**C4 - Interview technical advisor coop, Cordoba - 18-11-2021**

Here there are 2 types of cultivation, with irrigation and dry cultivation. In the cultivation with irrigation, there are 2 types, superintensive with about 1600 trees per hectare, planted with 4x1.5 meter distance between them. And intensive olive farms, with about 250 trees, with a distance between 6x4, or 7x5 or 8x5, that differs a bit. That is with irrigation. In the dry cultivation, is more like you know in Jaen, with 10x10 meter distance or 12x11 meter distance. It is more traditional, with 3 legs, not 1 leg. In this area, which is a very fertile area, this is a bit out of date, because the costs of production/harvest for that traditional system are really high. It is not very mechanized and the recollection of olives is really expensive because you need a lot of man labour. The people are cultivating in superintensive, to do the recollection with machines, or in intensive, so you can do the harvest with a vibrator. These are the 2 types of olive trees here in this area. Here, a lot of farmers have irrigation and do this type of cultivation. We are going to see both systems later on.

The pruning is done differently. For superintensive, the pruning is mechanized, done with machine. Intensive olive trees are pruned by hand, one year yes and one year not. Those who do the pruning every year, the volumes are less. Those who prune every two years, they produce more pruning in one year and nothing in the other.

The management of the pruning rests is also different here, it varies per farmer. In intensive, with irrigation is different than dry cultivation. In dry cultivation you need to be very careful, in a dry year, your olive tree will suffer, you will have less production and your olives will be smaller. In dry cultivation you will need to have a closer look at your olive tree and de the pruning more carefully.

There are different olive varieties here, there is la Marteña, Picual, Hojiblanca, which can be used as table olives and also to produce olive oil. [name farmer] has intensive olive trees with irrigation and he produces table olives. And the other variety, which is dominant here, is Alberquino, for olive oil. Very good quality.

That is a little bit how we manage the olive fields here. Superintensive, where the harvest and pruning is done with machines. Intensive, where the harvest is done with machine, but not an integral machine like in superintensive, you still need some manual labour, and traditional.

**And how many members does this cooperative have?**

Here we have about 600 members.

**Which part of them has irrigation and which part dry cultivation?**

Here, those who have irrigation is more than half of the members, I would say 60% has irrigation and 40% dry. We have a road here, those on this side have irrigation, those on the other side don’t.

**And of them, how many have intensive and how many superintensive farms?**

In superintensive, each year that is more. Those who have new fields, almost all of them plant superintensive. The costs of recollection are a lot less. The difference is huge.

**And people replace the traditional fields with superintensive? They take out the old trees and plant new ones?**

Yes, and each year more. When we go take a look at the field, I can show you a plot that was in intensive last year and now is in superintensive. The people remove their olive trees, and plant new ones. Superintensive trees already produce olives after 2 years, I even saw some field where they produces after 1.5 years. And with irrigation, it is early. The difference between irrigation and dry cultivation is also high.

**And what is the size of the fields?**

Normally it is not very big, here, there a just a few people who own a lot of land, but these are in the minority, they own about 200 ha. And then there are smaller plot owners, with 2 or 3 hectares. The majority owns a small plot. Here we only have 4 or 5 members that have a large plot, the rest is smaller.

**Is that something you could share with us, the division of amount of hectares per member?**

That is difficult, I cannot give you a physical document, also with the data protection. But I can give you an average number. There are members also with different plots, one of 2 hectares here, one of 3 hectares there. And then there are people with 400 hectares. I can give you an estimate.

**I understands, but maybe an average?**

I can tell you the percentage. Members lower than 2.5 hectares, that will be around 30-40%, I don’t have the exact numbers. The majority, have between 2-3-4 hectares, not more.

**And then a very small percentage of members that have a lot of land**

Yes, members with plots bigger than 50 hectares, would be about 3-4%, not more.

**What do you do with the subproducts that are generated here?**

The pruning rests are the only subproducts generated in the olive production. For the oil production, we have alpeorujo, the waste water is evaporated, the olive pits are removed and used for energy and the orujo is brought to the orujeras and they extract the remaining oil. So the only subproduct that is left over is the pruning rests. There are different ways of managing that. Some people chop it and leave it on the soil. There are people that sell it for bioenergy, there is a company, Patamula, that comes and picks it up and produces some products, I don’t know what exactly, energy or fertilizers, I don’t know.

