



Shifting from traditional agriculture to Agroforestry

Analysis of Perceptions and barriers

A P R I L 2020

This report is made possible by the support of the American people through the United States Agency for International Development (USAID). The content of this study/other is the sole responsibility of the Lebanon Reforestation Initiative (LRI) and doesn't necessarily reflect the views of USAID or the United States Government.

Acknowledgements

This report was developed under the Livelihoods in Forestry (LiF) project funded by the United States Agency for International Development (USAID).

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Submitted to:

Lebanon Reforestation Initiative

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Report objectives

- Understand the mindset of the farmers in Lebanon, their mental representations, and readiness to shift to alternative productive methods with respect to:
 - Ability for innovation
 - Flexibility to adapt the new techniques and embrace alternative solutions
 - Capacity to influence others, Leadership and role model attitude
 - Problem solving state of mind
 - Team coordination and/or team player
 - Open mindedness
 - Motivation
 - Analyse the findings in view of the main geographical regions of Lebanon, the level of education and the gender of the interviewed farmers
- **Provide guidance on how to overcome barriers using environmental psychology approaches.**
- **Identify training needs.**

Context and approach

- This report was prepared as part of the “improving livelihoods in forest environment” implemented by LRI.
- Data collection was coordinated by Dr. Nabil Nemer with the support of the 5th class of Agriculture- Faculty of Agronomie- USEK 2018 (Raw data collected from the questionnaire are presented in the annexed excel sheet).
- Data analysis benefited the support of Oliver Fenianos using SPSS and R softwares.

Population of study

- According to Kothari (2004), a population is a well-defined set of people, services, elements, and events, group of things or households that are being investigated. Mugenda and Mugenda (2008), explain that the target population should have some observable characteristics, to which the researcher intends to generalize the results of the study. This definition assumes that the population is not homogeneous.
- This study covered 373 professionals in Agriculture interviewed using the questionnaire (presented in appendix 1). The data was collected from 5 sub regions in Lebanon: Bekaa, North, South, Mount Lebanon, Jbeil.

Sampling Design

A sample is a smaller group or sub-group obtained from the accessible population (Mugenda, 2008). This subgroup is carefully selected so as to represent the whole population with the relevant characteristics. Each member or case in the sample is referred to as subject, respondent or interviewees. Sampling is a procedure, process or technique of choosing a sub-group from a population to participate in the study (Ogula, 2005). It is the process of selecting a number of individuals for a study in such a way that the individuals selected represent the large group from which they were selected. The study will apply stratified random sampling procedures to obtain the respondents for questionnaires. The sample frame of the study includes a representative sample of Farmers within the Five regions in Lebanon

Data Collection

- A primary data collection instrument will be used during the study; a questionnaire. The reason for choosing questionnaire as the data collection instruments will be primarily due to its practicability, applicability to the research problem and the size of the population. A self-administered questionnaire with closed ended questions will be developed and administered to obtain information from the 373 respondents.
- The questionnaire will have four major sections. The first part will seek Section I: Personal Information of the respondents while the second part will seek information on Site. Part three will try to Compile Farmer Information while the fourth part shall concentrate on Discipline Perception
- Data was compiled using primary and secondary data collected from various sources. Starting with journals and websites to illustrate the geographical features, while primary data collected was through the questionnaire conducted featuring a plethora of questions on various variables tested. Question 1 part 2 responses allowed us to identify the main cultivated crops in a distinct region. Furthermore, the main hurdles faced by each area was determined by a group of questions summing different aspects of the confronts: part 2 questions 25 and 26, part 3 question 3 and part 4 question 1. Results of those questions cross-referenced led us to conclude the main challenges of faced by each region.
- Moreover, main strong points deducted from a multiplicity of questions asked: part 4 questions 1 and 4, part 2 questions 2.
- After data cleaning and coding the questionnaire, preliminary results were compiled pertaining to the frequency of gender distribution, level of education and level of income coming from agriculture.
- 353 respondents were kept in the results & findings of this study, 20 respondents were disregarded because of incomplete forms.

Sample description

Population size: 340 000

- Total number of interviewed persons: 373
- Total number of respondents: 353
- 20 respondents with incomplete forms

Table 1 5 study areas considered in the framework of this study

	Bekaa	North	South	Mount Lebanon	Jbeil
Geographical features	800 - 1200 m	400 - 1200 m	700 - 1200 m	800 - 1500 m	150 - 1200 m
Main crops	Apples - Peach - Cherries Perry	Tomatoes - Cucumbers - Roses - Citrus - Olives	Apple - peach - Olives -Citrus - trees - Tomatoes - Cucumbers	Apples - Tomatoes.	Apples - Avocado Citrus - Annona Green - Tomatoes- Cucumbers - Olives
Main challenges	Access to market Presence of pests No flat soil	Access to market Water Rent	Access to market Drought Water management and security	Access to market Frosting Water management and security	Climate leading to diseases Lack of subventions from the ministry and government Competition with the outsiders (products from the countries on the borders)
Main strong points	Rich soils Availability of water Presence of multiple varieties	2 season crops Weather Labor availability	Soil fertility Big land Farmer's knowledge	The cold weather prevent many diseases and pests Water availability Farmer's knowledge	Diversity of the crops and trees Small farmers can sell their products (from farmer to consumer)

Gender distribution

30 of the 353 respondents were females while were 323 males.

