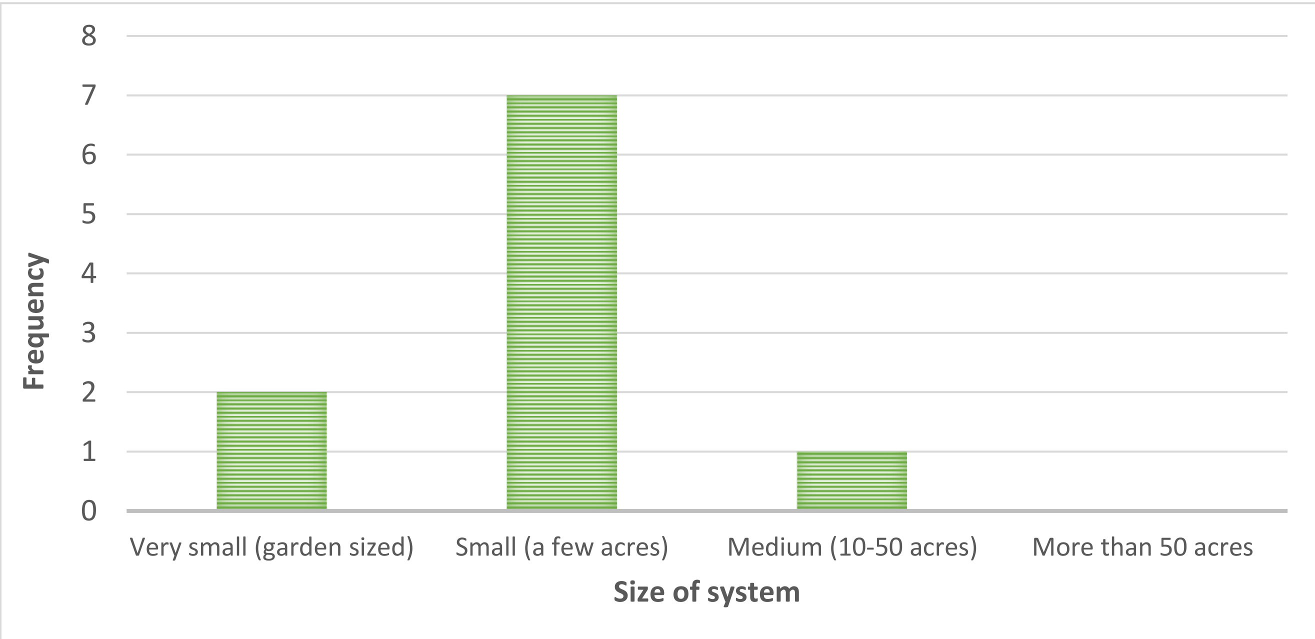


Figure 3- shows the proportion of different sizes of syntropic systems of the participants with 70% of participants having a small system of a few acres and only one participant having a larger system of 10-50 acres. No participants had systems larger than 50 acres and two had very small garden sized systems.

