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Cover photo: River prawn at the JW Marriott Hotel, Bangkok, Thailand (venue of SHRIMP 2019).
Credit: Roy D Palmer

Supplementary bulletins...

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As we leave one year behind and welcome a new one, let us resist the temptation to set overly lofty goals for the year ahead, for we belong to an industry that takes tremendous steps forward, and yet is ever-changing and always challenging. That being said, we at INFOFISH look forward to another exciting year of working together with partners and stakeholders, both current and new, in bringing about more positive developments in 2020.

We pledge that in addition to our trade information and communication services, consultancies, trainings and workshops, INFOFISH will continue to be responsive to the pulse of the industry. Our most recent major event, the World Shrimp Trade Conference and Exposition (SHRIMP 2019) held in Bangkok in mid-November 2019 - which attracted over 200 delegates and 32 speakers from 26 countries - reflects this sense of purpose.

Of the many thought-provoking presentations at SHRIMP 2019, we are pleased to be able to present at least two of them in this issue of the INFOFISH International, one on farming, and the other related to the rapidly expanding (and often confusing) area of certification of sustainability and food safety. In the former, the author states that P vannamei, once seen as a saviour for the Indian shrimp culture sector, is itself now showing signs of trouble, one major reason being the unrestrained expansion of farms. Those involved in the farming sector are urged to take the necessary steps to redress imbalances, including considering raising P monodon the vannamei way.

The other SHRIMP 2019-derived article is equally interesting, dealing as it does with an issue which has taken the whole industry by storm, i.e. certification and traceability. The author asks whether, despite good intentions, have we created a complicated and expensive system impacting sales and business, and disproportionately burdening producers and processors, particularly in developing countries?

Still on the subject of traceability, readers may be interested to know that the UNIDO-supported SMART-Fish programme in Indonesia has designed a data recording tool called INSPIRED (Integrated, Sustainable, Productive, Innovative, Resource Efficient Enterprise Development). The article elucidates upon the effectiveness of the tool in various pilots conducted in the domestic seafood processing sector, suggesting its usefulness throughout the industry in Indonesia and other countries.

Moving on to the Philippines, the spotlight falls on food security; in particular, arresting the declining production of round scad (or galunggong, as it is locally known) for domestic consumption and livelihoods. Noteworthy is the fact that in coming up with solutions and recommendations, a wide range of stakeholders was consulted, making it a participatory process.

Not to be missed too, are the interviews with two key industry people: Mr Jose Camposano, Executive President of the National Chamber of Aquaculture/ Cámara Nacional de Acuacultura (CNA), Ecuador and Mr James Gulkin, Managing Director of Siam Canadian Group Limited, based in Thailand. We hope you enjoy reading these interviews and the articles contained within these pages.

Meanwhile, back to the pulse. We are pleased to announce that our flagship event, the 16th INFOFISH World Tuna Trade Conference and Exhibition, will take place this May in Bangkok, Thailand. As always, leading players and top international spokespersons will helm the Conference, which promises to be the singularly most important event for the tuna industry this year. Details are available at www.tuna.infofish.org - we look forward to seeing you there!
Resúmenes de los principales artículos

¿ES TIEMPO DE UNA ESTRATEGIA DE SALIDA DE LAS CERTIFICACIONES?
Por Roy D Palmer
En esta columna de opinión que invita a la reflexión, el autor está de acuerdo en que la industria necesita un proceso que aumentaría la confianza en sus productos, pero al mismo tiempo, al impulsar la certificación y la acreditación, ¿hemos creado un sistema complicado y costoso que probablemente esté afectando las ventas y negocios en vez de mejorarlos? ¿Los productores y procesadores, particularmente en los países en desarrollo, tienen una carga desproporcionada en comparación con las grandes empresas? Y al final, ¿están los consumidores más informados o más confundidos?

“INSPIRED”: UNA HERRAMIENTA IMPULSADA POR DATOS PARA LA MEJORA CONTINUA EN EL PROCESAMIENTO DE PRODUCTOS PESQUEROS
Por Sudari Pawiro
“INSPIRADO” - Desarrollo empresarial integrado, sostenible, productivo, innovador y eficiente en recursos (INSPIRED en inglés: Integrated, Sustainable, Productive, Innovative, Resource Efficient Enterprise Development) - es una herramienta de recolección y registro de datos, diseñada por el Programa SMART-Fish, para la industria de procesamiento de productos pesqueros de Indonesia. Los pilotos en algas, pangasius y atún congelado han demostrado su eficacia no solo para mejorar la trazabilidad externa e interna, sino también para permitir a los operadores de la planta monitorear la productividad y el rendimiento, así como identificar el porcentaje de tiempo de fabricación que es realmente productivo, lo que lleva a mejor rentabilidad, menos desperdicio de energía y materia prima, y mayores rendimientos.

UN ANÁLISIS CRÍTICO DEL CULTIVO DE CAMARÓN VANNAMEI EN LA INDIA
Por Manoj M Sharma
Basado en una presentación del autor en la reciente Conferencia Mundial sobre el Comercio de Camarón de INFOFISH (SHRIMP 2019), este artículo menciona que el P vannamei, considerado en 2009 como un salvador para el sector camaronero indio, ahora está causando problemas. El análisis revela que un factor causal importante ha sido la expansión incontrolada de la acuicultura sin los conocimientos y técnicas de gestión adecuados necesarios para cultivar vannamei en lugar de monodon, teniendo en cuenta sus diferentes características de crecimiento. Con el fin de determinar las condiciones óptimas para el cultivo de vannamei, una compañía ha realizado varias pruebas, y los resultados indican que con algunos ajustes, de hecho, es posible cultivar exitosamente vannamei "al estilo monodon".

CONSERVANDO LAS POBLACIONES DECRECIENTES DE MACARELA (GALUNGGONG) EN FILIPINAS
Por la Oficina de Pesca y Recursos Acuáticos (BFAR), Filipinas
Galunggong o macarela es una de las especies de peces más importantes en Filipinas en términos de seguridad alimentaria y sustento para miles de personas. Su producción en declive llevó a la Oficina de Pesca y Pesca Acuática (BFAR) a exigir más políticas de gestión basadas en la ciencia en colaboración con las principales partes interesadas. En consecuencia, en enero pasado, la BFAR convocó la primera Cumbre Nacional de Galunggong, en la cual se acordaron varias resoluciones. La BFAR ahora está trabajando en la formulación de un Plan Nacional de Gestión de cinco años para la pesquería.
Résumés des articles de fond

EST-IL GRAND TEMPS POUR METTRE EN PLACE UNE STRATÉGIE DE SORTIE DE LA CERTIFICATION ?
Par Roy D. Palmer

Dans cet article fondé sur l’opinion qui donne à réfléchir, l’auteur s’accorde à dire que l’industrie a besoin d’un processus qui augmenterait la confiance en ses produits, mais en même temps, elle a intérêt à s’orienter vers la certification et l’accréditation, or nous avons créé un système compliqué et coûteux qui a probablement un impact négatif sur les ventes et les activités au lieu de susciter une amélioration. Les producteurs et les transformateurs, en particulier dans les pays en développement, sont-ils soumis à une charge disproportionnée par rapport aux grandes entreprises ? Et en définitive, les consommateurs sont-ils plus informés ou plus confus ?