The Agriculture sector in Lebanon is predominantly composed of males.

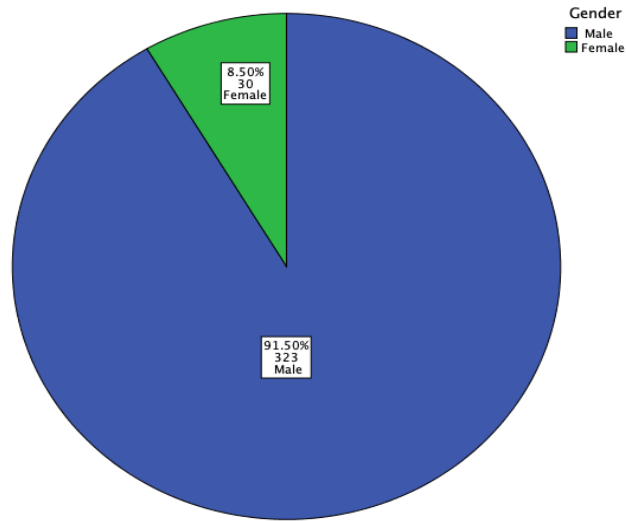


Figure 1 Gender distribution in the agriculture sector chart

Distribution by Level of education

80 of the overall respondents had completed no schooling, 107 had some high school but without receiving a diploma, 87 had technical degrees while 79 respondents had university degrees

Most of the farmers still consider this profession as artisanal and very few pursue high school education to be dedicated into it

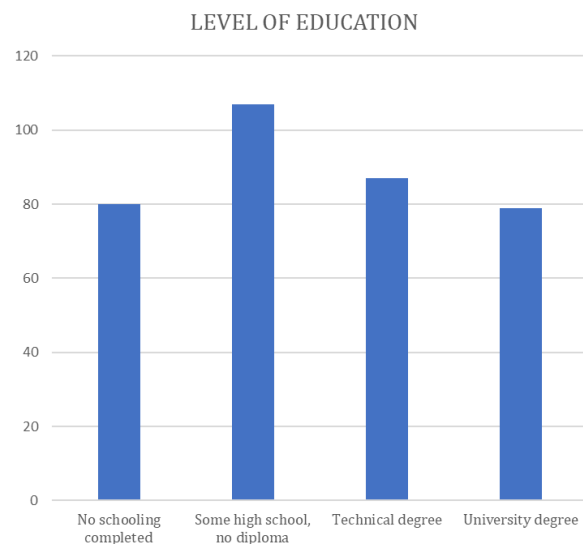


Figure 2 Distribution by level of education chart

Distribution in view of the level of income from agriculture

20.68% of the respondents reported an income less than 10,000\$, 18.70% of a range between 10,000 and 20,000\$, while the lowest cumulative amount was 18.41% pertaining to a 20,000 to 30,000\$ income and the highest was to an income of 30,000 to 40,000\$ and finally 20.40% of the overall respondents recorded a greater than 40,000\$ income.

Agriculture is still not a major contributor to the family incomes in Lebanon and still needs to be complemented by additional activities to become sustainable

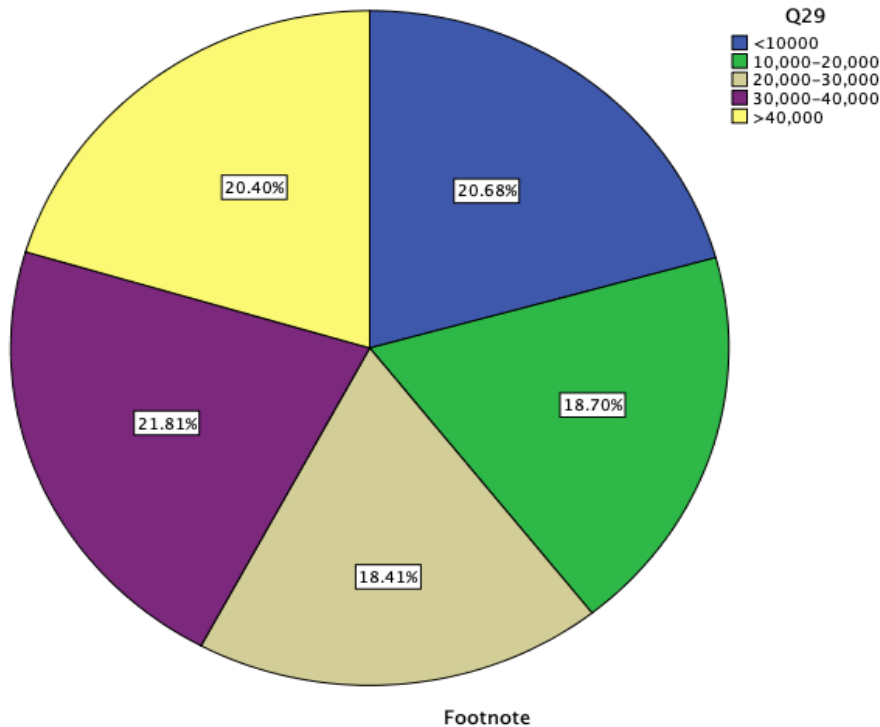


Figure 3 Distribution by level of income chart

Distribution in view of age groups

Agriculture sector employs a large spectrum of age groups ranging from 19 to above 60 years old with a large majority falling into the 40- 60 age.