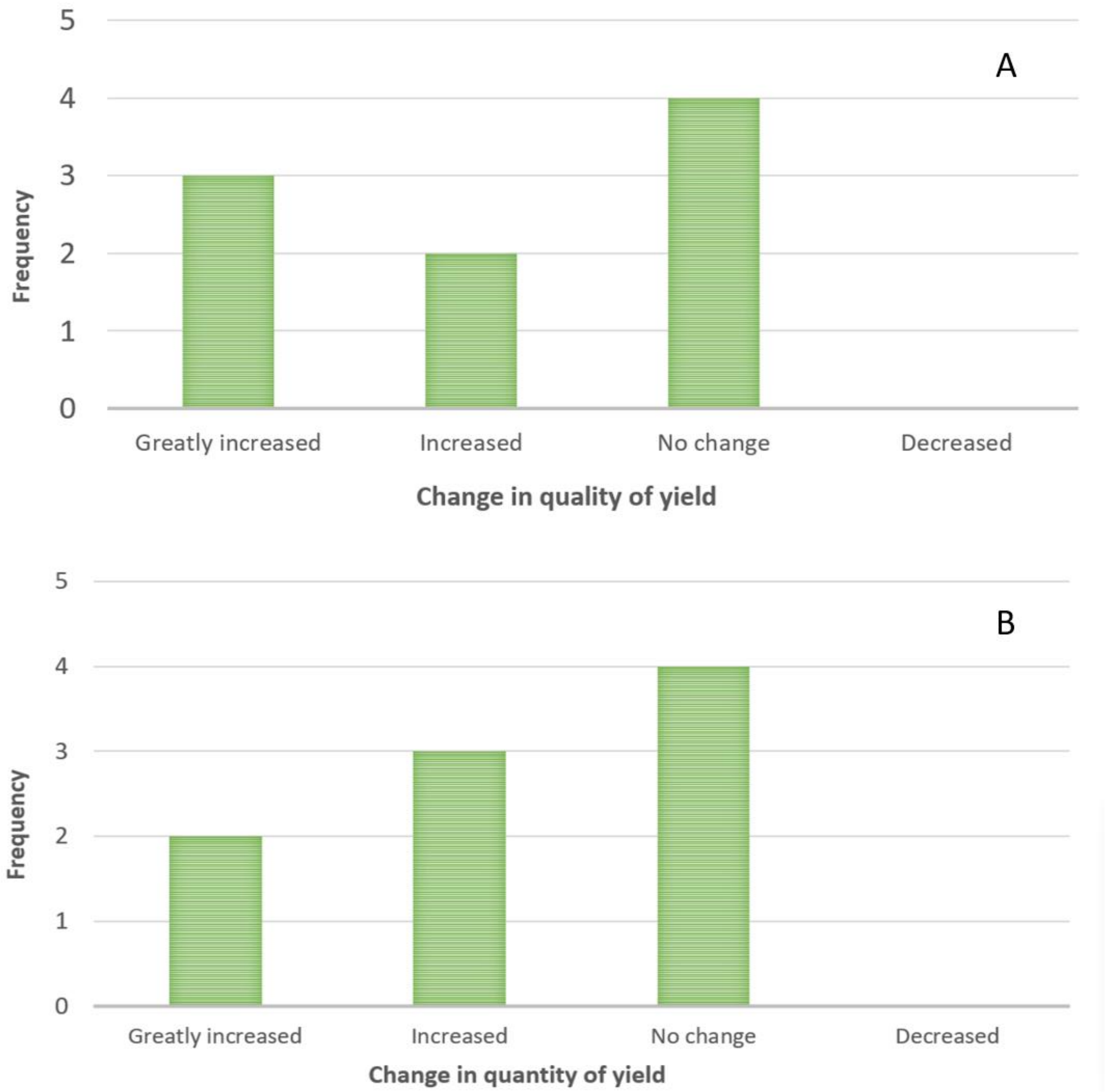
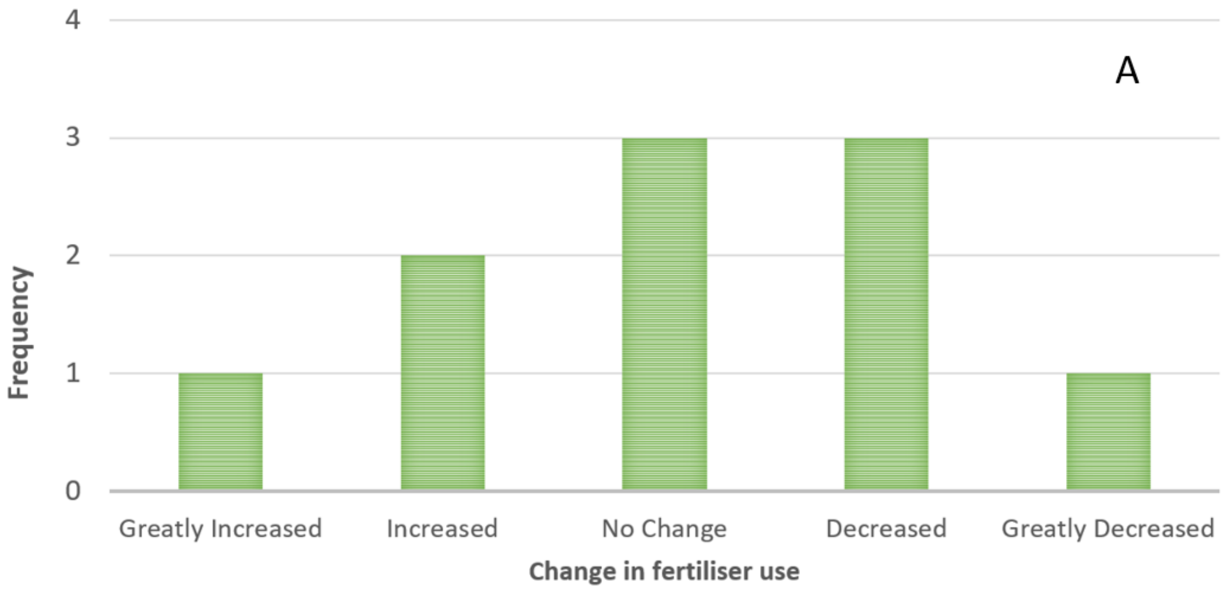