INSPIRED : OUTIL DE GESTION DE DONNÉES POUR UNE AMÉLIORATION CONTINUE DANS LE TRAITEMENT DES FRUITS DE MER
Par Sudari Pawiro

INSPIRED - Développement d’Entreprise Intégré, Durable, Productif, Innovant et Économique en Ressources - est un outil d’enregistrement de données conçu par le programme SMART-Fish soutenu par l’ONUDI pour l’industrie indonésienne de transformation des fruits de mer. Les projets pilotes sur les algues, le pangasius et les usines de congélation de thon ont démontré leurs efficacité non seulement pour améliorer la traçabilité externe et interne, mais aussi pour permettre aux opérateurs de surveiller la productivité et les performances, ainsi que d’identifier le pourcentage de temps de fabrication réellement productif, conduisant à une meilleure rentabilité, à la réduction du gaspillage d’énergie et de matières premières et avec des rendements plus élevés.

UNE ANALYSE CRITIQUE SUR L’ÉLEVAGE DES CREVETTES VANNAMEI EN INDE
Par Manoj M Sharma

Selon la présentation de l’auteur lors de la récente Conférence Mondiale sur le Commerce de la Crevette organisée par INFOFISH, cet article mentionne que l’espèce de crevette P vannamei, qui était considérée en 2009 comme le propulseur de la crevetticulture indienne, montre actuellement en elle-même des signes de faiblesse. L’analyse révèle que l’un des facteurs de la cause majeure a été l’expansion incontrôlée de l’élevage sans le savoir-faire convenable et l’application inappropriée des techniques de gestion nécessaire à la culture du vannamei par rapport à l’espèce monodon, et sans tenir compte de leurs caractéristiques différentes de croissance. Pour déterminer les conditions optimales pour la culture du vannamei, une compagnie a entrepris des essais et les résultats indiquent qu’avec quelques ajustements, il est en effet possible de faire l’élevage de vannamei avec succès en appliquant “la technique de l’espèce monodon”.

PRÉSERVATION DES STOCKS DE CHINCAHRD (GALUNGGONG) EN DEPEUPLEMEENT AUX PHILIPPINES
Par Le Bureau des Pêches et des Ressources Aquatiques (BFAR), Philippines

Le Galunggong ou scad rond est l’une des espèces de poisson les plus importantes des Philippines en termes de sécurité alimentaire et de moyens de subsistance pour des milliers de personnes. Sa baisse de production a incité le Bureau des Pêches et des Ressources Aquatiques (BFAR) à mettre l’accent sur des mesures de gestion davantage basées sur les données scientifiques en collaboration avec les principales parties prenantes. En conséquence, en janvier dernier, le BFAR a convoqué le tout premier Sommet National du Galunggong, au cours duquel plusieurs résolutions ont été approuvées. Le BFAR travaille actuellement à la formulation d’un plan quinquennal de gestion nationale des pêches.

Pour plus amples informations et pour la traduction des articles contenus dans cette revue, veuillez vous adresser à INFOPÊCHE, BP 1747 Abidjan 01, Côte d’Ivoire, Tél (225) 20 21 31 98/20 21 57 75, Fax (+225) 20 21 80 54, Email: infopeche@aviso.ci, infopech@gmail.com, Website: www.infopeche.ci.
文章摘要

08 是时候进行出口认证策略了吗？

在这篇发人深省的文章中，作者同意行业需要一个能够增强人们对产品信心的流程。但与此同时，在推动认证和鉴定的过程中，我们是否会因创建的这个复杂而昂贵的体系影响到销售和商业，而不去改进这一体系？与大企业相比，生产商和加工商（尤其是发展中国家的生产商和加工商）负担过重吗？最后，消费者对此是更了解还是更困惑呢？

26 NSPIRED：用于持续提升海产品加工业的数据驱动工具

NSPIRED——集成、可持续、生产、创新、资源高效的企业发展。NSPIRED是由联合国工业发展组织（UNIDO）支持的SMART-Fish项目，是为印度尼西亚海产品加工业设计的数据记录工具，在海藻、鳄鱼和冷冻金枪鱼工厂的试验不仅证明了其在增强内部和内部可追溯性的有效性，而且还使工厂操作员能够监控生产率和性能，并确定真正可生产的制造时间的百分比，从而更好地实现成本效益，减少能源和原材料浪费，获得更高产量。

51 印度南美白对虾养殖批判性分析

Manoj M Sharma

根据作者在最近举行的INFOFISH世界虾贸易大会上的演讲，本文提到南美白对虾（P. Vannamei）在2009年被视为印度虾养殖业的救世主，有迹象表明这出现了问题。分析表明，一个主要的诱因是南美白对虾有不同的生长特性，在用南美白对虾替代斑节对虾养殖时，盲目扩大养殖，而没有采取必要且适当的知识和管理技术。为了确定南美白对虾养殖的最佳条件，一家公司着手进行试验，结果表明，通过一些调整，确实有可能成功地以养殖斑节对虾的方法养殖南美白对虾。

56 保护菲律宾日益减少的竹荚鱼种群

菲律宾渔业和水产资源局（BFAR）

竹荚鱼是菲律宾最重要的鱼类之一，事关万千民众的粮食安全和生计，其产量下降促使渔业和水产资源局（BFAR）在与主要利益相关者合作中采取更多基于科学的管理措施。因此，BFAR在去年1月召开了第一次全国竹荚鱼峰会，并在会上商定了多项决议。BFAR现在正在努力制定五年渔业国家管理计划。

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خلاصة لأهم المقالات

هل أن الأولان للخروج باستراتيجية تهم التصديق؟
Roy D Palmer

في هذا المقال الذي يدعو إلى الأمل في التفكير، يؤكد الكاتب على أن الصناعة تحتاج إلى عملية من شأنها الرفع من الثقة في منتجاتها وفي الوقت ذاته، يتساقط على التصديق والإعتماد، وأنه لنا شيء مفيداً ومكافأة يؤثر على المبيعات والإنتاج بدلاً من التصوير والمصنوع، ولذا، نحن في البلدان النامية، نقلنا باعتذار عن مهنة مقارنة بالشركات الكبرى، أو نختبر هذا المقال متسالنا، هل المنتجون أكثر أطلاعاً أم جيرة بخصوص هذا الوضع؟

تحليل تقي من استزراع الروبيان من نوع فانامي في الهند
Manoj M Sharma

يقدم الكاتب "INSPIRED SudariPawiro" بتقديم "INSPIRED" لتقنية المشاريع المتكاملة والمتدفقة والإنتاجية والمنافسة، في استخدام المواد، أبناءة تأسيس برنامج SMART-Fish بواسطة برنامج مجمعية الروبيان في مibile الأشعاب البحرية، والبنايات والمواد ومجلة فانامي للتصغير الخارجي والداخل، وبناء أيضاً لتمكين من خلال المصموم من لقاء الإنتاجية والأداء، فضلاً عن تحقيق النسبة النموية لوقت التصنيع الذي يكون مثيراً بالفعل، مما يؤدي إلى فعالية أفضل من حيث التكلفة، وندر أقل للطاقة والمواد الخام، والرفع من العائدات.