Distribution is comparable between study areas with similitude between Mount Lebanon and Jbeil as well as between Bekaa and North Lebanon.

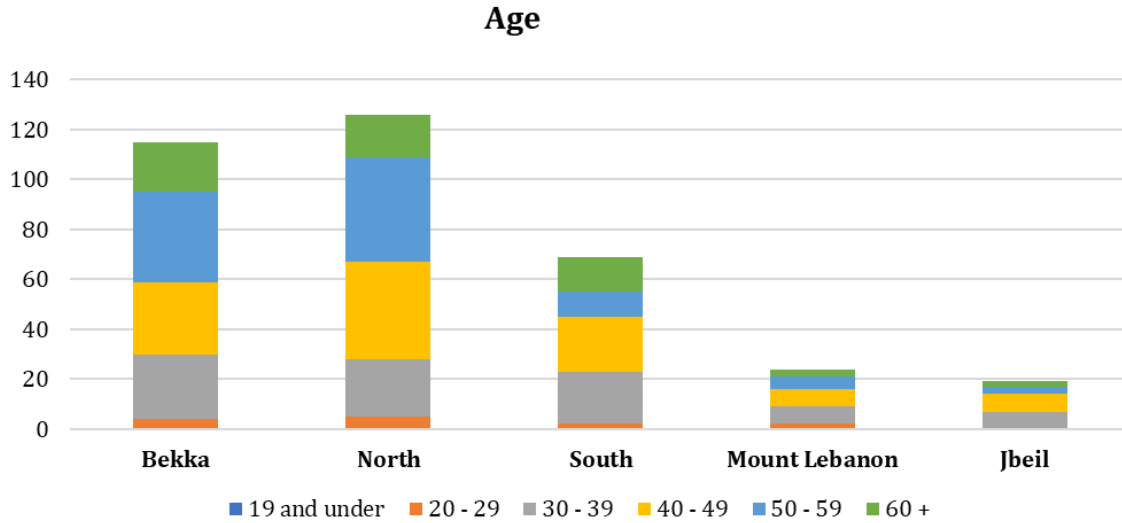


Figure 4 Distribution by age chart

Distribution in function of the regions

Region in our study is of paramount importance as most variables tested in this research are crossed with it.

It shows that North Lebanon had the highest number of respondents accumulating 126 followed by Bekaa with 115, South Lebanon with 69, and closely followed Mount Lebanon and Jbeil with 24 and 19 respondents respectively.

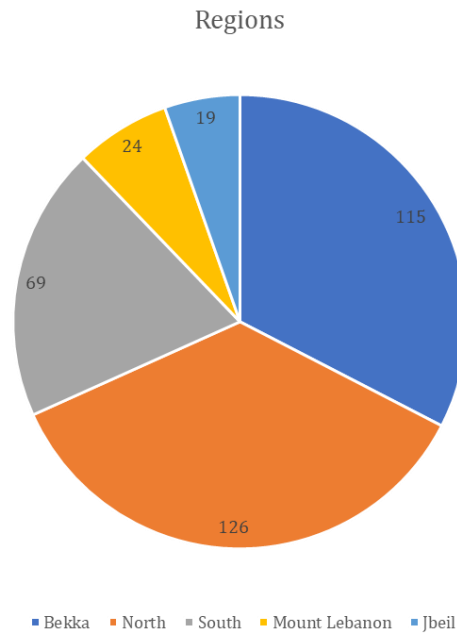


Figure 5 Distribution by regions chart

Major findings

1. Mental representation of farmers/ perception towards their profession

1.1. Assessing mental representations

Mental representations were evaluated in view of:

- Problem solving state of mind
- Team coordination and/or team player
- Open mindless
- Motivation.

Mental representation was deduced from the results of multiple questions, mainly from part 4 of the questionnaire titled Discipline perception and predominantly answers to question 1 (Appendix 1).

Table 2 Survey questions related to mental representation of farmers/perception toward their profession

1. Agriculture is at a turning point and current farming systems cannot continue
2. Farmers will have to take more care of their soil's life
3. We have tremendously neglected the interesting inputs that nature can bring
4. Farmers could not produce without chemical fertilizers and plant-protection products
5. I am satisfied with the way I currently farm
6. I prefer to observe how it goes with my neighbors before testing agroforestry
7. To get things moving with farmers, you need to talk about money, subsidies, and profitability
8. Long-term leases or a lower land rent could convince me doing agroforestry
9. If I had technical-economical references in agroforestry I would probably take the plunge

1.2. Methodology

A statistical computation of collected data and SPSS statistics produced different tables. The data analysis includes descriptive and inferential statistics.

Results of those questions were cross referenced with previous enquires related to region, income and age. Which guided us in understanding the mental representations of farmers in Lebanon in particular in view of their problem-solving state of mind, team coordination and/ or team player, open mindness and ending with motivation.