Figure 4- Graphs to show change in quality and quantity of yield, indicating whether the use of syntropic agriculture as a method has been beneficial to the growing system. A- Figure 4a portrays the change in quality of yield of the participants since using the method of syntropic agroforestry. It was 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.



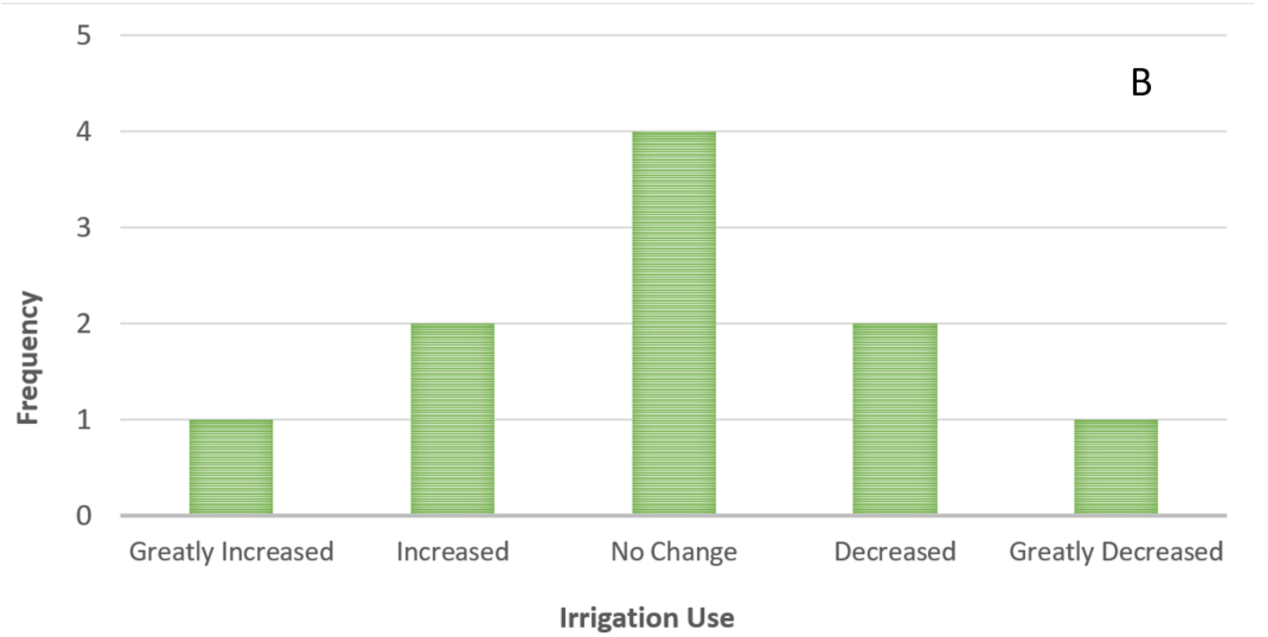


Figure 5- Graphs to show whether changes in water consumption through irrigation and fertiliser usage have changed to indicate whether the method allows the system to be sustainable with lower external inputs. A- Figure 5a shows the participants change in fertiliser usage. This was interesting when compared 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.

