Research Report

Title	Evidence-Based Determination of Farm Gate and Market Values of Agroecological Produce in Upper Akkar
Submitted by	Mada Association
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I - Background

Under the CAFOD-funded project 'Producers, Consumers and Civil Society for Greater Food Sovereignty in Lebanon', which is currently in its second phase, Mada is working in partnership with Dikken el Mazraa and Nation Station. With the goal of **contributing to food sovereignty in Lebanon through an alternative, sustainable model, the project has three,** Mada is promoting a **sustainable food model** whereby: produce is purchased at a fair price from farmers who are being supported to shift to agroecology, which is expected to raise awareness that return on investment from less chemical inputs-intensive production and guaranteed sale at an equal or greater price is more attractive than conventional agriculture; leading to farmers allocating increasing portions of their plots to agroecology; leading to a growing production, which ensures more competitive prices, in turn allowing Dikken - that sells the products at subsidized prices - to increase sales, while rendering the products more affordable to communities and further encouraging farmers to produce, creating a self-reinforcing loop.

Under the first phase of the project, Mada hired an Agri-Business Consultant to determine the **farm gate value** of selected products of farmers targeted under the project. This is the cost of production at the farm level (before transportation and marketing costs), which varies based on several factors and scenarios. This was intended to determine **whether it is possible to provide a fair price to farmers and to consumers at the same time.** In summary, the results showed that while for particular crops, the farmgate value is higher than the current selling price at farmgate - for cabbage, cauliflower, lettuce, potato and cucumber, for the majority of crops, and the average of all crops, the current selling price from farmer to wholesale would ensure profit, meaning no % would have to be added for a fair price to farmers. As such, as the project was purchasing produce from the farmers at 15% above wholesale price, it was concluded that this could be considered more than fair given the results, which showed that for the majority of products, this would ensure a significant profit margin.

As this study had many limitations – including a very limited sample of farmers, crops, and an insufficient time period that did not cover the entire season/production period, Mada undertook research with CAFOD-funded to complement and expand on the findings. The research, conducted from February to October 2023, covered the entire production season and had the objective of ***determining the farm gate value and market value of the products (all) of the farmers supported to shift to agroecology in Akkar.***

II - Methodology

Data was collected on a daily basis from 5 farmers being supported to shift to agroecology in Akkar. All of these farmers are in the Akkar Highlands, meaning they have relatively similar microclimates,

services, resources, and environmental conditions. Moreover, their agroecological plots have almost equal sizes – approximately 1,000 m2 each.

Data collection covered the entire production season from land preparations to harvest, using the same tool used in the previous mission, which is both a data collection and a data analysis tool. Data was collected as follows:

- For each farmer, all of the crops cultivated in their agroecological plots were studied, noting not all of the farmers planted every one of the crops. The crops included 15 varieties: onions, potatoes, garlic, cabbage, red chili, tomatoes, green beans, cauliflower, lettuce, parsley, corn, green pepper, eggplant, tomatoes, zucchini,
- To be able to include the cost of existing assets at farm level, Mada made a list of the assets of each farmer with an average lifespan of each, to be able to estimate per season, how much each asset costs per farmer. The assets included: black much without punch, how, magnifier for insects, serfouette, anti-insect net, vegetable harvesting scissors, dibble, wheelbarrow, digital thermometer, manual back-sprayer, brush cutter, grelinette, arceaux, drip irrigation system, water pump, pipes.
- Inputs, services, and consumables were collected on a daily basis, including: compost, water, manure, seeds and seedlings, fuel, and labor (seasonal workers, if any).

The research team relied on information provided by the farmers, but also on field visits, and triangulation of data. Mada's in house expertise in agroecology and farming, allowed for the identification of inaccurate information provided by the farmers, and therefore minimized errors.

To be able to calculate farm gate value per crop, three types of calculations are possible:

- Calculated based on % from total yield.
- Calculated based on % from total cost of production
- Calculated based on % from total land surface.