1.3. Perception analysis by education level

Perception analysis by education level showed the higher the degree of education obtained the greater the perception of respondents, as the visual representation illustrates No schooling completed registered a far lower count of agree than a respondent with University degree. However, some high school, no diploma accounted for the highest respondents with neutral perception to agroforestry.

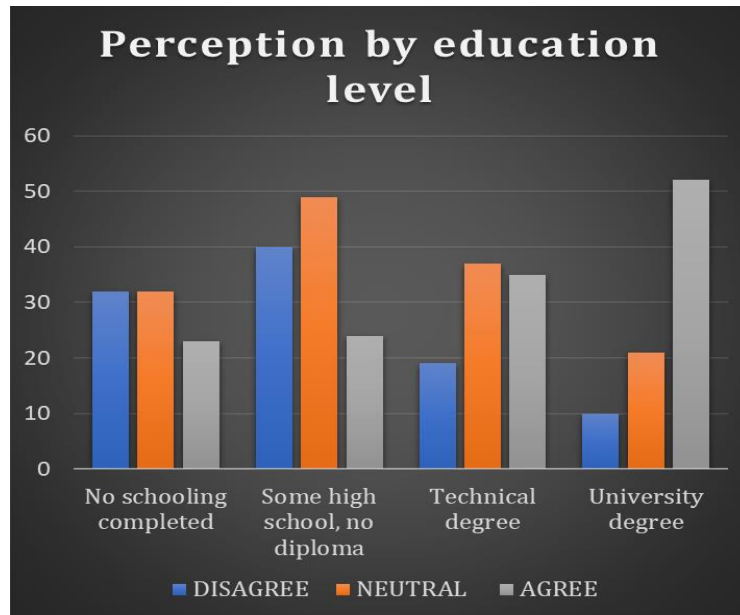


Figure 6 Perception analysis by education level chart

1.4. Perception analysis by region

The perception by region, as indicated by the graph ledger, disagree was mostly accounted for in the North area, followed by Bekaa, South, Jbeil and Mount Lebanon. Neutral response was mostly evident in Bekaa, North, South, Jbeil and Mount Lebanon respectively. Ending with agree which is mostly accounted for in North, Bekaa, South Mount Lebanon and lastly Jbeil. North Lebanon constituted the Region with most counts of Disagree and Agree, followed by Bekaa and South in the same pattern while Jbeil and Mount Lebanon had irregular forms Mount Lebanon agree far more than disagree and Jbeil pertaining to the number of respondents had opposite to that of mount Lebanon.

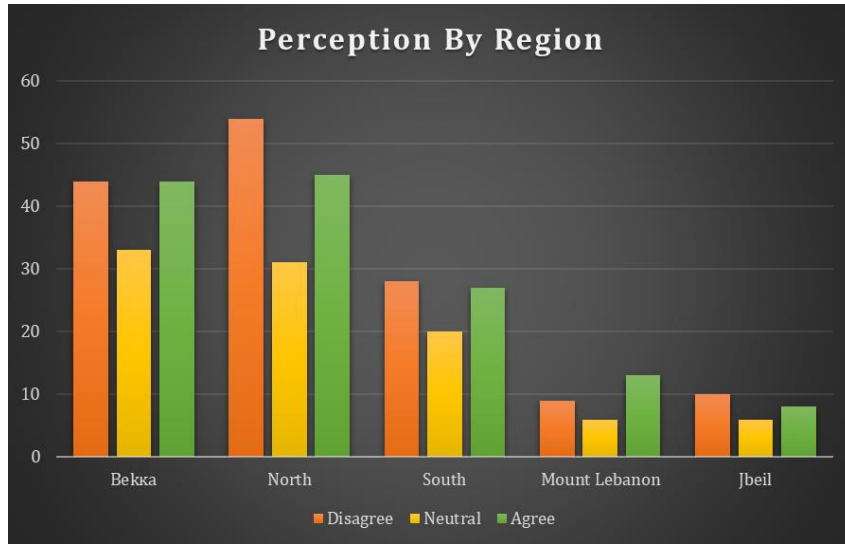


Figure 7 Perception analysis by region chart

1.5. Perception analysis by income level

Perception was skewed to agree in the income brackets between less than 10,000\$ and 10,000 to 20,000\$ while completely shifting to disagree in the remaining brackets while significantly shifting negatively in greater than 40,000\$.

This shows that there is an inverse relation between income and perception as the income grows beyond 20,000\$ while a positive perception when income is below 20,000\$. The results present us with a finding that 20,000\$ is a pivotal income segment, where decisions can be shifted for or against the perception variable.