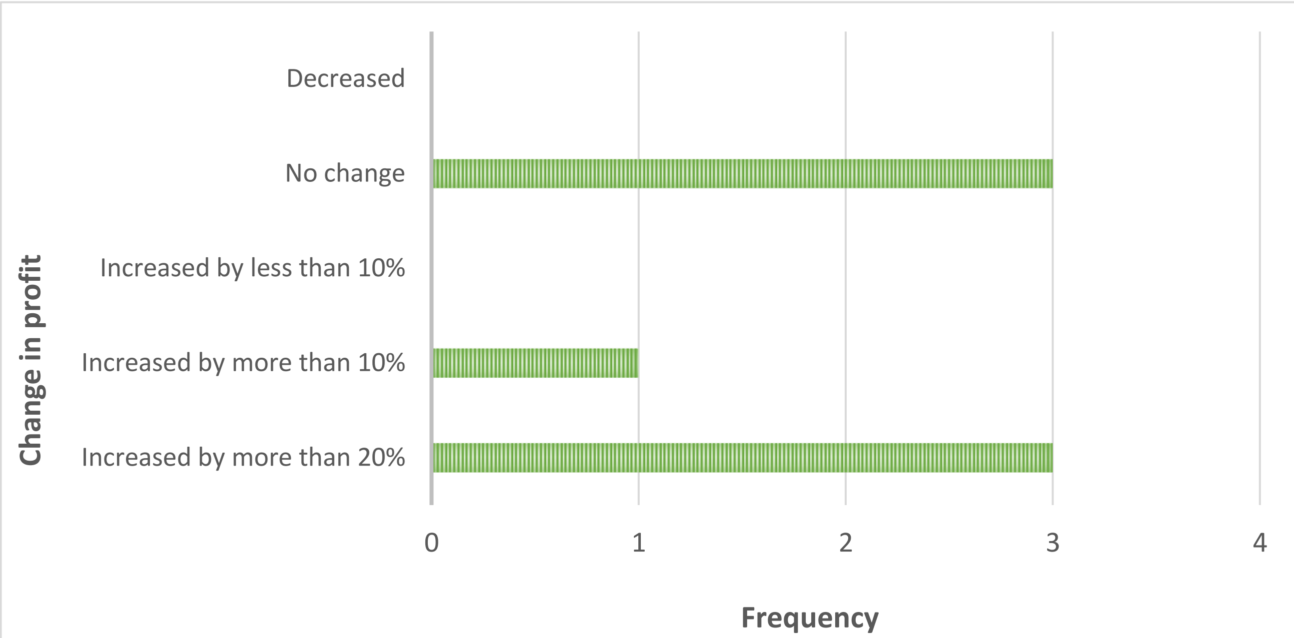


Figure 6- shows the change in net profit recorded by participants who answered the survey since using the syntropic agroforestry method. Interestingly, no participants had a decrease in profit since using the method however, one participant stated that his system was only a couple of years old so it was too soon to tell what his net profit will be. What is also interesting to note is that 3 participants recorded no change in net profit on the other hand three participants also recorded an increase in net profit of over 20 percent.

The following questions gauged the participants thoughts of the method more generally including both open and closed ended questions. The open-ended questions allowed for the participants to elaborate their answers and give more detailed answers when it came to things such as the benefits and challenges of the method.

55 percent of participants felt that the syntropic method was more labour intensive than conventional methods. This was compared to only 18 percent who thought that it was not with the rest of the participants selecting ‘maybe’.

Forty percent of participants felt that syntropic agriculture is more costly than traditional agricultural practices and 50 percent voiced that it is not. The other 10 percent answered maybe. Interestingly, one participant argued that syntropic agriculture is only more costly due to the lack of subsidies and financial incentives.

Furthermore, 91 percent of participants stated that they will continue to use the syntropic method in the future. No participants selected that they would not continue in the future and the remaining participants said that they might.