**And that company comes and picks up the biomass from the field?**

Yes exactly, they chop it and take it.

**And they produce energy?**

I think so, it is a thermal central. It is very close, only 10 minutes from here.

And there are also people that burn it, because is more complicated to leave it in the field or chop it, because they don’t have the machine. So it is easier to burn it. These are the 3 ways to manage the pruning rests.

**And do you know which part of the farmers use which method?**

The great majority incorporates it in the soil, I think 70% and about 30% sends it to the company. The percentage of people that burn it is really small. Maybe 2 or 3 %, those who have small parcels, and don’t have the machines, it is easiest to burn it.

**Do you know why the majority of the farmers incorporate the pruning rests in the soil?**

Because it brings back nutrients into the soil. Here, a problem that we have is a lack of organic material in the soil. It is very low, so the people have learned that it is really important to have organic material in the soil and so they leave the chopped pruning rests on the soil to decompose.

**What are the costs to do that? Do most of the farmers own these machines themselves?**

Some have it, mostly the farmers that have larger fields, because for them it is economically viable. Those who have smaller plots, it is not viable to but a machine like that.

[name farmer]: The machine to chop the ramon (pruning rests), the company that comes to pick it up, they make an agreement with the farmer. The farmer should make a pile or a line of the pruning rests, they come and chop it and take it. If it is only to chop it and leave it on the field, it will be about 10 or 12 euros per hectare. If it is to chop it and take it to the company, the cost will go down to 3 euros per hectare.

**So it is cheaper for the farmer to let the company pick it up**

Yes, the farmers need to put it in a line, the company that comes to chop it and leave it on the soil will charge you 10 euros, but if they take it, is cheaper, because they can use the biomass and sell a product. If you leave it on the soil, and organic material, it is more expensive, but you do have organic material in your soil.

**Do people also have cover crops here?**

Yes, in 2 types, spontaneous or sown cover crops. There are only a few people who sow cover crops, the majority of the people who do it, have spontaneous ground cover. Those who sow it, they leave it grow for one year, and then they also chip that and leave it on the soil. This is often a type of grass. Spontaneous ground cover is often a combination of different varieties.

Normally in areas that are more mountainous/more hills, people do have ground cover, in the rest they use herbicides. I think about 30% of the farmers have cover crops, the rest doesn’t do it. And especially in the more mountainous areas, to prevent erosion.

**What do you see as the main challenges here in the sector?**

Obviously the price. Last year, the olive oil price was good, it was interesting for the farmer. But, in Spain, when the production increases, in a year when there is a lot of rain, and the production rises, especially in Jaen, then the price will decrease. That is a problem, especially in the areas with dry cultivation, where the costs of production are really high. You need to reduce the costs of production and the way to do that is to mechanize. For an olive tree to be economically viable, you need to reduce the costs of production, there is no other way. Or the consumption should increase a lot. Or the production will need to be reduced, to balance the offer and demand, otherwise, in some areas, it will disappear, because it won’t be viable. Especially in Jaen, and more specifically the mountain areas of Jaen. A year like this year, when you can sell your olive oil for 3 euros, it is alright. But it becomes a problem when the price is 1.80 or 1.90, that is below the cost price.

In dry cultivation, it is not viable, without mechanization, it cannot survive.

Another possibility to differentiate the traditional production from the mountain areas and sell it for a different price, a higher price. Protected origin or something. But otherwise, it is not viable, they cannot compete.

In those areas it is difficult to mechanize, because of the landscape.

Management of cover crops, that is more a topic of conservation. When you look at economic viability, if it is more profitable to leave cover crops or not, I don’t think there is a lot of difference.

Another topic is the use of herbicides, and to use less of that. We use chemical products and in a lot of cases, people abuse the use of herbicides.

**How much herbicides and fertilizers are used?**

Here, glyphosate, as emergency herbcides, and they also use some products to prevent herbs to grow, like suflorfen, disfulgenican . These are most used.

**In what amounts?**

There are norms set, so we as technical advisors, we always recommend to use some chemical products, but within the norms set by the ministry.

A lot of members have ‘integrated production’ , so they use less, and there are also people that have ecological production, so for them it is prohibited to use. And for the rest, we always recommend to use the amounts that are set/limited by the ministry. Dependent on the hectars and amount of trees.