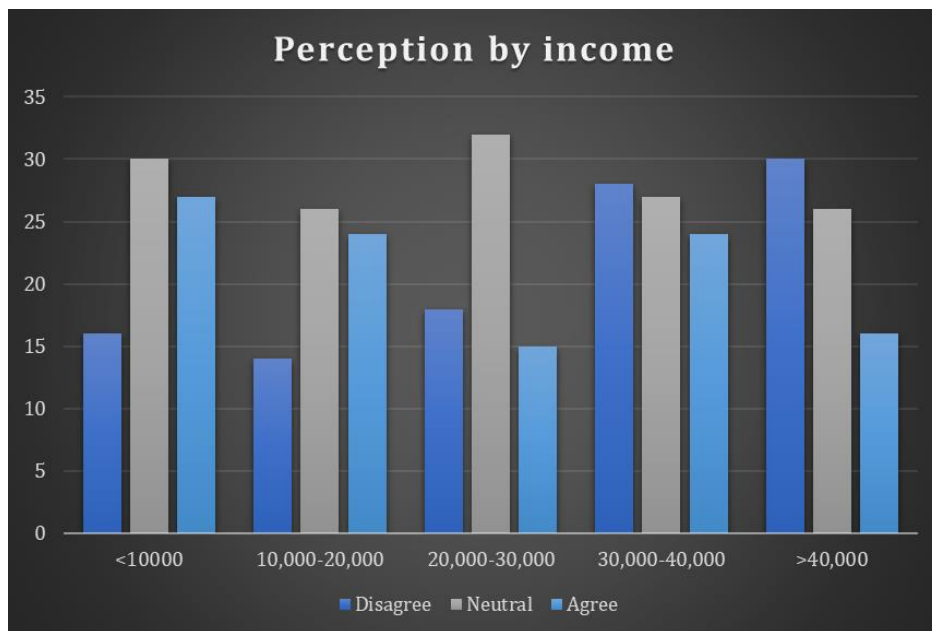


Figure 8 Perception analysis by income level chart

1.6. Sub conclusion - Mental representations/perception

No major difference between:

- The 5 sub regions studied.
- The level of education.
- The level of income generated from agriculture.

Significant difference related to level of education (university graduates vs. school level and non-educated).

The population studied, is characterized by

- High problem-solving aptitude.
- Low team coordination.
- Average open mindedness.

2. Readiness to shift to alternative practices

2.1. Assessing readiness to shift to alternative productive methods

The following questions guided understanding the attitude of farmers in Lebanon and their readiness to shift to alternative production methods.

In particular in view of:

- Ability for innovation.
- Flexibility to adapt the new techniques.
- Capacity to embrace alternative solutions.
- Capacity to influence others.
- Leadership and role model attitude.
- Limitations/fear.

Table 3 Survey questions related to the readiness to shift to alternative practices

Questions

10. Do you think any of the following to your land will enhance your Yield?

11. In your opinion what could be the advantages of Agroforestry in your land

12. In your opinion would other farmers adopt Agroforestry as a solution to their current challenges?

13. What would be the factors/ drivers that could make you change your current practices in Agriculture and adopt new/ different techniques.

2.2. Attitude analysis by income

Grouping the questions under a specific attitude principle was a major challenge as the answers yielded variations in results, as such a weighted average was calculated on the importance of each question to the overall concept of attitude and thus the results were measured. Attitude response was bottled into a likely or unlikely decision to foster an Agroforestry approach to farming. As shown in figure 8, a correlation between attitude and income is visible. In fact, the higher farmers' income is, the more likely they are to adopt an attitude towards agroforestry. Inversely, the lesser the income, the more unlikely the farmer is to adopt an agroforestry approach. However, the benchmark of 20,000 to 30,000\$ was a pivotal point in the response towards attitude, where the shift dramatically changes from unlikely to likely. Furthermore, the most count of unlikely was registered to farmers with an income of below 10,000\$.

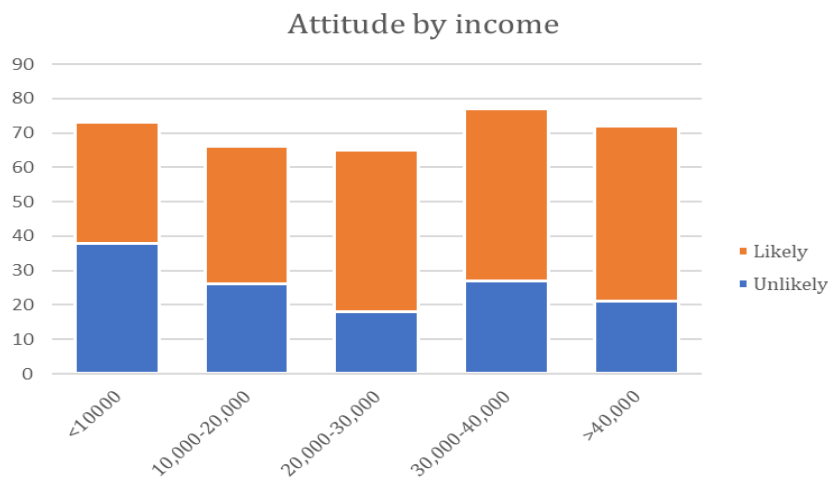


Figure 9 Attitude analysis by income chart

2.3. Attitude analysis by region

Another crosstabulation between attitude and region was piloted, results illustrated in the above table, Bekaa, North, south, Mount Lebanon and Jbeil registered a 45, 48, 26,8, 10 counts unlikely respectively, while same regions registered 76, 80, 46, 20, 14 counts of likely. Results show that North Lebanon had the highest number of likely attitudes towards upholding agroforestry closely followed by Bekaa, and then south mount Lebanon and ending with Jbeil. However, the unlikely results had a minor deviation as mount Lebanon's count was lesser than that of Jbeil by 2 counts and Bekaa had lower unlikely results than that of North Lebanon.