Some reoccurring themes throughout the survey responses were biodiversity and soil fertility. Not only did these appear in participants answers when they were asked their motivation for applying the method, but these were also both reoccurring benefits of the method mentioned by participants. 45 percent of participants stated an environmental reason for first applying the method, including things such as reforestation, carbon sequestration, sustainability, and landscape stabilisation. Furthermore, one participant stated that they first experimented with the methodology to test the claims for its agronomic viability.

82 percent of participants felt the method could be used on a commercial scale. Only one participant answered no, as they felt it was too labour intensive for non-exploitive commercial viability. The other participant believed it would do better as an addition to conventional farming methods.

A later question asked about the benefits of the method and 91 percent of participants had positive responses including increased biodiversity, improved soil quality, carbon sequestration, soil moisture levels and increased resistance a selection of the benefits that were listed. One participant argued that cover cropping is the most beneficial factor of the method and the factor with well documented research support.

There were a few recurrent themes when looking at the challenges the method presents. This included the intensive labour during the implementation period, the knowledge and technical skills needed by workers to plan and apply the method and the increased amount of time and dedication the system needs compared to a conventional agricultural system. One participant stated that these challenges were all to be expected as the method is still in a phase of research and development and future, larger systems will be more streamlined for efficient management.

One of the final questions asked whether there were any other positive aspects of using the method for the surrounding environment, and one participant spoke of the recuperation of ecosystem services. Biodiversity and general soil quality of the surrounding area were also common factors that multiple participants suggested. One participant also spoke of the inclusion of livestock as a benefit.

10 out of 11 participants agreed that the method is sustainable under a changing climate, however one participant did not agree as they felt that the precepts of the method are too vague for it to be easily scalable for profitable adoption by farmers that are commercially incentivised. Further to this point, the participant argued that the methodology will only appeal to wealthy landowners due to the fact that there are delayed returns on investment as the implementation stage is long.

Lastly, only one out of the 11 participants had not heard of the United Nations sustainable development goals. One participant agreed that while the goals have good intentions and are admirable in aspiration, they are highly critical of the methods by which they have been promoted. Another participant felt that the syntropic methodology cannot improve poverty or hunger due to the lack of economy scale for agronomic viability Furthermore, they felt that the methods are too complex and would require too high a skill set for fair pay due to lower farm revenues. This participant felt there were better agroecological methods than syntropic agroforestry such as alley cropping and rotating interplanted cover crops among annual cash crops.

Discussion:

To what extent is syntropic agroforestry a sustainable method of producing high-yield crops?

It is clear that the syntropic agroforestry method is capable of producing crops that are, if not the same, of better yields than that of conventional agriculture. Not a single participant found that their yield decreased in quantity or quality, and over half of the participants had found that it increased in quantity and quality (Figure 4). Four participants answered that they had no change for both the quantity and quality of their yields, showing that it is no less sufficient at growing crops that conventional methods. In terms of quality, five participants stated that it had increased, thus supporting the beliefs of Gotsch (1995) that syntropic agriculture "produces an optimum quantity of high-quality fruits, seeds and other organic materials" (Gotsch, 1995, p. 1). Furthermore, five participants had an increased quantity, therefore reinforcing Gotsch's theories further. Moreover, one participant voiced that they grow and produce more food in a smaller area than they did when using conventional methods, emphasising this point further. Not only this but the claims for its agronomic feasibility are supported by the research of other academics such as Andrade, et al. (2020), who provide evidence of the economic feasibility of the syntropic agriculture method (Table 1).

Table 1- Evidence supporting the economic viability of syntropic agriculture and other methods of successional agriculture in Brazil (Andrade, et al., 2020).