As during the previous mission, the **% from total yield** was used, and as this is considered the most accurate, the same was used for this research. As such, to determine farmgate per crop, the following was done:

- The total cost of production of the season was determined based on the data collected.
- The total yield (all crops) was calculated.
- Farm gate per crop was calculated after dividing its yield by the total yield (to obtain its own % of the total) and then divided by the total cost of production.

Farmgate was then compared to the price farmers currently sell to middlemen, to determine if a margin of profit exists or if the farmer would be selling at a loss, namely:

- When farmgate is lower than the selling price to middlemen: the farmer profits.
- When farmgate is higher than selling price to middlemen: the farmer loses.

Finally, **market value**, which is the cost of the product when marketing and transportation costs are added, was determined based on the locations of the farmers, with an estimated price of bringing the products to the markets in Beirut or in North, in a scenario that the farmers transport collectively, which makes all of the difference and which is what Mada is promoting to decrease costs. In this scenario, the farmers bypass the middleman and sell directly to consumers, and therefore the comparison is with current prices at the market level.

Based on the market value, 15% was added to each crop as an average profit margin. This was then compared to current market prices of those crops to determine if it is possible to sell agroecological products to the average consumer at a fair price.

Determining farm gate and market values, allowed Mada to draw conclusions and provided recommendations on fair prices for farmers and for consumers, as well as what the preferred marketing channels are.

III - Findings and Analysis

As previously mentioned, 5 farmers were included in this study, with varying plot sizes and crops, for which farmgate values of the different crops were determined, as per Table 1 Below. The values ranged from 0.36 USD up to 1.38 USD per kg.

Table 1: Farmers' Crops and their Farmgate Values

Crop	Farmer 1 Farmgate Value	Farmer 2 Farmgate Value	Farmer 3 Farmgate Value	Farmer 4 Farmgate Value	Farmer 5 Farmgate Value
Green pepper	$ -	N/A	$ 0.99	$ 0.55	$ 0.56
Red Chili	$ 0.46	N/A	N/A	N/A	N/A
Onion	$ 0.36	$ 0.97	$ 1.05	$ 0.65	N/A
Loubiyeh - American Beans	N/A	$ 0.93	$ 0.96	N/A	N/A
Lettuce	$ 0.36	$ 0.93	N/A	N/A	N/A
Zucchini	$ 0.37	N/A	N/A	N/A	$ 0.58
Cauliflower	N/A	$ 0.92	N/A	N/A	N/A
Cucumber	$ 0.36	$ 0.90	N/A	$ 0.55	$ 0.55
Parsley	$ 0.35	N/A	N/A	N/A	N/A
Garlic	$ 0.54	$ 0.94	$ 2.94	N/A	N/A
Cabbage	$ 0.36	$ 0.91	N/A	$ 0.55	$ 0.53
Eggplant	$ 0.37	N/A	N/A	N/A	$ 0.53
Potato	$ 0.41	N/A	N/A	$ 0.74	N/A
Corn	$ 0.34	N/A	$ 0.96	N/A	$ 0.50
Tomatoes	N/A	$ 0.92	N/A	$ 0.54	$ 0.54
Average Farmgate	**$ 0.36**	**$ 0.93**	**$ 1.38**	**$ 0.60**	**$ 0.54**

The various farm gate values of the crops, calculated as averages of the various farmers, were compared against the selling prices of the farmers (Table 2), which Mada gathered over several months to have a representative average, as these prices fluctuate on a daily basis and even within the same day. These selling prices are to middlemen, which generally, profit significantly, and therefore, the results must be viewed in this perspective, noting that in the ideal scenario, farmers would not be selling to middlemen but directly to consumers through markets. However, this scenario is considered as the majority of farmers sells to middlemen.