الحافظ على تخفيف مخزون الأسماك
(GALUNGGONG - BFAR) في الفلبين

في الفلبين (GALUNGGONG - BFAR) يвлечен الكاتب مصيب الأسماك والموروث المائي، بجانب تخفيف الأسماك في الفلبين من حيث أن الفيلتى وقددعى كونه شعباً يوفر سبل العيش للفيلتى. وقد دفع الطلب على التركيز على الفيلتى من خلال الإدارة المالية (BFAR) إلى التدفق مع الفيلتى. وقد دفع الطلب على التركيز على الأسماك بعملية (BFAR) على أساس التقييم والإدارة، عند مكيك مصيب الأسماك والموروث المائي (BFAR) في فلسطين الصوناسة، والذي تم بعداً اتخاذ العديد من القرارات. ويعمل مكيك مصيب الأسماك والموروث المائي (BFAR) حاليًا على خطة طباق بلد لإدارة مصيب الأسماك.
TIME FOR EXIT STRATEGY ON CERTIFICATION?

By Roy D Palmer

In this thought-provoking opinion piece, the author agrees that the industry needs a process which would raise confidence in its products; but at the same time, in pushing for certification and accreditation, have we created a complicated and expensive system that is likely impacting sales and business as against improving it? Are producers and processors, particularly in developing countries, disproportionately burdened as compared to big businesses? And in the end, are consumers more informed or more confused?

The original INFOFISH article mentioned raised the concern of a disjointed approach in this issue because a genuinely shared responsibility would maximise returns to all and could enable governments and institutional buyers to revolutionise trade in seafood which will ease costs and enable more funding to be spent on research and promotion of seafood.

This issue was the subject of a session on, Certification and Standardisation at the INFOFISH World Shrimp Trade Conference and Exposition (SHRIMP 2019) in Bangkok, Thailand in November 2019, under the theme ‘Modelling for Sustainability’. The aim of this article is to expand on the presentation and to encourage discussion on this important subject.

Is certification a political tool?

If Unilever were still in the seafood industry, we could ask them – how is this working for you? But, alas, having been the creator, they ‘left the building’ and indeed, have left the industry and seafood consumers around the world with the increased cost model where a ‘middleman’ has been added – the accreditation and certification companies.

We are always seeing ‘this is what the consumer wants’, but these are weasel words as it is not possible to truly understand every consumer’s desire. No, indeed, the winners are the large end of business – the global supermarkets egged on by certification/accreditation companies and with certain NGOs stirring the pot and pressurising industry and governments down the pathway.

Let there be no doubt that the harvest side of the industry needed a process that enabled confidence to be created through the supply chain at that time so it is important not to criticise the intent BUT it would be useful if we now take a step back and ask ourselves: is what we have today the answer as we move forward? If we had the chance to start over, would we end up with what we have?

Of course, the answer would depend on who you asked, particularly which country they were from, the size of the organisation and so forth. Some larger fishing companies...
involved in high priced species see the involvement as positive as it gives them a marketing edge but in general the likely consensus would be that we have created a complicated and expensive system that is likely impacting sales and business as against improving it.

One of the aims of accreditation/certification is transparency and a question we must ask all in that business (and let us not forget that this is a multi-million dollar industry) is “where is their transparency about the added costs and how do they shape against the benefits”?

In a published paper ‘Understanding aquaculture certification’ by Daniel Lee, it was highlighted that the ‘Aquaculture industry must redouble its efforts to drive down external costs and to increase net production of fish and shellfish’. The report stated that NGOs were setting the agenda; certification was favouring the management systems of developed countries; the high costs of certification were discouraging poor performers from applying; there were disproportionate benefits between producer and processor; the benefits of certification (premiums, enhanced credibility or market access) are often not being passed down to the producer but shared disproportionately within the supply chain; there was a lack of certifying bodies from developing countries and the certification challenges were too great for small operations in developing countries.

Interestingly, a new research document has just been made available through the Review of International Political Economy; entitled ‘Global value chains as entrepreneurial capture: insights from management theory’ by Elena Baglioni, Liam Campling and Gerard Hanlon. The authors challenge several assumptions underpinning much of the thinking behind Global Value Chains (GVCs) to provide a counter-narrative to the idea that GVCs equate to development. They suggest that the division of labour relies on standardisation – a process that unveils management’s class basis and conclude to suggest that GVCs, like management generally, are not technical divisions of labour, but extended political organisations capturing value.

In their research they examined management as a set of tools that enable particular groups to enforce competition on others and to render the knowledge and ways of living of those groups as somehow lacking and hence in need of change. In particular, they saw managerialism as creating competition and enforcing it on others through standardisation, but importantly, not on everyone, nor everywhere through standardisation. Thus, they saw management as built on the foundation of the late-nineteenth and early-twenty century standardisation of the division of labour. This very much relates to the issue of accreditation/certification and what we have seen in the seafood commodity chain and global commodity chain (GCC) analysis, both of which stressed uneven development in international divisions of labour.

Confused customers, unmet expectations

When we look at the global fishing industry and consider that accreditation/certification has been in operation for over twenty years, yet less than 15% is covered. Incidentally, most fisheries that are covered are those which already had acceptable management practices. There should be questions about the lack of uptake if this is such an important issue.

An example of the lack of uptake can be seen with the Ashtamudi short-necked clam fishery in India which achieved certification in 2014. It is highlighted in a promotional pamphlet as a ‘pioneer for fisheries certification in India and in the developing world’ and the suggested promise that ‘certification could be useful in opening access to new markets’.

The pamphlet states: ‘MSC certification to export products to the US and Europe will soon be almost mandatory, with the main retailers committing to sourcing from sustainably certified sources – Marine Conservation Programme, WWF-India’. Despite these claims, there have been no further fisheries achieving similar certification in India. What is not highlighted is that it is also somewhat doubtful that a bivalve product, no matter what the sustainability claims may be, would be allowed into the US or Europe without full clearance regarding food safety relating to the waters from which they have been harvested. Questionable promotion or worse?
In global aquaculture there is a heavy focus on accreditation/certification concentrated on industrial aquaculture operators but even then, it is unlikely there would be more than twenty per cent of the volume of aquaculture covered. It is not easy to get accurate figures, but no one has put the case that it is a higher figure.

Seven years ago, the Global Sustainable Seafood Initiative (GSSI) was established to create a ‘Global Benchmark Tool’ to provide confidence in certified seafood and promote improvement in certification schemes. The GSSI provides a global, multi-stakeholder platform for collaboration and knowledge exchange to address sustainability challenges that have an environmental, economic and social impact. Their website states ‘GSSI creates global alignment in seafood certification and is the one-stop-shop for credible seafood certification schemes’; yet, only eight accreditations are listed to have been officially benchmarked.

FAO states that ‘Ecolabels are seals of approval given to products that are deemed to have fewer impacts on the environment than functionally or competitively similar products. The goal of ecolabelling initiatives is to promote sustainably managed fisheries and highlight their products to consumers. Product claims associated with ecolabelling aim at tapping the growing public demand for environmentally preferable products.’ But with the plethora of logos and brands and the confusion about the value offering, are consumers more informed or more confused?