Main products	Ecoregion	Description of the case
Palm oil	Amazon	Smallholder farmers benefitted from adding short cycle (3 yrs) crops until palms started producing. Furthermore, when palm trees decline in about 25 yrs, slow growing timber and nut trees planted will be producing
Pineapple, banana, palm heart, citrus	Atlantic forest	Four succession-based agroforestry designs required 10 times less land to reach the same productivity and income per unit area than the region's conventional soybean, corn and milk operations
Tomato, pineapple, papaya, citrus, cacao, mahogany	Cerrado and Atlantic forest	Average yield projected for two syntropic agriculture plots were 16 and 21 $t.ha^{-1}.yr^{-1}$, whereas other agroforestry systems produced between 2 and 13 $t.ha^{-1}.yr^{-1}$
Horticulture, fruit, coffee	Cerrado	Payback of this successional system occurred after 1.1 month. In one year, benefits surpassed costs by 82%

This research question not only poses whether this method can produce high-yield crops but additionally asks whether it can be done sustainably. One of Ernst Gotsch's most paramount principles is the lack of need for external inputs such as fertilisers or water through irrigation (Gotsch, 1995). He describes the contrast between conventional methods where man uses fertilisers, pesticides, and heavy machinery to adapt plants and ecosystems to the 'needs' of modern agriculture. Alternatively in his principles no external inputs are necessary, therefore there is no extra investment needed. The results of this study did not mirror this view entirely, with some participants disagreeing. Figure 5 shows that there was a wide variation in both water consumption through irrigation and fertiliser usage. Three participants found there to be no change in water consumption and four participants had no change in fertiliser use respectively, nevertheless, three participants stated that their water consumption through irrigation had increased, and three participants also said the same for fertiliser usage. Despite this, 10 out of 11 participants believed this method is sustainable under a changing climate, and one of the participants who stated their water consumption and fertiliser usage increased also spoke highly of the benefits such as biodiversity, increased soil health, resilience, and natural pest repellence. It could therefore be argued that despite participants finding that the initial implementation stage does require more external inputs, the benefits that it reaps make up for the difference (Gotsch, 1995). In addition to this, not all of the participants saw this increase in inputs, moreover, four participants found their fertiliser usage decreased and three participants found their water consumption decreased which mirrors the ideology of Ernst Gotsch more closely (Gotsch, 1995).

Sustainability also considers social and economic factors such as labour and costs. It is apparent that the time and highly skilled labour that goes into the system, particularly in the initial stages is higher than conventional methods. This is reflected by more than half of participants stating that it is more labour intensive than traditional practices. Ernst Gotsch believes there should be no additional costs to using this method than that of conventional agriculture (Gotsch, 1995), with half of participants agreeing with this. On the other hand, just under half the participants felt that their costs had increased since using the method, however one participant argued that much of this was due to the lack of subsidies and financial incentives to use this method as opposed to modern agricultural methods such as large-scale monocultures. This agrees with the thoughts of Tittonell, et al. (2020) that the high production costs, high risks of failure and narrow margins of conventional agricultural practices are being allowed for by subsidies and economic compensation. The study states that these modern systems are only seen as efficient because they are highly productive despite the fact that they are not cost effective. The need for higher skilled workers and more hours of labour initially will ultimately lead to higher costs (Andrade, et al., 2020).

Therefore, in the long run syntropic agroforestry can be a sustainable method of producing high yield crops however, the initial implementation stage requires more labour than traditional agricultural practices and, in some instances, still requires external inputs such as fertilisers and irrigation, making the first few years of practice less sustainable than Ernst Gotsch states.

Would syntropic agroforestry be applicable on a large scale in temperate regions?

Whether syntropic agroforestry can be applicable on a large scale in temperate regions, and whether that application would be realistic in the current agricultural world are two very different questions. The whole foundation of the principles of the syntropic method is that it mimics the natural ecosystem, and wherever crops are cultivated on the planet, the principles of the method would be the same (Gotsch, 1995). With that being said, more research and application of the method has been done in tropical biomes such as Brazil (Damant & Villela, 2018; Amador, 2018), with approximately 5000 family farms adopting the method (Andrade, et al., 2020), and so further research and experimentation will very likely be required in temperate areas such as Europe. This is however already in the process of being done, with studies such as that of von Cossel, et al., (2020) showing that the method is applicable in a temperate region such as southwest Germany.