Table 2: Average Farmgate Values vs Selling Prices to Middlemen

Crop	Average Farmgate	Price Farmers are Selling at Farm Level	% difference
Green pepper	$ 0.70	$ 0.78	11%
Red Chili	$ 0.46	$ 0.94	105%
Onion	$ 0.76	$ 0.53	-29%

Loubiyeh - American Beans	$	0.94	$	0.84	-11%
Lettuce	$	0.65	$	0.52	-19%
Zucchini	$	0.47	$	0.57	20%
Cauliflower	$	0.92	$	0.45	-51%
Cucumber	$	0.59	$	0.48	-19%
Parsley	$	0.35	$	0.19	-44%
Garlic	$	1.47	$	2.77	88%
Cabbage	$	0.59	$	0.52	-11%
Eggplant	$	0.45	$	0.47	5%
Potato	$	0.57	$	0.49	-14%
Corn	$	0.60	$	0.40	-34%
Tomatoes	$	0.66	$	0.57	-14%
	$	**0.68**	**$**	**0.70**	**3%**

While profit vs loss varies among the crops of each individual farmers, the averages show that:

- Farmer 1: Average farmgate is 0.36 USD and average selling price is 0.7 USD, meaning the farmer is **profiting** when selling to a middleman (97%).
- Farmer 2: Average farmgate is 0.93 USD and average selling price is 0.7 USD, meaning the farmer is **not profiting** when selling to a middleman (-25%).
- Farmer 3: Average farmgate is 1.38 USD and average selling price is 0.7 USD, meaning the farmer is **not profiting** when selling to a middleman (-49%).
- Farmer 4: Average farmgate is 0.6 USD and average selling price is 0.7 USD, meaning the farmer is **profiting** when selling to a middleman (17%).
- Farmer 5: Average farmgate is 0.54 USD and average selling price is 0.7 USD, meaning the farmer is **profiting** when selling to a middleman (44%).

Regarding the average farmgate value of all crops of all farmers (0.68 USD), when compared to the selling price to middlemen of 0.7 USD, this result shows that it is **3% lower**, meaning that on average, selling directly to the middleman, based on this sample of farmers, there is no significant profit margin. However, the reality is that 3 out of 5 farmers can sell at significant profit, to varying degrees, to the middlemen and the average is not necessarily relevant in this case.

For the two farmers at a loss when selling to middlemen, and who have relatively higher farmgate values, it must be noted that the studied seasons are not representative given the following:

- Farmer 2: given issues accessing power sources given the crisis in Lebanon, with the government providing electricity less than 2 hours per day in his location, this farmer had to purchase a generator, which adds significantly to his asset costs, which are included in production costs. Moreover, due to the same power issues, his electric pump was damaged and he had to purchase a new one, further adding to his production costs.
- Farmer 3: this farmer's production this season was significantly affected by unexpected weather changes, which increased the vulnerability of his crops to pests and diseases. While these changes affected all farmers, this farmer in particular, who was very affected by the deteriorating economic context and skyrocketing fuel prices, attempted to reduce expenses by visiting the land on foot, which reduced his ability be present on a daily basis, leading to delayed disease detection, at stages when they became difficult to control, as well as reduced irrigation. Finally, as this farmer's land is situated near a forest, wild animals targeted the crops. Installing a fence to address this problem is planned for the upcoming season.

For the market values, collective transportation to Beirut (0.09 USD/kg based on current prices) and to Northern (0.025 USD/kg based on current prices) markets were calculated as per Table 3.

Table 3: Market Values of the Crops

Crop	Market Value (collective transportation to Beirut)	Market Value (collective transportation to Tripoli)
Green pepper	$ 0.79	$ 0.73
Red Chili	$ 0.55	$ 0.49
Onion	$ 0.85	$ 0.78
Loubiyeh - American Beans	$ 1.03	$ 0.97
Lettuce	$ 0.74	$ 0.67
Zucchini	$ 0.56	$ 0.50
Cauliflower	$ 1.01	$ 0.95
Cucumber	$ 0.68	$ 0.62
Parsley	$ 0.44	$ 0.37
Garlic	$ 1.56	$ 1.50
Cabbage	$ 0.68	$ 0.61
Eggplant	$ 0.54	$ 0.47
Potato	$ 0.66	$ 0.60
Corn	$ 0.69	$ 0.63
Tomatoes	$ 0.75	$ 0.69

Following the determination of the market values, a 15% was added to each crop to determine a fair price for the farmer to sell to consumers, to ensure profit, and this was compared to current prices of the crops at markets to determine if the prices of these agroecological products would have to be higher or lower. Ultimately, this allowed Mada to draw conclusions on whether the average consumer in Lebanon can access these products. Table 4 outlines the results of this comparison.