Our primary producers (fishing and aquaculture) and processors who must ensure their systems are ready for auditing at any time would wonder if they were in heaven or hell. There are so many requirements due to there being so many accreditation/certification systems and there seems no end to new entrants into the accreditation/certification business. Those within the system are not overly keen to raise their concerns but there are many examples of audit numbers due to lack of harmonisation across all the systems and constant changes in the processes.

Returning to the paper by Daniel Lee, he stated ‘when consumers select seafood products from displays or from restaurant menus, they can easily base their choice on a quick assessment of key attributes such as price, quality, convenience and origin. But refining their choices further, based on food safety, ethical, environmental or animal welfare grounds, is more difficult because of a shortage of reliable, independent information (Wessells et al., 1999). In essence, it is this information gap that opens the way for seafood certification and eco-labelling schemes. Such schemes have the potential to link a consumer’s responsible choices with a producer’s responsible practices and to deliver market rewards accordingly’ (Wessells et al., 2001, Philips et al., 2003, FAO/ NACA 2007).

Hence, when it comes to seafood consumption you would have expected that with all this knowledge available to consumers now, sales would be increased. But alas, that is far from the case in all countries which are supposedly driving accreditation/certification – at best, they are maintaining status quo but many are seeing falling sales. What was expected to become a pathway to increased sales of seafood has seemingly become a barrier to consumption.

Additionally, in Lee’s paper he remarked ‘Mathew (2004) notes for fishery products, there is as yet no clear signal from the market that the price for eco-labelled fish could more than offset the costs of certification.’ Who is paying is sometimes murky – in some areas there is clear subsidisation by the accreditation or government which adds to the unfair process.

Meanwhile, a 2019 Seafish UK report stated that ‘70% of seafood consumers think sustainability is important, but over a third feel it is the retailer’s responsibility to source sustainable seafood and only 36% are actively buying sustainable seafood.’ How would they know, as clearly so many major retailers do not go the full distance in ensuring that what they insist from their suppliers (transparency) is not continued throughout their own businesses?
It could be easily argued that accreditation/certification organisations insisting on their brands/ecolabels being locked into the process have not clearly explained what their logo/brand brings to global consumers. There have been strong rumours that some supermarket chains insist on certain ecolabels on the primary producer’s brand but when it comes to their own brand, they are not prepared to pay the ecoclabel fees. Immediately that activity puts the primary producer at a price disadvantage and potentially drives them down a commodity pathway putting their business at risk.

If sustainability credentials were so important, you would have thought that the harmonised tariff system (HTS) would have penalised non-sustainable products and prioritised those which are sustainable, but clearly this is not the case and there are so many examples where sustainable product is in fact penalised through the tariff system. Very little has changed globally since this shift in ecolabels and have such demands ever been part of any free trade arrangements?

Evelyne Nusalim, executive director of the Indonesia Food Safety Institute, was a presenter at SHRIMP 2019, on “Achieving sustainability in food safety: An ethical code as corporate social responsibility?”. The paper addressed fraudulent practices in the industry and how shareholders can limit their exposure to risk.

She highlighted ‘The European Union’s (EU) trade flows for fisheries and aquaculture products are the highest in the world, with 70 percent of it imported. However, fraudulent practices concerning imported seafood products in the EU market are among the highest as well, including unapproved treatment and/or processing (30 percent), the replacement, dilution and removal of products (30 percent), mislabeling (33 percent) and others (7 percent).’

Whilst strict controls and bans on imports have been initiated to discourage such practices, she remarked ‘One of the primary reasons for failure to comply with the EU regulations is the lack of technical skills regarding the correct treatment and processing of the products as well as knowledge on the legal requirements’.

At a time when accreditation/certification is at its highest level should we be concerned that such practices are still occurring in major markets like EU?

The major concern is having created a new ‘middleman’ which adds costs without providing guaranteed benefits. With no apparent exit strategy, will we just see more and more burden on our primary producers? Is this never ending? Is it time to change the system to ensure that the industry controls its own destiny by creating its own global standard, taking in the best of what is out there and ensuring that we become partners of the huge organisations rather than their slaves?

As Evelyne Nusalim said ‘Should seafood producers wait for ‘punishment’ by other countries or should they take the initiative to prevent fraud? Honour, honesty and a sense of order should be the pillars of an ethical code for food, based on the integrity of seafood business operators. This code should be part of the corporate social responsibility policy of every business operator, for the sake of consumer protection.’

By creating a Seafood Industry Standard there would be greater opportunity to grow in directions which would improve our industry, organisations and people and be proactive in creating our own agendas. But it is a brave new path. We talk of collaboration and a united stand as an industry, but do we have the intestinal fortitude to do this? Failure to take on this responsibility would potentially lock ourselves into status quo and be herded into a commodity market controlled by oligopolistic masters.

References


MARKET TRENDS

International fishery production and trade

Global fish production is expected to be flat year-on-year for 2019, with a 3.4 percent decline in capture fisheries production offset by a 3.9 percent increase in aquaculture harvests. The growth trajectory of the aquaculture sector remains steady, driven in 2019 by a forecasted increase in supplies of the major farmed finfish species – salmon, tilapia, pangasius, seabass and seabream. However, shrimp production in Asia is expected to drop sharply, particularly in India. Both aquaculture and capture harvests have been affected by higher water temperatures in 2019, with heavy farmed Atlantic salmon mortalities reported in Northeastern Canada and a productivity decline observed for Pacific cod stocks.

The tariffs introduced by both China and the United States of America have negatively impacted bottom lines all along the supply chain for a number of heavily traded species, including lobster and tilapia.

Based on year-to-date performance, imports into the USA are expected to fall marginally in 2019, while Japanese import growth should slow but remain positive. Price declines for multiple commodities imported into the EU28 will contribute to an estimated 2.8 percent fall in import value in 2019, a reversal of positive indications in 2017. Declines in imports are also projected for Latin America and most emerging economies in Asia, but China is the notable exception. The forecasted 12 percent increase in imports into China is somewhat unusual considering the broader trends and is explained largely by significant increases in shrimp imports from Ecuador and India. This is likely related to the Chinese government’s crackdown on illegal (unreported) trade through Vietnam.

SHRIMP

Supplies: Asian shrimp farmers remained conservative during the main aquaculture season between April and September of 2019, amid continued low market prices in the international trade. In India, where shrimp aquaculture is mainly export-oriented, production forecast for 2019 suggested a 30–40 percent decrease in comparison with 2018. In the main aquaculture region, Andhra, the often unsuccessful price negotiations between farmers and processors/exporters, resulted in a much lower production in 2019. In Odisha, cyclone and floods disrupted farmed shrimp production during the second half of the year and the region of Tamil Nadu was affected by the unusual and extreme hot weather. Production trend in Gujarat and West Bengal remained moderate but insufficient to offset the falling supplies in the southern farming regions. Production in China and Southeast Asia (Indonesia, Vietnam, Thailand and Malaysia) is likely to be lower than 2018. Farmed shrimp production in Ecuador continued to grow, which became evident in its increased export trade during the review period. The overall supply of sea-caught shrimp in Argentina was 16 percent below the 2018 level during the first six months of 2019. Subsequently, the Federal Fisheries Council of Argentina announced in September an early closure of the shrimp fishing season effective 15 October 2019. Shrimp landings in the US Gulf of Mexico were also below 2018 during the review period.