When answering the survey, most participants voiced the opinion that syntropic agroforestry could be utilised on a large, commercial scale. More to this point, only one participant disagreed completely with this notion, stating that it is too labour intensive for non-exploitive commercial viability. This increase in labour and therefore costs due to the high level of skill and manual operations required leads to challenges for large scale enterprises (Andrade, et al., 2020). Andrade et al (2020) and Tittonell et al. (2020) argue that to boost the scalability potential of syntropic agriculture, the innovation and development of low impact technology is needed. This is something that Ernst Gotsch has addressed, speaking of his ideas for new machines called ‘peace farming technologies’, with the first being a bed maker (Andrade, et al., 2020). This has brought promising potential and the first product demonstration occurred in Germany and Italy in late 2019 (Pasini, 2019).

Research and innovation such as this is key to the adoption of agroecological practices such as syntropic agroforestry on a larger scale, however policies that support the transition to agroecology have been weak (Tittonell, et al., 2020). Currently the application of large-scale agricultural systems that run completely on the principles of syntropic agriculture is not realistic (Tittonell, et al., 2020). However, as pointed out by one of the participants answering the survey, the method is still in a phase of research and development and with time it does have the potential to be more streamlined for efficient management. One of the biggest challenges the method presents is the increased time and labour requirements. Not only this but the high level of knowledge and skill the workers require means that fair pay is difficult given the lower initial farm revenue, as pointed out by one of the survey participants. Currently delayed returns on investment and a lack of financial backing or policy from governments means that profitable adoption of a large-scale system is not feasible to economically incentivised farmers, a point also made by a survey participant that is reiterated by Tittonell, et al., (2020). Despite this, the survey provided some promising responses from participants with not one participant recording a decrease in net profit and four participants recording an increase, with one stating their net profit had increased by over 20 percent.

Could syntropic agroforestry have a part in achieving the targets of Sustainable Development Goal 2?

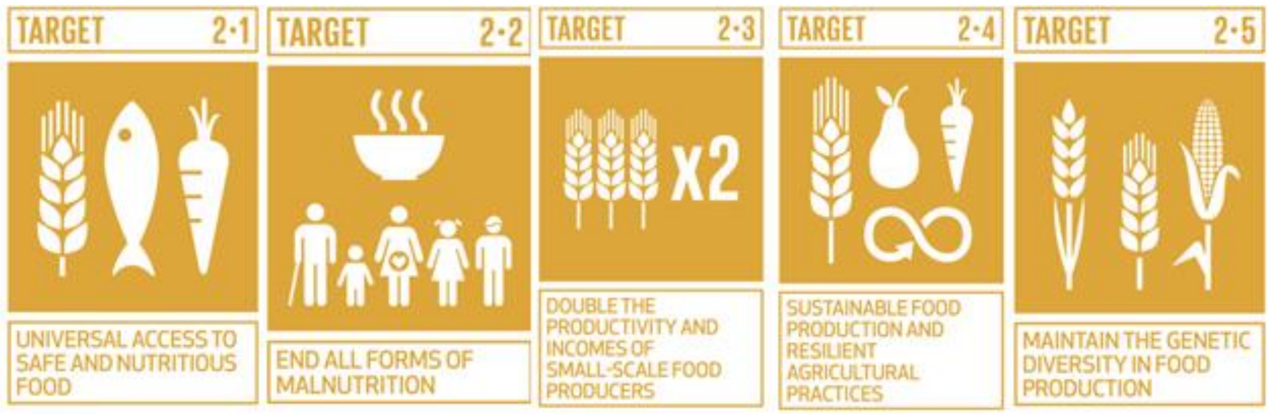


Figure 7- A graphic to show the targets of Sustainable Development Goal 2 focused on by this study. (Geneva Environment Network, 2023)

This study focuses on the SDG2 targets (Figure 7). In order to meet the SDGs 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 (FAO, 2019b).