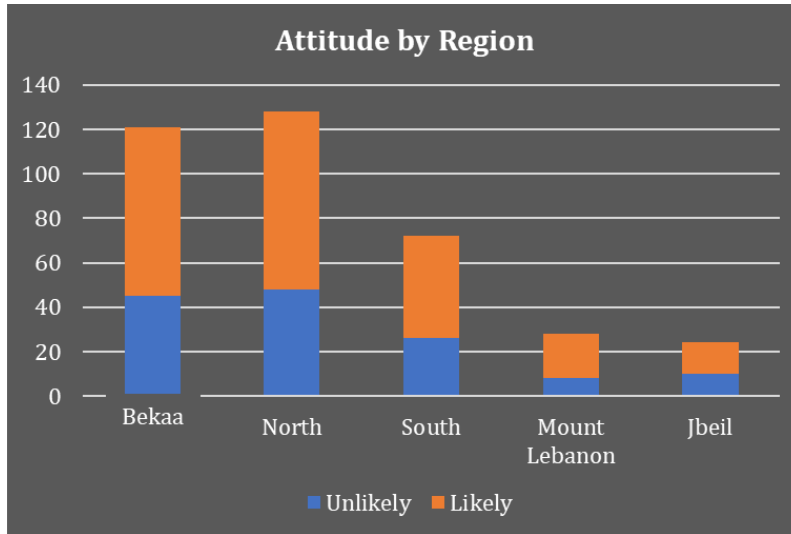


Figure 10 Attitude analysis by region chart

2.4. Attitude analysis by educational level

Further to the abovementioned independent variables, education level was tested also on the attitude of farmers to analyze whether education had an impact on the overall attitude of farmers in adopting Agroforestry rather than conventional farming methods. Results were depicted in the above histogram. Likely counts were constantly higher in all educational degrees, however the gap between the likely and unlikely counts was getting bigger and bigger especially after some high school, no diploma. This shows that educational level does not have a high impact on a farmer from likely adopting Agroforestry as a mean of farming methods.

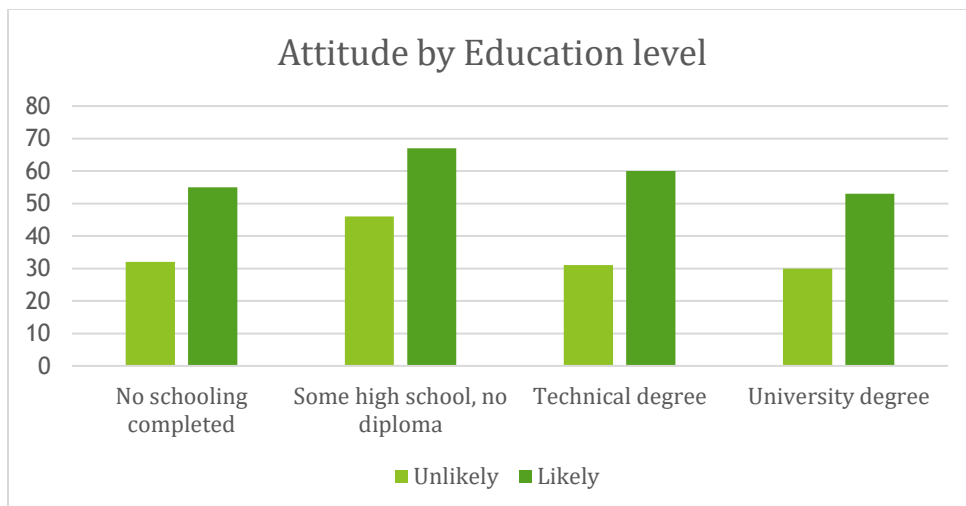


Figure 11 Attitude analysis by education level chart

2.5. Sub conclusion- Attitude/ Readiness to shift to alternative methods

- Low readiness to innovation.
- Low flexibility.
- Medium aptitude to shift to new solutions.
- Medium influencers attitude.
- Medium leadership skills.
- Motivation mainly related to in cash drivers.

3. Motivations and barriers to shifting to agroforestry

3.1. Motivations

In view of the results presented in this report, the motivation and drivers that might initiate and trigger behavioral change and attitude modification of farmers in the different regions are comparable despite the small variation between regions. They can be summarized as follows:

Farmers and landowners are more likely to shift to agroforestry practices if provided with financial incentives such as external funding or sponsored projects. On another level, awareness raising is needed as well as providing technical support or lead example to farmers and providing technical incentives such as all year long production and risk reduction on erosion and landslides, water economy or other.

Table 4 Drivers/motivations related to shifting to Agroforestry

Drivers/ motivations
<ul style="list-style-type: none">• Fund availability• Awareness and technical support• Sponsored projects for shifting agroforestry• Various production all year long• Saving their land from risks• Seeing a good example

3.2. Barriers

On the other hand, some barriers might stand in the way of such a change in agriculture practices. Farmers are particularly afraid to lose crops and consequently money if they shift to integrated and sustainable practices as they often rely on traditional irrigation and pest management. In addition, they often fear new techniques will involve additional cost which might not be profitable on short terms. This is often the common reluctance with new non-conventional systems.