International trade: During the second half of 2019, international shrimp trade escaped another market crash supported by strong imports by China. However, the three other large traditional markets, the US, the EU28 and Japan posted negative import growths during this period. Closely following the US, China became the second largest shrimp importer in the world market during the first half of the year. Therefore, China is now the world’s number one market for shrimp. China produces about one million tonnes of farmed shrimp annually and about less than 20 percent of those are exported. Farmers in Asia, as well as in Latin America, benefited much from the strong import growth in China. In East Asia, stable local demand and firm prices of head-on shrimp also absorbed more fresh shrimp in the regional markets.

Prices: Shrimp prices in the international trade remained stable in 2019 albeit with a weaker trend. In the US, the average import price of shrimp in 2019 was 8.5 percent lower during the first half of 2019, compared with the same period in 2018. Wholesale prices remained stable at lower levels which encouraged good demand during the high consumption period in the summer months. In view of the falling production in India, export prices have started to improve since August, albeit marginally.

TUNA

Raw material supplies: Tuna catches worldwide were lower than average between July and September 2019, when the two scheduled fishing closures were in place in the Pacific Ocean. There was the July-September FAO fishing closure in the Western and Central Pacific and the 2-month IATTC ’veda’ fishing closure from 29 July to 8 October in the Eastern Pacific. Nonetheless, skipjack prices were at record lows following short demand from Bangkok packers. Catches in the Indian Ocean were low to moderate between July and September. Catches also slowed down in the Atlantic Ocean by August.

Japan: After the sluggish demand trend during the hot summer months of June and July, the sashimi trade in Japan started to improve from late September with increased supplies of fresh tuna from local and foreign sources. Unfortunately, this development took an abrupt halt when the typhoon Hagibis hit Japan in mid-October causing widespread damage not seen since 1958 across the Kanto region.

USA: The US market for non-canned tuna remained firm in the first half of 2019 with an 18 percent growth compared with the same period in 2018. Fresh tuna imports remained stable at 11 800 tonnes (+1.8 percent), twice as much in quantity imported in Japan during this period. In response to the good summer demand in the restaurant and retail trade, imports of frozen tuna improved significantly to 3 100 tonnes (+67.8 percent) for whole/dressed fish and to 21 700 tonnes (+18.5 percent) for frozen fillets and steaks during the review period.
EU: Demand trend was mixed in Europe, where frozen fillets are more popular. In the EU28, imports of frozen tuna fillets were down by 7.8 percent to 11 400 tonnes during the first half of 2019, compared with the same period in 2018. Supplies were lower from Southeast Asia, which is subject to higher tariff, but increased from Ecuador, which is subject to zero tariff, and from Mexico.

Canned tuna trade

Exports: Thailand, Ecuador and Spain remained the top three suppliers of processed and canned tuna to the global market during the first half of 2019, while China took the fourth position from the Philippines. The top exporter, Thailand, posted a double-digit growth supported by substantial increases in exports to the Middle East markets and minor increases to the US market (+2.0 percent). China’s prominence in the processed tuna exports trade could be attributed to aggressive sales of precooked loins, particularly to the EU28 and Thailand, while exports to the US declined following the rise in tariffs (now 25 percent) imposed on Chinese products in that market.

Imports: Demand for canned and processed tuna remained positive in most of the markets worldwide during the first half of 2019, supported by weaker prices of frozen skipjack during this period compared with 2018. Markets in the Middle East remained strong for Asian origin products. Consumer preference for higher value products also continued in the western markets.

North and South America: According to the US National Marine Fisheries Service (NMFS), total imports of canned/processed tuna in the US increased by 2.6 percent to 115 600 tonnes during the first six months of 2019 compared with 112 700 tonnes of imports in the same period in 2018.

Prices: The average price of frozen skipjack, CFR Thailand, was at a four-year low from January to September 2019, down to US$1 243 per tonne, compared with US$1 536 per tonne in 2018, US$1 765 per tonne in 2017 and US$1 411 per tonne in 2016. It even declined to US$1 000 per tonne in June/July due to low demand from Thailand, though it bounced back to US$1 350 per tonne in August, when catches were low in the Pacific because of fishing closures.

TILAPIA

Production: According to the most recent available estimates released by the Global Aquaculture Alliance (GAA), global harvests of tilapia are expected to increase by around 3–4 percent in 2019, to around 6.5 million tonnes. According to the GAA figures, this increase will be driven primarily by an additional 50 000 tonnes of production in China, the world’s leading producer and exporter by some distance. However, regulatory changes and mounting challenges in China’s most important market, the US, represent an increasingly strong incentive to develop tilapia farming industries in a number of other countries in Latin America, Asia and Africa. Of the various Asian producers exploring the possibility of taking advantage of the current opportunity to fill a supply gap in the US market, Vietnam is arguably the most likely candidate, given its existing large-scale aquaculture sector and developed export industry.

Markets: Following the spike in buying activity observed just prior to the tariff hike, the full effect of the 25 percent increase in raw material costs resulting from the imposition of the new duty on Chinese tilapia imports into the US is now evident. The market is generally weak. Smaller businesses are struggling and packers are reluctant to place orders despite the low price level. The tariff is much higher than the average profit margin in the supply chain, so it is inevitably passed on to the consumer, eroding the competitiveness of Chinese product in the frozen commodity whitefish segment.

Trade: The new tariff regime has negatively impacted Chinese exports to the key US market and in turn has seen Chinese exports fall significantly in the first six months of 2019. This marks a continuation of a steady decline in China’s tilapia export revenues. From a peak in 2014, Chinese exports have fallen every year, despite some gains in African markets during this period. For the first half of 2019, reported export value was US$252 million.

PANGASIUS

Production: Farmed pangasius production by the world’s leading supplier, Vietnam, will reach record levels in 2019 following heavy investment and expansion across the Mekong Delta. Total harvests are expected to surpass 1.3 million tonnes. Although Vietnam dominates international supply, output growth in other producing countries is also contributing to the widespread availability of pangasius. Indonesia, which produces mainly for its domestic market, is seeing rapid growth in pangasius harvest volumes, while pangasius farming development continues to gather pace in China.

Trade: After exceptional export performance in 2018, a less active US market saw Vietnamese export revenues decline in the first half of 2019. According to the Vietnamese Association of Seafood Exporters and Producers (VASEP), total export revenue fell by 4.1 percent in the first six months of the year, compared with the same period in 2018.

The value of exports to mainland China and Hong Kong, which now represents 26.4 percent of Vietnam’s total export market in value terms, grew by 1.2 percent, a substantially slower growth than that observed over the last few years. China has been cracking down on the illegal seafood trade between the two countries and recently issued import bans to Vietnamese companies, two of which are pangasius exporters, although no specific reason was given for the bans. Vietnam provides almost the entirety of China’s external pangasius supply. Elsewhere, Vietnamese exports to the Association of Southeast Asian Nations (ASEAN) bloc continue to grow as the region takes on increasing importance as a target for market development. In the EU28, a number of large markets, including Germany and the UK, registered significant increases in imports of frozen pangasius fillets from Vietnam in the first half of 2019.