Our current agricultural systems house too many trade-offs (FAO, 2019b; Tittonell, et al., 2020), and currently food production relies on the resources that it is degrading (Allahyari & Poursaeed, 2020). This issue is being further exacerbated by the rapidly growing population with higher overall consumption of protein, fruit, and vegetables due to income growth in low- and middle-income countries (FAO, 2019b). Therefore, it is paramount that some form of change occurs, and evidence suggests that a level of food security globally, comparable to traditional agricultural practices, can be achieved through agroecology (Chappell & Lavalle, 2011). Syntropic agriculture as an agroecological practice can play a part in meeting the targets of SDG2 shown by Figure 7. Small, family farms were there at the beginning of the development of the syntropic method with approximately 5000 family farms in Brazil (Andrade, et al., 2020). This mirrors target 2.3 which aims to double the productivity and incomes of small-scale food producers. The method provides a sustainable way of producing food that reaps benefits for both the growers and the environment. Moreover, the nature of the systems having a higher demand for high-skilled labour means that the number of job opportunities will increase. This could potentially be further enhanced by financial backing from governments through subsidies (Tittonell, et al., 2020), which would allow for fair pay for these workers, providing them with an income.

Furthermore, the principles of the system allow for an increase in species diversity, not only does this increase biodiversity within the ecosystem, but the absence of monoculture allows for an increased resilience, one of the ten elements of agroecology (FAO, 2018), of the crops being grown. This works in conjunction with target 2.5, as the species genetic variability with syntropic systems increases as well as the species diversity (Gietzen, 2016). A common theme within the answers of the participants of the survey is that they had seen a noticeable increase in the disease and climate resistance of their systems. One participant noticed their system was more resilient in extreme conditions such as drought and prolonged wet periods. Another participant stated that the resilience and antifragility of the diverse system meant it would be sustainable under a changing climate. This resilience, combined with the more sustainable method of food production that the syntropic method allows compared with conventional methods helps towards target 2.4. It is more difficult to say to what extent the method will have the capacity to address targets 2.1 and 2.2 as they are more far reaching and generalised. It can however be said that the diversity of plant species that the syntropic method encourages plays an important role in improving dietary diversity and making sure people have the right nutrition (FAO, 2019b). This can help provide nutritious food as stated in target 2.1 and provides increased and more varied nutrition which plays a role in target 2.2.

In order for this method to produce food ‘universally’ there has to be the means and resources for people to implement it. Further research is needed into how policy and government support should be best implemented (FAO, 2019b; Allahyari & Poursaeed, 2020). Initiatives such as the UNFAOS ‘Scaling Up Agroecology Initiative- Transforming Food and Agriculture in Support of the SDGs’ pave the way for this change to occur (FAO, 2018), however a solid governance structure through both national governments and non-governmental organisations is essential. It is also of note that a couple of participants felt that as much as the SDGs had the right ambition, they are a westernised concept, and it is important that those they are addressing the needs of are involved in the schemes and development strategies being implemented.

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.

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Appendix:

Questions answered in the research survey:

1. What country and region are you based in?
2. What is your age?
3. What is your gender?
4. What is the capacity in which you work within the field of Syntropic Agriculture?
5. How long have you been in the field of Syntropic Farming?
6. How did you hear about the method?
7. What scale is your farm or growing system?
8. Did you have instruction on how to use the method (i.e. workshops or research through literature)
9. What was your motivation for applying the method to your farm?
10. If you are a farmer, to what extent is this method applied to your agricultural system as a percentage?
11. To what extent has it changed the quality of your yield?
12. To what extent has it changed the quantity of your yield?
13. To what extent has using this method changed your use of water through irrigation?
14. To what extent has using this method changed your use of fertilisers?
15. Would you say this method is more labour intensive than traditional farming methods?
16. How has this method changed your net profit?

17. Would you say this method is more costly than traditional agricultural practices?
18. In your opinion do you think this method could be used on a larger scale (e.g. on a commercial scale)?
19. How beneficial has this method been for your agricultural system? (What benefits have you seen?)
20. What challenges has this method presented?
21. Will you continue to use this method?
22. Have there been other positive aspects of using the method to the surrounding environment? (E.g. increased biodiversity)
23. Would you say the use of this method has attracted media or public attention for you individually?
24. Our farming and forestry practices are having to adjust to cope with the pressures of a changing climate. Do you think this method is sustainable under a changing climate?
25. Have you ever heard of the United Nations Sustainable Development Goals?