Table 5 Barriers/limitations to shifting to Agroforestry

Barriers/ limitations
<ul style="list-style-type: none">• Water availability and pest management• Lack of money• Non profitable• New system non conventional

3.3. Overcoming barriers and building on incentives

Guidance on how to overcome barriers using environmental psycho-cognitive approaches:

It might be possible, while relying on introducing psycho-cognitive approaches inspired from environmental psychology to overcome non-technical barriers.

In particular, flexibility exercises performed prior to training or introductory sessions might contribute in reducing resistance of participants and increasing chances of adoption of new techniques.

It might also be recommended to privilege team building session between farmers adopting agroforestry and between agricultural engineers and farmers to initiate trust building and out of the box thinking.

Initiating participatory project design sessions could help considerably farmers in their access to funding quest. Helping the farmers by making available a proposal writer who could help identify the needs and develop the proposals might be perceived as a positive incentive to shifting to agroforestry.

Finally, all types of collaborative work are encouraged to serve as show case, technical support, experience sharing etc.

Recommended training needs

In addition to the psycho cognitive support, some training recommendations could contribute to empowering farmers and landowners in shifting from traditional agriculture to agroforestry. In particular, training sessions in **Marketing, Packaging and Labelling** are essential aspects to guarantee the sustainability and success of agroforestry market systems and value. Training in **Agricultural techniques (pruning, tilling, integrated pest management)** could be considered as a plus.

The trainings include:

1. An introduction on agroecology and agroforestry:
 - a. Impacts of modern intensive agriculture on the environment.

- b. The major principles of agro-ecology.
 - c. Agroforestry:
 - Contribution of the tree to the production system: soil, biodiversity, and water.
 - Example of agroforestry systems and the results of their production.
 - Benefits of agroforestry practices.
2. Agroforestry: techniques and practices:
- a. How to choose an agroforestry system: from identification of the objectives to the choice of the plots, species, spacing and techniques.
 - b. Main parameters to consider (technical, agronomic, environmental ...).
 - c. Agricultural techniques (pruning, tilling, integrated management).
 - d. Management of agroforestry plots.
3. From farm to market:
- Marketing.
 - Packaging.
 - Labelling.

Additionally, it could be profitable to plan and organize some educational trips where farmers could witness success stories and share difficulties with peers, but also visit plots to practice the identification of the most suitable agroforestry systems and their management.

Conclusion

In conclusion, agroforestry is an innovative nontraditional technique that might face some resistance before adoption by local farmers.

The process is a lengthy process and will require time. Change should be gradual and will necessitate trainings, awareness, incentives as well as financial and technical support.

Show cases and sharing success stories might be a positive support to this process.

Appendix 1: Questionnaire

Student

Farmers

Name :

Name :

Surname :

Surname :

Student number :

Village :

Phone :

Phone :

This questionnaire is part of a project on forest livelihood implemented by LRI - Lebanese Reforestation Initiative.

It is being developed in order to assess the perception of farmers/agriculture engineers working on farms, on agro-ecology practices/agro-ecology.

It has to be strictly addressed to farmer/ landowners and agriculture engineers working with farms, in non-urban areas.

The data collection is being performed in collaboration with USEK university - faculty of agriculture 4th year students.

GUIDING QUESTIONS

Section I: Personal Information

1. In what age group are you?

- 19 and under
- 20 - 29
- 30 - 39
- 40 - 49
- 50 - 59
- 60 +

2. Gender:

- Male
- Female

3. Level of Education:

- No schooling completed
- Some high school, no diploma
- Technical degree
Define
- University degree
Define

4. What is your marital status?

- Single, never married
- Married or domestic partnership
- Widowed
- Divorced
- Separated

5. Are you currently...?

- Full time farmer
- Self-employed
- Part time farmer
Define (other jobs)
- Landowners with employees on site
Define (how many) Males Females ...

6. How Big is the land under your management?

- <5000 m2
- 5000 - 10 000 m2
- 10 000 - 20 000 m2
- > 30 000 m2

Define

7. Since when are you in Agriculture Business

- Less than 5 years
- 5- 10 years
- More than 10 years

8. Do you have equipment on land

- No
- Yes
 - Heavy
 - Manual

9. How old is your Equipment?

- 1 - 5 years
- 5 - 10 years
- 10 - 15 years
- >15 years
- Not available

10. Are you willing to buy more equipment?

- No
- Yes

For what purpose

- Diversify the scope of activities
- Renew old equipment

11. How much of your income do you re invest in your agriculture activities?

- none
- less than 10 %
- 10-30 %
- 30-50%
- More than 50%
- All

12. Are you willing to try new possibilities / alternatives?

- No
- Yes
 - Equipment
 - Practices
 - Crops
 - Phytosanitary products
 - Means for pest management

13. Do you compost?

- No
- Yes

Section 2: Site information

1. What is the main production of your land/ farm ?

- Fruits Define.....
- Vegetables Define.....
- Others Define.....

2. Is your land productive over one season or more?

- No
- Yes Define

3. Do you plant/ grow/ keep trees for other purposes on your land?

- No
- Yes Define
 - o Type.....
 - o Pattern
 - Line
 - Hedges
 - Bosks
 - Others.....
 - o Purpose

4. Do you have any Livestock present on the Farm?

- No
- Yes Define
 - Type.....
 - Quantity.....