Source: FAO Globefish
### PRICE TRENDS

#### FROZEN SHRIMP, C&F JAPAN (US$/Kg)

- Bangladesh: B/triger, H/L, 16/20
- Vietnam: B/triger, H/L, 16/20
- India: PUD, 300/500

#### FROZEN SHRIMP, WHOLESALE TOKYO, JAPAN (¥ 1000/kg)

- India: B/triger, H/L, 16/20
- Indonesia: B/triger, H/L, 31/40
- S.W. Pacific: Yellowfin, rd, 10 kg/up, Auction Shimizu, Japan
- Albacore, 10 kg/up Wholesale, Japan

#### FROZEN SHRIMP, cfr USA

- Bangladesh: B/triger, H/L, 21/25
- Asia: Vannamei, easy-peel, H/L, 21/25
- Central/South America: Vannamei, H/L, 41/50

#### FROZEN SHRIMP, USA (ex-warehouse NY, US$/lb)

- Asia: B/triger, H/L, 21/25
- Asia: Vannamei, easy-peel, H/L, 31/40

#### FROZEN SHRIMP, EUROPE (CFR, US$/kg)

- Bangladesh: B/triger, H/L, 16/20
- India: Vannamei, H/L, 16/20

#### FROZEN TUNA (US$/MT)

- Albacore, 10 kg/up Wholesale, Japan
- S.W. Pacific: Yellowfin, rd, 10 kg/up, Auction Shimizu, Japan
- Skipjack, rd, 40/50 cfr Thailand
FISHMEAL & FISH OIL

Production

The first anchovy fishing season of 2019 in the centre-north region in Peru ended with a total output marginally over 2 million tonnes, nearly 96 percent of the designated 2.1 million tonnes quota. For the first eight months of 2019, a total of 2.4 million tonnes of raw material were landed in ports along the Peruvian coast. This represents a 41.5 percent decrease from the same period of the previous year. The decline in raw material translated into a similar drop in fishmeal output in Peru, with only 564 100 tonnes produced between January and August of 2019 compared to 962 400 tonnes in the same period of 2018.

In contrast, the fishmeal production in Chile was stable at approximately 271 000 tonnes during the review period between 2019 and 2018, including fishmeal coming from salmon processing industry wastes.

There have not been any announcements for capelin quotas around Iceland and in the Barents Sea, as capelin stocks in Icelandic waters are in poor shape. These are important sources for fishmeal production and they are largely responsible for the slide in fishmeal production in Iceland and the North Atlantic during the first eight months of 2019.

Fish oil production plunged during the first half of 2019, confirming the forecast. All producing countries reported output of less than 100 000 tonnes between January and August, with Peru and Chile totalling around 98 000 tonnes each.
Exports

Peru increased its fishmeal exports by 12 percent (627,000 tonnes) during the first half of 2019, compared with the same period in 2018, with 80 percent directed to the Chinese market. Asian countries, including also Japan and Vietnam, absorbed more than 90 percent of the Peruvian fishmeal exports.

Peru increased total exports of fish oil by 41 percent to a total of 95,900 tonnes in the first half of 2019. Denmark’s exports of fish oil reached 72,800 tonnes, an increase of 14 percent compared with the same period of last year. About 77 percent of these were imported by Norway (56,600 tonnes).

Markets

In the largest fishmeal market, China, approximately 55 percent or 428,800 tonnes of fishmeal imports were sourced in Peru during the review period. This represents a 98 percent increase from the volume reported for the same period in 2018. Stocks at Chinese ports are at sky-high levels and trade has been low until Peru initiates its new season, possibly in November. According to the Marine Ingredients Organisation (IFFO), stocks in Chinese ports such as Shanghai and Guangzhou stood at around 300,000 tonnes in September, almost double that of September 2018. This figure does not include stocks held by feed companies themselves.

More than half of the Chinese swine livestock will likely be lost by the end of this year due to an outbreak of African Swine Fever (ASF). This is one of the reasons why the fishmeal...
stock level in Chinese ports is so high, and the second is the substantial increase in fishmeal imports from Peru. During the interval between the first and second anchovy fishing seasons in Peru, with nearly no landings, the high inventory will likely be consumed.

Vietnam is gradually becoming an important supplier of fishmeal to Asian countries, given its clear geographical advantage and processing sector. The rapid development of the pangasius and shrimp industry in the country requires a large amount of fishmeal input, so domestic fishmeal production would be a clear gain. However, a large amount of its fishmeal is still imported. During the first half of 2019, Vietnam was the third largest importer of Peruvian fishmeal, following China and Japan.

**Prices**

Fishmeal and fish oil prices have been on an overall downward trend with occasional oscillations, after prices peaked at the end of 2014 as a result of a zero quota at that time. Fishmeal prices have been hovering at around US$1 500 per tonne since June 2018, but there is a noticeable drop that started in June 2019, mainly due to the high stocks in China, but also because of the weakening yuan. The trade war between China and the US has no clear end in sight, but fishmeal has been removed from the punitive list. The Chinese tariff on imported fishmeal from the US is back to 2 percent again, but the impact of this change on global fishmeal and oil prices is still unknown.

**Outlook**

With the first anchovy fishing season of 2019 now over, IMARPE is conducting a biomass evaluation for the second fishing season, which usually starts in November. There is currently no reason to expect a weak second season in Peru, but the actual quota is still unknown. The prices of fishmeal and fish oil have been decreasing and this trend is likely to continue considering the weakening yuan and Chinese high stocks. In addition, the tax to be levied on fishmeal exports by Peruvian authorities will compound the situation of global fishmeal supply.

*Source: FAO-Globefish*
For readers who are not familiar with the National Chamber of Aquaculture, could you elaborate on its mandate and role in developing the sector in Ecuador?

The National Chamber of Aquaculture (CNA) was created in 1993 with the intention of representing the whole shrimp production chain, putting together aquaculture companies under an institution with the aim of transmitting their expectations and needs to authorities, control entities, and other international organisations with which we are related. In fact, the National Chamber of Aquaculture has fulfilled the function of being a representative of the Ecuadorian shrimp sector in different local and international forums, with a specific mission: helping to promote the development and evolution of shrimp activity, promoting its competitiveness through new markets, improving production conditions in Ecuador, looking forward for a sustainable development of the entire production chain.

Ecuador is of course a major exporter of tuna from the capture sector, but the country has also become a regional powerhouse in the export of sustainable (farmed) shrimp. The Sustainable Shrimp Partnership (SSP) project is an indication of this success as this past March it was announced that the first batch of SSP shrimp has been approved for export to the US. Could you provide some background of the SSP project?

For more than 50 years, Ecuador has proven to be a leader in shrimp aquaculture - complying with the highest standards – establishing itself as the world reference in producing a healthy, nutritious, and pure premium quality shrimp, farmed in the most sustainable way. As an example of commitment, the first farm obtaining ASC certification worldwide was an Ecuadorian shrimp farm.