Table 4 – Comparison of Agroecological Product Prices with Market Prices

Crop	Profit Margin of 15% (Beirut)	Profit Margin of 15% (North)	Current Market Prices (average)	% Difference (Beirut)	% Difference (North)
Green pepper	$ 0.91	$ 0.84	$ 2.22	144%	166%
Red Chili	$ 0.63	$ 0.56	$ 1.56	145%	178%
Onion	$ 0.97	$ 0.90	$ 1.11	14%	24%
Loubiyeh - American Beans	$ 1.19	$ 1.11	$ 2.00	68%	80%
Lettuce	$ 0.85	$ 0.77	$ 0.92	9%	19%
Zucchini	$ 0.65	$ 0.57	$ 1.56	140%	171%
Cauliflower	$ 1.16	$ 1.09	$ 0.89	-24%	-18%

Cucumber	$ 0.78	$ 0.71	$ 1.11	42%	57%
Parsley	$ 0.51	$ 0.43	$ 0.28	-45%	-35%
Garlic	$ 1.80	$ 1.72	$ 3.89	117%	126%
Cabbage	$ 0.78	$ 0.70	$ 0.74	-4%	6%
Eggplant	$ 0.62	$ 0.54	$ 0.67	8%	23%
Potato	$ 0.76	$ 0.69	$ 0.67	-13%	-3%
Corn	$ 0.80	$ 0.72	$ 0.44	-44%	-38%
Tomatoes	$ 0.87	$ 0.79	$ 0.91	5%	15%

The results above indicate that if farmers overpass middlemen and sell directly to consumers and/or markets, with the exception of a minority of the crops, profitability is ensured. With some crops showing very high profitability, and differences of up to 171% when compared to current market prices, meaning the crops can actually be sold at much lower prices in this scenario. More specifically, as per Table 5, when farmgate values are compared to current market prices, with the exception of 3 crops, the lowest % difference is of 16%, and the highest is 325%, with the majority being higher than 40%. This indicates that even without the 15% addition that was made, these crops can be sold at significant profit at the market, and even at reduced prices. The average % difference is as high as 86%, showing high profitability.

Table 5 – Farmgate Values vs Current Market Prices

Crops	Average Farmgate Values	Current market prices	% difference
Green pepper	$ 0.70	$ 2.22	217%
Red Chili	$ 0.46	$ 1.56	237%
Onion	$ 0.76	$ 1.11	47%
Loubiyeh - American Beans	$ 0.94	$ 2.00	112%
Lettuce	$ 0.65	$ 0.92	43%
Zucchini	$ 0.47	$ 1.56	228%
Cauliflower	$ 0.92	$ 0.89	-4%
Cucumber	$ 0.59	$ 1.11	88%
Parsley	$ 0.35	$ 0.28	-20%

Garlic	$ 1.47	$ 3.89	164%
Cabbage	$ 0.59	$ 0.74	27%
Eggplant	$ 0.45	$ 0.67	49%
Potato	$ 0.57	$ 0.67	16%
Corn	$ 0.60	$ 0.44	-26%
Tomatoes	$ 0.66	$ 0.91	37%
Average	**$ 0.68**	1.26	**86%**

When compared to market prices, the following is noted per farmer:

- Farmer 1: Average farmgate is 0.36 USD and average market price is 1.26 USD, meaning a difference of 255%, translating into significant profit if bypassing the middleman, noting this farmer also profits significantly if selling to the middleman. This farmer can either sell at current market price at a profit or even sell at lower, more competitive prices.
- Farmer 2: Average farmgate is 0.93 USD and average market price is 1.26 USD, meaning a difference of 36%, translating into significant profit if bypassing the middleman, noting this farmer's results showed no profits if selling to the middleman. This particular case shows the significant difference between selling directly or passing through middlemen.
- Farmer 3: Average farmgate is 1.38 USD and average selling price is 1.26 USD, meaning the farmer would not profit even through direct sales, revealing an issue in the production, given some of the challenges described above, and noting this is not necessarily representative of every season.
- Farmer 4: Average farmgate is 0.6 USD and average selling price is 1.26 USD, meaning a difference of 111%, translating into significant profit if bypassing the middleman, noting this farmer also profits if selling to the middleman. This farmer can either sell at current market price at a profit or even sell at lower, more competitive prices.
- Farmer 5: Average farmgate is 0.54 USD and average selling price is 1.26 USD, meaning a difference of 134%, translating into significant profit if bypassing the middleman, noting this farmer also profits if selling to the middleman. This farmer can either sell at current market price at a profit or even sell at lower, more competitive prices.

IV - Limitation of the Research

Determining farm gate and market values is extremely complex in the case of the agroecological farmers in Akkar given various factors:

- The context is constantly changing (inflation, rising fuel prices, increasingly unpredictable weather, etc.), and as such, costs may vary across seasons due to these fluctuations and changes. Prices of inputs and services have a major impact on production costs, and therefore no season can be fully representative in a volatile context of economic collapse.
- Agroecology entails various types of products in a single plot of land, meaning that various costs are cross-cutting for the all the products and formulas/averages had to be used to

include them in the values. While some costs are straightforward – e.g., seedlings, others have to be divided among several crops (e.g., water and compost).

- Certain costs that contribute to farmgate value, such as asset depreciation and interest (as some inputs are purchased at debt and paid by the farmer later with interest), are difficult to include in the formulas, and therefore were not included. These could be included eventually, once the tool is used for one production cycle and lessons are generated, as well as information gathered on what must be added for more accurate results.
- Ideally, farmgate value and market value must be studied across various production cycles (several years). Building on the findings of this research, and its lessons learned, and if funds are secured, it would be important that Mada repeats it the following year.
- Climate change is having certain, yet unpredictable and yet to be fully understood impacts on production. This past season, the entire production cycle was delayed due to the weather, and new diseases are spreading, which have yet to be controlled. As such, this past season is not fully representative, and again, this exercise will have to be repeated every year to provide fully reliable data.
- The lands of the studied farmers are relatively small. Asset depreciation and some services (e.g., water) would decrease significantly in the formula if the lands were larger. All of these farmers have larger plots of land that can be eventually shifted to agroecology, especially once its viability is proven to them.

It is important to note, that in view of limitations, and as this is the first research of this kind ever conducted in Lebanon, it is a learning process, with the analysis tool used adapting and evolving as the work proceeds, to integrate more variables and obtain increasingly more accurate data.

V - Conclusion

The findings of this research lead to various key **observations**:

- Despite unexpected weather events and emerging diseases/pests, as well as the deteriorating context which increased production costs for farmers and led to negative coping mechanisms: on average, the study shows that agroecology is (or can be) profitable, and if the conditions are optimized and losses are minimized, the crops can be sold at a profit by the farmers both at farm level and at market level profitably.
- The varying farmgate values of the farmers, even for the same crops, show that the sample have very different conditions, which renders having standardized prices per crop difficult, as different farmers will have very different profit margins.
- Most of the crops can be sold at fair market prices to consumers, meaning these products do not have to be reserved for niche markets inaccessible to the vast majority of the population, but can actually be sold in regular markets to the wider consumer base. As shown in the comparison wit current market prices, most of the crops can be sold with a 15% additional profit margin and still be sold either at much lower prices or equal prices to the current market.
- If farmgate can be reduced further, with Farmer 1 and also to a certain extent Farmer 4, providing good examples of reduced production costs and good yield, then the profit margin for farmers can be even larger, and in these cases, agroecology is much more profitable than conventional agriculture. Farmer 1 has a farmgate value 96% lower than the selling price and Farmer 4 has a farmgate value 17% lower than selling price, showing a significant profit margin, especially if the 15% is then added at the market level. When it comes to these farmers, for the crops with slightly higher farmgate which currently appear to be non-

profitable when compared to current market prices, the 15% could even be removed and profit would still be ensured given their farmgate value is significantly lower.