The fertilizers that are used here, the tradition is to apply fertilizers only in spring, when the olive starts to ‘wake up’ after the winter. They do it in spring, and use a complex fertilizer, NPK, with different formulas. Those who have irrigation, and can apply fertilizers using irrigation, they can extend the time of applying fertilizers, in March and September, they use irrigation, which is much more efficient.

They use about 700 kg per hectares. There is also a limit, contamination of nitrogen, there is a limit of using nitrogen, you cannot use the amount you want, it is limited. In the date you use it, and also if it is dry or irrigated cultivation.

**And those farmers that have integrated production use less?**

Yes, they need to use less, this is calculated based on the amount of hectares you have. For nitrogen it will be 17 units of fertilizers per tonne of olives. Phosphor about 5 units and potassium about 21 units. Independent from the production, in integrated production they have to use less, about 70 units of fertilizers in dry cultivation and 110 in irrigation. This is a bit by heart, I don’t know the exact numbers but it is something like this.

**You said that the mechanization is a challenge here, do you think that people here are open to changes?**

Yes definitely, they have to because of the circumstances. If I am cultivating for 3 years and it is not profitable, I need to do something, need to change. Maybe if it is bad for one year and the other one good, ok, but if its like that for 2 or 3 years, you need to change your mentality, and people are doing that.

Here they have more options, in the area of Jaen, even if you wanted it, it is not always possible. The terrain is limiting a lot. Here, we don’t have that problem, we only have about 2 or 3 % in mountainous areas. What is a limit is the size of your plot. If you don’t have a large plot, it won’t be viable to buy all these machines. But what you can do is let a company do all the work, so you don’t need your own machines. Here, people are planting more superintensive, you will see it when we will drive around here, to recollect it with machines. And this will increase a lot in the future.

**How much employees do you need in the harvest for these three systems?**

That is the fundamental difference. For superintensive you only need a driver of the machine and a driver of the truck that brings the olives to the cooperative. You don’t need more than 2 people. In intensive cultivation, they need more people. 3 tractors: 1 that vibrates the tree, 1 tractor that recollects the bales (recolector de fardos), and another tractor with a trailer that takes the olives to the cooperative. So you need 3 drivers, 4 people that help with the machine that vibrates the tree and another 4 or 5 people that help with the bales/olives to put it into the truck. So that is about 11 or 12 people, compared to 2 people in superintensive. That is another level.

And traditional is similar to intensive, only when you can enter with the tractor into the fields, otherwise hand machines are used. Often when a tree has 3 legs, you cannot go with the tractor, you need a hand machine.

**Do you also know how much energy is used during the harvest, in these systems?**

Here the energy use is mainly diesel.

**Do you know the quantity?**

[name farmer]: with the 3 tractors I use, I use about 200 liters of diesel per day

**And superintensive?**

I don’t know what the machine uses, it is not cheap, but it will be less. Maybe also about 200 diesel. I don’t know exactly, but it will be cheaper.

**So that will be 200 litres per day, how many hectares could you harvest in one day?**

[name farmer]: that also depends on the amount of trees that you have on your field, in one day, about 500 trees, about 2 hectares.

[name technical advisor]: normally, when a terrain is easy to access, with a tractor with a vibrator, 500 trees per day is a good day. In intensive. 500 trees will be the maximum.

In superintensive, a machine harvests 1 hectare in 2 hours, so in a work day of 8 hours, you can do 4 hectares. Currently, it is prohibited to harvest during the nights, to protect the birds, but before that, they were also working during the night.

**And how many years can an intensive and super intensive olive tree produce olives, is there a maximum?**

A superintensive tree will start producing after 2.5 years, sometimes 1.5 years but very low quantity and it’s not worth it to use the machine. But after that it will have high production.

**And until when can they produce?**

They can produce up to 20-25 years, a superintensive has a lower life span than traditional, which can be over a 100 years old. But the superintensive, with a good management and good pruning practice, can produce about 20 to 25 years, without any problem. An intensive tree, can be between 80-120 years without any problem. The life span of a superintensive tree is lower, but it will start producing earlier.

After 20-25 years, you need to replace the trees, you remove them, plant new ones and then after 2.5 years, you have new production.

**And did this already happen? Since when do you have superintensive trees here?**

Superintensive already for 20 years.

**So they are about to renew their plantation?**

Yes some of them are and some of them already did.