5. Type of Land management/ practices Used

Please tick the ones that you utilize:

- Tree establishment
- Coppicing
- Thinning
- Pruning
- Weeding
- Mulching
- Conservation
- Lopping
- Pollarding
- No Management
- Grafting
- Fertilizers
- Herbicides
- Root Pruning
- Root Barriers
- Irrigation
- Insecticides
- Other

6. What is your farm type?

- Small subsistence-oriented family farms.
- Small semi-subsistence or part-commercial family farms,

- Small independent specialized family farms.
- Small dependent specialized family farms
- Large commercial family farms,
- Commercial estates

7. Define the 2 majors challenges (problems) related to your actual agriculture business ?

.....
.....

8. Define the 2 majors challenges (problems) related to the area/ region

.....
.....

9. Can you cite 2 actions that could be taken to face those challenges?

.....
.....

10. Did you or are you ready to remove existing trees (forest or pre existing fruit trees) to plant your land?

- No
- Yes Define

Section 3: Farmer Information

1. Do you have any information/ knowledge about agro-environmental schemes currently employed internationally, or in Lebanon?
 - No
 - Yes Define.....

2. Do you participate in any networking activities among farmers on local level (e.g. being part of an association)?
 - No
 - Yes Define.....

3. If the opportunity to learn more would be given to you or the representative of your farm, what topics would you choose? (you can choose more than one options)
 - Developing products
 - Branding and labelling
 - Access to markets
 - Setting up cooperatives
 - Requirements for good agricultural and environmental conditions from national and local policies and regulations
 - Competitiveness and environmental performance
 - Other topics:

4. Rank the importance of the following criteria (1 2 3) for your farm
 - Yield
 - Investment Costs
 - Maintenance Costs

5. What sort of development trajectories did your farm follow and plan to follow?
 - Conventional farming
 - Sustainable farming
 - Integrated farming
 - No organic farmer

6. What is your turnover range (amount in USD)
 - <10,000
 - 10,000 - 20,000
 - 20,000 - 30,000
 - 30,000 - 40,000
 - >40,000

7. How do you define the financial performance of your agriculture activity ?
 - Bad
 - Poor
 - Average
 - Good
 - Very Good
 - Excellent

Section 4: Discipline perception

1. With respect to Agroforestry please indicate the extent to which you agree or disagree with the following statements:

SD = Strongly Disagree
 D = Disagree
 N = Neutral
 A = Agree
 SA = Strongly Agree

Agriculture is at a turning point and current farming systems cannot continue	<input type="radio"/>	SD	<input type="radio"/>	D	<input type="radio"/>	N	<input type="radio"/>	A	<input type="radio"/>	SA
Farmers will have to take more care of their soil's life	<input type="radio"/>	SD	<input type="radio"/>	D	<input type="radio"/>	N	<input type="radio"/>	A	<input type="radio"/>	SA
We have tremendously neglected the interesting inputs that nature can bring offered in this software.	<input type="radio"/>	SD	<input type="radio"/>	D	<input type="radio"/>	N	<input type="radio"/>	A	<input type="radio"/>	SA
Farmers could not produce without chemical fertilizers and plant-protection products	<input type="radio"/>	SD	<input type="radio"/>	D	<input type="radio"/>	N	<input type="radio"/>	A	<input type="radio"/>	SA
I am satisfied with the way I currently farm	<input type="radio"/>	SD	<input type="radio"/>	D	<input type="radio"/>	N	<input type="radio"/>	A	<input type="radio"/>	SA
I prefer to observe how it goes with my neighbors before testing agroforestry	<input type="radio"/>	SD	<input type="radio"/>	D	<input type="radio"/>	N	<input type="radio"/>	A	<input type="radio"/>	SA
To get things moving with farmers, you need to talk about money, subsidies, and profitability	<input type="radio"/>	SD	<input type="radio"/>	D	<input type="radio"/>	N	<input type="radio"/>	A	<input type="radio"/>	SA
Long-term leases or a lower land rent could convince me doing agroforestry	<input type="radio"/>	SD	<input type="radio"/>	D	<input type="radio"/>	N	<input type="radio"/>	A	<input type="radio"/>	SA
If I had technical-economical references in agroforestry I would probably take the plunge	<input type="radio"/>	SD	<input type="radio"/>	D	<input type="radio"/>	N	<input type="radio"/>	A	<input type="radio"/>	SA

2. Do you think any of the following to your land will enhance your Yield?

- No
- Yes
 - Animals Define

- Trees Define
- Intercrops Define
- Others Define

3. In your opinion what could be the advantages of Agroforestry in your land:

Tick the ones you think are relevant

- A more efficient management of water resources
- To fight against soil erosion and run-off
- Toward a more efficient use of nutrients
- Other

4. In your opinion would other farmers adopt Agroforestry as a solution to their current challenges? (rate from 0 to 10)

0 1 2 3 4 5 6 7 8 9 10

5. What would be the factors/ drivers that could make you change your current practices in Agriculture and adopt new/ different techniques. (rate from 0 to 10)

- It can increase productivity on short term
- It can increase productivity on medium/long term
- Financial incentives
- If I see a good example
- If professionals advise me to
- I am satisfied with my current situation and not interested in changing
- If I can have better quality of products
- If I can invest less time and money for the same/ better productivity
- If I can have production all year long