- While collective transportation does not add a significant cost, selling the products in the Northern markets is significantly more profitable than selling them in Beirut, which calls for initiatives including farmer's markets in the Northern cities and even rural areas.
- The scenario of consumers purchasing directly at farm level was not considered as this is not currently feasible or the norm in Lebanon, but it must be noted that if this was to eventually become an option, the profit margin would increase significantly for all farmers and all crops.
- The majority of the crops can be sold to consumers at lower than current market prices, meaning these agroecological products could be largely accessible and affordable to the average consumer, and can potentially be sold at even lower prices. This would especially be the case if production is optimized, which is increasingly possible.
- The current market prices, when compared to the prices sold to middlemen, show that farmers' bargaining power is extremely limited, with middlemen absorbing large part of the profit. The two farmers whose results show loss when selling to middlemen do have relatively high farmgate values that must be decreased, but the profit margin of middlemen must also be taken into consideration when analyzing these results, as farmers are selling to middlemen at a minimum, often at a loss, even when it comes to conventional agriculture.

The main **recommendations** include:

- The results of this study must be used by each farmer and Mada's Technical Team to optimize production, re-assessing the viability of specific crops with very high farm gate values, to determine is the cultivation of these crops must be discontinued or requires a technical intervention to be improved. The crops that are most concerning are: cauliflower, parsley and corn – their farmgate values are even higher than current market prices and therefore these crops, as currently cultivated by the farmers, are certainly not profitable. It must be investigated further whether these were due to specific issues faced in this season, or to larger issues that render them non-profitable in general, and whether specific actions can decrease their farmgate – e.g., cultivating larger quantities.
- Farmers must overpass middlemen and collectively transport their produce to urban markets, whether in the North, Beirut, or elsewhere, to maximize their profit and also be able to provide reduced prices to consumers.
- Farmers must engage in collective price setting (something Mada has already begun organizing), to agree on the market prices of their various products, and even consider selling some of the products (those which can) at lower prices to reach more customers, while still ensuring a fair profit. This would boost the competitiveness of these products in the market.
- If farmers collaborate, it would also be possible to sell to middlemen or other middle entities at a profit, noting the disparity between current market prices and prices to middlemen. If farmers standardize their prices and bargain together, the selling price to middlemen can be increased with significant profit.
- As power and water continue to be challenges, which add to production costs while also affecting yield, these must be addressed in the medium term, through renewable/green energy sources potentially, or other measures.
- Farmers must expand agroecological production to reduce production costs, noting that farmers with larger plots of land had lower farm gate values. While this requires an initial investment, it will ensure greater profit in the long term.

- Experimentation and research must be prioritized by Mada to deal with changing weather patterns and emerging diseases and pests that affect yield and lead to greater production costs.
- When it comes to the very different conditions of the farmers leading to very different farm gate values, this is something that needs to be addressed through ongoing technical support, experimentation and research, and collaboration, noting that costs can never be harmonized completely, especially for a type of agriculture this dependent on the natural environment. However, the disparity must be reduced to reach a point of strong collective negotiation and collaboration.

It must also be noted that this research will have to be repeated across several seasons for conclusive results, and the sample must be expanded from 4 to at least 10 farmers in the coming years. This first comprehensive study across a full season is the first concrete step towards more extensive research. The findings are very promising, and at the same time highlight various areas requiring interventions and investigations. In parallel, the farmers must continue to be supported technically, individually and collectively, especially in the deteriorating context, to overcome current shocks and boost their profits, while providing nutritious, sustainable produce to consumers and meet demand.