**And what do they do with the removed trees?**

Normally, they also chip it and leave it on the soil. If it is a change from traditional or intensive to superintensive, the wood will be thicker, they cut it into pieces and use if for the chimney. A superintensive tree, that doesn’t have a big truck, they chip it and leave on the soil. Or they take it for biomass. Or sometimes they also make a big pile and burn it.

It is much more expensive to take it to a place, than to destroy it by burning it.

***Showing the biohub infographic***

If there is someone, a government, that invests and supports an industry like that here, it is really interesting. Because we generate a lot of biomass, and often the subproduct of olive production is a problem for the farmers. They need to get rid of it, or they chip it or they burn it. If there is anyone that can solve that problem and also pays you to solve your problem, that would be fantastic. But there should be someone that supports this, normally that would be the government right?

Here, it looks like that now they talk a lot about carbon neutral and things like that, it could be an opportunity.

I think it is interesting, there is enough offer of biomass in this area, certain. I am sure that if you could offer the farmer that you take the pruning rests out of their field and you would pay for it, they would be happy to.

The other option, which is also an interesting option, is to incorporate the pruning rests as organic material into the soil. That is also a good option. The soils are very poor here, very low content of organic material here. The only way to treat that is to put organic material into the soil for a few years. The people use herbicides now and remove it, and then there is less and less organic material in the soil.

I am sure that if you would say to a farmer that he puts the pruning rests into one line and that you would come to pick it up and pay for that, he will do that, he will work together with you.

**You don’t see problems or obstacles?**

No, I don’t. There is already a company that does this. What happens is that there is a law here, about plant health (sanidad vegetal), that says that after the 1st of May you cannot leave any residues of logging in the field. Because there is plague, that is called ‘barrenío’, that comes from the olive tree, and after May, it will jump from the pruning rests to the olive trees and that causes a lot of harm. This company has problems to remove all the pruning rests after this date. They don’t have enough trucks, they cannot handle the amount of pruning rests. As technical advisor, I cannot let it happen that in fields that I manage/help, are pruning rests left. It generate a problem, the plague. They only have 3 trucks, but we have a lot of piles of pruning rests. They don’t have time to remove everything. It generates a problem for the farmer. I have seen this problem.

[name farmer]: the problem that [name technical advisor] is talking about, that is for me a reason that I don’t do it, I don’t let the company take my pruning rests. I prune, I collect it and I burn it, because otherwise I have a problem, I don’t want that. But if I could call them and they could come and pick it up tomorrow, I will do that. There are a lot of farmers that make use of this service, but it takes too much time to collect it, and that generates a problem for the farmer but also for their neighbours.

**And do you think that the cooperative could play a role in a system like this?**

The role will be talking to the farming and explaining to them why this would be a good idea. For me, burning is the easiest, most comfortable option. It is not the best agricultural practice, that is incorporation into the soil. If everyone would do that, this factory would disappear.

If the company could come pick the pruning rests on time and could also compensate the farmers, I think that could be a good idea as well. There is already a company here and a lot of members of us work with them.

**Last question, in Jaen, the majority of the farmers are members of cooperatives, like 80%, is it the same in Cordoba?**

Yes, the majority is member of a cooperative, same as in Jaen. There are some private mills, but this is just a small volume.

Because the farmers are small, they don’t have enough production to have their own factory. And then you need to do the commercialization and everything. It is easier to do that in a cooperative.

We produce 3 million kg of olive oil, we need to sell it. It is not easy to sell everything.

**Would it also be possible to share with us how many electricity and water you use here in the mill?**

Here, one month, when the machines run in full capacity, it is 20.000 euros for electricity per month. It is more now, because the price of the light has risen a lot. This is during the period that we run in full capacity. We process 200.000-300.000 kg of olives every day. What comes in during the day you need to process right away, so you run almost 24 hours.

**And these are 20.000 euros, do you also know the amount of electricity you use?**

I don’t know the price of KB per hour, I will check.

From 1st of January until the 31st of January, we pay 28.000 euros for the light, amount of Kilobytes: 252.000 kilobytes in one month.

**And do you also know the amount of water?**

No I can’t say that, but here we use a lot of water in the process.

**What is the amount of water that is used in the irrigation?**

This year it was 2.000 kubic meter per hectare. That is not excessive, there are areas where they use more.