The Sustainable Shrimp Partnership (SSP) marks a significant turning point for the shrimp aquaculture sector, sets to transform the future of the industry and turn it in a new direction – a race to the top. Pioneered in Ecuador, members of the SSP are committed to achieving, and promoting, the highest quality products, produced to the highest social and environmental standards, through greater collaboration and transparency. In order to achieve this mission, the SSP has outlined strict product criteria all members must meet:

- Aquaculture Stewardship Council (ASC)-certified
- Zero antibiotics in all the production process
- Fully traceable
- Minimal environmental impact – measured through an assessment of water quality

Using the ASC standard as a benchmark for its sustainability performance, SSP members have added three additional indicators which will support greater market differentiation. Ultimately offering consumers the ability to make more informed choices on the products they purchase, consumers who want more choices, consumers who care about what they eat, and how it has been produced.

In addition to improving industry standards amongst CNA members, does the SSP have larger ambitions? For instance, do you foresee that one day all the farmed shrimp exported from Ecuador will be SSP certified, and that it will inspire the establishment of similar traceability schemes in Latin America?

The global shrimp industry is a commodity market, and many regions are constantly looking to lower costs/prices and will do so at the expense of responsible practices. This approach has resulted in on-going challenges with disease control and has led to high use of antibiotics in particular regions. Regions and countries such as Ecuador, who are committed to producing...
high quality shrimp with sustainable practices, often get disadvantaged in the marketplace, and see that preferential practices create economic risk. With no incentive to improve practices, there is a growing race to the bottom which is not only harmful to the industry and the environment, but also limits the choice for consumers, and reduces their ability to buy healthy and responsibly farmed shrimp.

Industry-wide improvements in social and environmental performance are needed, and SSP encourages efforts to elevate the whole industry to the next level in sustainable practices, providing consumers with the highest quality products and meeting their needs in the most transparent way possible and with the latest technology available. Hopefully we will push the industry away from today’s commoditised market to a much more added-value market proposition.

SSP welcomes responsible and committed producers who can meet SSP criteria. In Ecuador, SSP is leading an Industry Scale Up Program committed to supporting more small and mid-sized farms achieve SSP, with the support of its Advisory Board consisting of the World Wildlife Fund (WWF), IDH The Sustainable Trade Initiative, and the Aquaculture Stewardship Council (ASC).

Beginning December 2018, shrimp was added to the US Seafood Import Monitoring Program (SIMP), which means that all shrimp imports must be accompanied by harvest and landing data. Your organisation was quoted as having welcomed the move. What has been the impact of SIMP on Ecuadorian shrimp exports to the US in volume and value, as well as with regard to competition with other countries in supplying the US market?

There have been no major impacts in Ecuador regarding the information requested by the SIMP for shrimp imported by the United States for one reason: Ecuador has been working to improve the processes of traceability system associated to sanitary and operational conditions; so the SIMP requirements really correspond to information that is available thanks to traceability systems that have been developed by the competent authority and production chain establishments.

Ecuador’s share of the global shrimp trade is increasing steadily, not only to the US and Europe, but also to Asia, particularly Vietnam and China. What would you say are the factors that make Ecuadorian shrimp attractive for these growing Asian markets, and conversely, what are some major challenges in breaking into these markets?

Indeed, Ecuador has increased its exports to Asian markets, mainly to China, who has required importing products to be able to supply its domestic demand and which is currently partially met by local production. There is a great opportunity for Ecuadorian shrimp, which today has undoubtedly become the main supplier to China due to the quality of the product and because it is tied to a country that has a culture of shrimp consumption. This makes Ecuador a natural supplier of shrimp to the Chinese market which is very discerning in terms of quality, flavour, size, texture and presentation - opportunities that Ecuador is taking advantage of. With regard to the challenges in growing the Chinese market, Ecuador continues to adapt to the rapidly evolving distribution trends in that country. The Chamber is well aware of the online platforms in China that can be utilised for the sale and distribution of shrimp, and we hope very soon to make an important announcement about the promotion of Ecuadorian shrimp through these new platforms.

The industry has woken up to the fact that China is a huge market: in 2018 the country imported US$615 million worth of Ecuadorian shrimp compared to US$105 million in 2017. What is your five-year prediction with regard to international supply flows of shrimp to China, and what could Ecuador do to maintain its position as a leading supplier to this market?

Undoubtedly, and as I have just mentioned, China’s demand will continue to grow due to several factors, one of them being market growth as such, and the second is the expansion of the middle class. Demand has risen for higher quality protein, including that which comes from imports, shrimp in this case. Many of these consumer segments wait for the arrival of imported products in supermarkets, and also through cellphones and online platforms, so to be able to meet that...
sustained growth in demand, Ecuador has made significant domestic investments to grow its production volume (i.e. increasing densities), enhancing grow out and survival rates, and improving stress management within the crop, but without exerting undue pressure on production systems. All these variables have allowed the country to grow with a main objective, i.e., to supply China and other Asian markets.

Obviously we supply other markets too such as the European Union, and the United States, that remain as important destinations for our shrimp, but without a doubt, the main objective of the investments that Ecuador is making at the whole level of the production chain - laboratories, grow out farms, process capacity, is mainly due to consumers in China who will continue to demand shrimp from producing countries.

With regard to aquaculture production (land-based and offshore) for the domestic market, how much of the output is consumed directly, and what percentage goes for processing? What are the present and predicted trends?

Ecuador currently produces more than 605k tonnes. Though it is a country with more than 17 million people, domestic consumption of shrimp is low, and more than 99% of the national production goes to exports. In terms of presentation forms, almost 80% of the exports consists of whole shrimp, 10% of shrimp tails and 10% of value added, peeled, deveined, trays and other types of products.

Moving on to incentives and investments in aquaculture technology, you have been quoted as having said that it is vital for aquaculture to innovate and introduce new technologies in order to increase production in a sustainable manner (for example, the recent announcement of US$200 million investment by Development Bank of Latin America (CAF) to improve the transmission of clean energy to 55 000 hectares of shrimp farms in Ecuador). Reportedly, initiatives such as these will be covered under the new regulatory framework for aquaculture that the Government is working on. Could you mention a few key points from the framework, and how you think they will impact upon the sector?

The change in the energy matrix of the shrimp sector implies the possibility of including or implementing new technologies in production systems. The fact of having a reliable and cleaner energy source would allow shrimp producers, whether large, medium or small, to apply technologies that aim to improve their efficiencies.

Undoubtedly, one of the main changes in efficiency that is sought through the new energy matrix are the pumping systems, which would change from diesel pumping to electric pumping systems. The electric systems are much more efficient, require less maintenance, but beyond the change of the equipment itself is that it gives the possibility for the producer to redesign the whole pumping system in general. The infrastructure works associated with pumping systems that in some cases are part of the original construction of the farms, are not necessarily efficient. Enhancement in efficiency can also come through redesigning channels, the slopes of those channels, the location of the pumping station that may not have been the best at the time it was built, and changing the equipment itself. It needs to be assessed whether the pumping system was designed properly to achieve real efficiency.

With electric energy, there is less pollution of course, which continues to point towards a much cleaner shrimp culture. In addition, the new matrix changes will allow farmers to go beyond pumping systems, to include aeration, process automation, and parameterisation of some processes that are tied to the different production stages.

