Clear requirements for recyclability

Packaging is therefore useful, and often indispensable, but it also creates problems, because once the product has been removed, it becomes waste. Its relatively short life cycle burdens the environment, especially as packaging often consists of plastics that decompose only very slowly. This raises the bar, because packaging must be capable of environmentally sound disposal, be recyclable, or biodegradable. The target recycling rates for packaging are 90 per cent for glass, ferrous metals, aluminium, paper, and cardboard.

Composite materials and plastic packaging should be at least two-thirds recycled. This should not pose any problems for tins, which in the fish sector are commonly used and not only for herring, mackerel, sardine, or tuna products. They are mostly made of aluminium or tinplate, which can be recycled almost indefinitely. However, this requires relatively large amounts of energy, which has a negative impact on the carbon footprint. Bio-plastic, which is produced from plant-based biomass such as maize or sugar cane, is a rather controversial alternative packaging material. On the surface, it appears more sustainable than plastics made from crude oil. Life cycle assessments, however, show that bio-based plastic does not offer convincing environmental advantages. The cultivation of maize, sugar cane, or potatoes used as raw materials requires agricultural land that is then no longer available for food production. The manufacture of bio-plastic requires chemicals and a great deal of energy. Disposal is also difficult. Although the term "bio" suggests that it can simply be put in the organic waste bin, but this is not advisable for biodegradable plastic, because decomposition takes considerably longer than for "natural" compost. With the exception of bio-PET, which can be disposed of like conventional plastic, other bio-plastic packaging belongs in the residual waste bin. *Manfred Klinkhardt*

Italian shellfish farmers diversify income streams

Italian shellfish farmers currently face multiple challenges both immediate and more long term that threaten their industry. The most serious is probably climate change which has already rendered some areas inhospitable to the growing of shellfish due to high water temperatures and the spread of invasive predators. Other factors affecting the sector include generational change and bureaucracy. The Association Mediterranea Acquacoltori (AMA) represents the interests of the sector and has taken initiatives to make it more resilient, says Federico Pinza, the president of the association.

Mollusc production in Italy has been in gradual decline for about a decade. What efforts can AMA undertake to increase, or at least stabilise, production? What will be the long-term consequences for the sector if this decline continues?
AMA works alongside farmers, supporting them and guiding them in strategic choices aimed at diversifying production through the introduction of new activities such as oyster farming, algal polyculture, direct sales, and product processing. Added to these are activities connected with tourism, such as fishing tourism and aquaculture tourism, which represent further opportunities to supplement income. The objective is to help counter the progressive loss of farmers which, because of the critical issues described above, has now been taking place in the sector for several years. Recently, several businesses have joined forces to set up producer organisations to face market challenges more effectively and limit problems arising from competition between production companies. AMA firmly believes that this delicate moment will be overcome and will continue to represent a stable point of reference for farmers, accompanying the sector towards a phase of greater resilience, innovation, and economic sustainability.

Allocated zones for aquaculture cover about 30,000 hectares in Italian waters. What advantages or otherwise has the identification of these areas brought for AMA members?
Further areas have been identified, and others may be recognised once the Italian programme for the study and identification of allocated zones for aquaculture concludes. The main advantage of this instrument lies in the possibility of long-term planning and in the fact that these zones have already been assessed in terms of their environmental characteristics and compatibility with farming activity. However, it remains to be considered whether, under normal market conditions, an increase in areas designated for aquaculture, and therefore in production, could in some cases boomerang on the operators themselves. AMA has long worked to raise awareness among its members of the need to maintain an average selling price that covers all the costs incurred, to avoid selling below cost that, in the long term, risks compromising the economic sustainability of businesses.

Is management of the sector by the authorities uniform across the country? What are the consequences of different management regimes in different areas of the country? Is this desirable, given that bivalve farming can vary from one area to another, or is it better to have a single regulatory framework?
This too is a critical issue that our association constantly brings to the attention of the institutions. At present, there is in fact no fully homogeneous national regulatory framework for the sector. The management of state-owned maritime concessions varies considerably from region to region and, in some cases, even within the same territory, with different areas of responsibility distributed between the region, coastal municipalities, and port authorities. In some fishing communities, in fact, concession-holders answer to different bodies, with procedures and interpretations that are not always uniform. It is easy to understand how this administrative fragmentation creates considerable difficulties in the day-to-day management of activities, as well as generating regulatory uncertainty and uneven treatment among operators.

Bivalve farming contributes to the spread of alien species, as these colonise the infrastructure (ropes, nets, longlines) used for their growth. They can also develop on the shells of the bivalves themselves and spread when bivalves are transferred between farming areas. How do you think this problem can be addressed?
Unfortunately, this is a real problem in aquaculture. Mussel, oyster, and other bivalve farms provide an ideal habitat for fouling organisms (algae, ascidians, bryozoans, hydroids, crustaceans). In addition, the transfer of seed, or adult product on ropes, between different areas of the Mediterranean, or even Atlantic areas, can transport alien species, their larvae, fragments, or associated pathogens. The problem is difficult to solve; completely eliminating the risk associated with bivalves is probably impossible. The realistic objective is to reduce drastically the likelihood of introduction through stronger controls and to make farmers aware of the risks involved in uncontrolled re-immersion.

Federico Pinza, President, Association Mediterranea Acquacoltori (AMA)

Among the challenges facing the sector, including climate change, bureaucracy, and generational renewal, which do you consider to be the greatest threat? And what solutions would you suggest to address the problem?
All these factors represent important limits to the expansion of the activity. However, while it is possible in some way to overcome the difficulties linked to bureaucracy and to mitigate the impact of other constraints through training and professional development, climate change represents a challenge of a different nature,

and one that is far more complex to address. There are, in fact, no simple or immediate solutions capable of directly countering its effects at local level. If the current trend continues, the risk that entire production areas may in future become unsuitable for productive activity, because of environmental conditions, is an increasingly concrete possibility.

How does a new operator in the sector obtain the concession needed to start the activity? How does the transfer of ownership take place? Are there incentives to encourage young farmers who are just starting out to enter the sector?
In Italy, state-owned maritime concessions for aquaculture are often transferred through the sale of shares in the companies that hold them, or through taking over the activity, subject to authorisation by the granting authority. Since the concession areas are state-owned property, they cannot be sold; what is purchased is the farming infrastructure. There are also incentives for young entrepreneurs who intend to start an activity in the sector, but these contributions cover only part of the high initial investment needed for the installation and management of the activity. As a result, entry into the sector often remains complex and requires significant initial capital or the support of existing companies.

What is the status of employment in the sector? Do bivalve farmers hire staff from outside the family? Is it easy to find people willing to work in bivalve farming? What happens if they cannot find the employees they need?
As already noted, the number of people employed in the sector has fallen significantly, an inevitable consequence after such a prolonged period of crisis. However, it is important to prepare for a future recovery by investing in the training of new staff through specific courses and dedicated professional pathways. The progressive reduction in the number of businesses and the predominantly family-based management of activities have, in fact, impoverished the pool of qualified workers from which the sector can draw. For this reason, generational renewal represents one of the sector's main challenges. This is an issue that we constantly bring to the attention of the institutions. Today, few young people choose to approach the world of aquaculture and shellfish farming, and in some production areas, especially in the Adriatic, much of the workforce consists of young non-EU nationals with no experience in the sector. Without adequate policies to support training and raise the profile of the profession, there is a risk of losing skills that are fundamental to the future of the sector.

How has the bivalve market evolved over the last five years? Can small producers earn enough income from bivalve farming to support themselves and their families? If not, what alternatives are available to them?
In recent years, Italian shellfish farming has experienced a severe crisis due to rising sea temperatures, the spread of alien predatory species, and other environmental changes. The consequences have been a sharp reduction in production, the closure of many businesses, and the loss of numerous jobs. For many families, leaving the activity was the only way to maintain an adequate income. Where possible, some operators have instead tried to diversify their activities by introducing new production lines or developing complementary services, in an attempt to overcome this period of serious economic hardship.

Is there a trend among bivalve farmers to diversify their sources of income, for example by farming other species or engaging in aquaculture tourism? Are there incentives to do so?
Diversification is becoming an important opportunity to supplement the income of aquaculture businesses. Alongside mussel and clam farming, oyster farming is developing successfully, as shown by the Italian Oyster Fest in La Spezia, which enhances and promotes national oyster production. Processing and direct sales of products are also increasing, as are activities linked to tourism, such as fishing tourism and aquaculture tourism, which allow businesses to broaden their sources of income. In this context, the European Maritime, Fisheries and Aquaculture Fund offers essential support for investment and for increasing the competitiveness of the sector. For this reason, our association is committed to ensuring that the European Union continues to guarantee adequate resources for a sector that is going through a period of deep difficulty.

Mussel farming has been indicated as a way to offset the waste (faecal material and uneaten feed) associated with marine fish farming. Have studies been carried out in Italy on this issue?
Yes. In Italy, several studies have been carried out specifically on the idea of using mussels (*Mytilus galloprovincialis*) as a component of integrated multi-trophic aquaculture systems (IMTA), that is, farms in which waste produced by gilthead seabream, European seabass, or other fish is intercepted by filter-feeding organisms such as mussels, sponges, polychaetes, and algae. Studies carried out in some fishing communities in southern Italy have shown that mussels farmed in IMTA systems grew well, achieved interesting production levels, and, above all, maintained standards suitable for human consumption as regards the microbiological parameters and contaminants monitored. However, at present I am not aware that this technique is being applied in commercial farms.