Actually, the change in the energy matrix is a new opportunity for an industry seeking new efficiencies and cannot achieve them with traditional methods or with traditional energy sources such as fossil fuels.
Another aspect to mention is the incentives related to financing: small production units are more vulnerable because of the lack of financing that would otherwise allow them to upgrade their technology. The CAF loan is undoubtedly an important support because it covers the financing gap preventing modernisation of the electrical infrastructure in Ecuador, but an additional source of financing for shrimp farmers is required in order to achieve the desired technological ability. Technology exists, but what in some cases do not exist are the continued resources for production units where one can assume that investments will depreciate over time (perhaps 10 years). In other words, there are many productive units that cannot make that technological leap because they do not have the resources to do so, and this is something that has not only been noticed in Ecuador.

There is a need for public policies which address the financing of reimbursable resources so that small or medium-sized productive units can make the technological leaps involved, for example, changing the energy matrix. It takes both to work: in the case of electricity there is the technology that is proven and works, but it does not apply country-wide because there are productive units which do not have the financial resources to cope with the costs involved in engine equipment changes, infrastructure and farm redesign. For example, rebuilding a pumping station implies civil engineering work that demands certain resources which many shrimp producers do not have, even more so in the current price situation.

And last, but not least, how do the CNA, Government and private sector work with smallscale aquaculture farmers to ensure that their culture practices are sustainable and traceable, as well as conform to the requisite biosecurity standards?

As mentioned earlier, the CNA has a programme together with Sustainable Shrimp Partnership (SSP) called the “Scale Up program”, which allows a SSP technical team to visit small and medium farms in Ecuador to give technical support in areas such as improving biosafety levels, product traceability, producing products for export, or to be able to apply for safety certifications, that are now demanded by the destination markets. Our aspiration is for this programme to continue receiving support from organisations such as IDH (The Sustainable Trade Initiative), or others that may be interested, in order to have sufficient resources to cover as many producers as possible in this country.
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On a personal level, you have an interesting story to tell, having gone from being a backpacker and oil rig roughneck to founding and managing a company in 1987 with offices in Thailand, Vietnam, Myanmar, China, India and Indonesia, dealing with customers in over 70 countries, and described in the 2012 Intrafish Industry Report as “one of the world’s top 30 farmed shrimp suppliers as well as one of Asia’s top 40 seafood companies”. What were the deciding factors then that steered you into the business of marketing fishery products, and what were the main challenges you faced in setting up shop in Asia?

Frankly, there were no actual deciding factors as such. I wanted to leave the oilfield and find something different. To make a very long story short, I looked at many different opportunities and ultimately came to the conclusion that exporting food products from Thailand to overseas markets could be a viable business. I tried my hand at it, worked hard and managed to grow up a business starting with canned foods which later expanded to frozen seafood items and other food products. I was certainly lucky too. I was in the right place at the right time for the seafood industry and I was fortunate enough to be able to see its potential at the time. And I took it from there.

Over the past decades, you would have seen some interesting changes in the global trade of fishery products, away from the traditional view of Europe and the US as being the most important markets. For instance, we see China shooting to the top of the rankings list as an importer and exporter of fishery products, and the expansion of intra-Asian seafood markets. What do you think the seafood trade world map will look like this year, and a decade hence in 2030?

No question there is a quantum shift underway that in fact has been underway for some time. When I started the business, we were focused on shipping Asian products to North America and the EU, in addition to a few other scattered markets. This week we are having our annual Year End Meeting in Bangkok where our management and senior executives from our offices in Thailand, Vietnam, China, Indonesia, Myanmar, India, Poland and Argentina get together for a week of review, projections and brainstorming for the future. While we continue to grow our business to our traditional markets in western countries, we are putting more and more emphasis on increasing our sales into Asia. This is already happening with our meat division which is based in Poland. We ship meat products from North and South America as well as Europe and the vast majority of our sales go into Asia itself. We are putting more focus on our import/distribution companies in Thailand and China as well as stepping up our efforts to grow our direct sales to importers, processors, distributors, retailers and other end users throughout Asia. No question, Asia is where the growth will be.

Specifically referring to China within the context of the ongoing US-China trade war, and using the example of tilapia, now that the US has imposed another tariff hike from 25% to 30% on imports of US$200 billion worth of Chinese goods, what do you think will be the short and long-term consequences for the Chinese tilapia export industry?

A 25% or 30% tariff is unquestionably a game changer. For tilapia there are still no viable alternatives for CO processed fillets so even with the tariff, the business continues although the volumes are certainly impacted. Going forward, if the tariffs are to remain as they are, then other countries - Vietnam for example - may be looking more closely at developing this business.

Some analysts have in fact commented that the US-China trade war has not necessarily been a bad thing in that it has created new (and possibly long-term) opportunities for
supplying countries to expand their market presence in China and the US. Businesses too, have had to adjust to the new realities. As a major importer-exporter, has Siam Canadian been impacted by the tit-for-tat moves by both the US and China?

- Siam Canadian’s China export business has been affected but we are seeing some of the affected items, breaded shrimp for example being shifted to our offices in Vietnam and Indonesia. In the long term those countries, as well as India, will continue to grow their market share of this business.

- Apart from the headquarters in Bangkok, Siam Canadian has offices in China, Vietnam, Indonesia, India, and Myanmar. Considering that Myanmar’s role is comparatively new in the international fishery trade, how would you describe the global market for its fishery products, particularly freshwater fish and prawn? How has your experience been thus far in accessing these international markets?

- Myanmar has been extremely challenging as there has been a decided lack of investment in that country’s aquaculture sector. Myanmar’s seafood exports to countries other than China have actually been shrinking. Until substantial investment occurs, Myanmar’s export industry will be somewhat stagnant.

- With the opening of the new Siam Canadian office in Argentina, you were reported as having said that the same business model that has made the company successful in Asia will be applied in South America. Could you elaborate on some key features of this business model which will be put into place to replicate the Asian experience? Once the Argentinian office is up and running (for example, exporting Ecuadorian shrimp to Asia), how will it affect your company’s intra-regional trade dealings in Asia?

- The key features of the model are having people with the ability to source a wide range of products from multiple different processors in different locations and ship to our customer base worldwide. Having an office in South America adds tremendous opportunities for our group to import South American products into China as well as other Asian countries, export Asian products from our offices into South America and sell South American products within South America itself.

- Most people would agree that farming is the best way to go in order to ensure stable supplies, without exerting pressure on wild stocks. Do you foresee a time when your company will invest in large-scale aquaculture?

- Aquaculture is critical to feed a growing global population and reducing pressure on our oceans. We have no immediate plans ourselves at this time for investing in the actual farming side of the sector but I certainly wouldn’t rule it out in the future. Aquaculture is the future of food production and ultimately feeding this planet.

- And on a final note, there is ongoing global dialogue on the role of businesses in contributing towards sustainability in the seafood industry. What are your thoughts on documents such as the FAO’s Guidance on Social Responsibility in Fisheries and Aquaculture Value Chains which outlines ways in which the private sector can contribute towards creating a socially responsible environment, especially for the small-scale sector?

- We cannot afford to underestimate the importance of continuing to develop fully sustainable and socially responsible fisheries and aquaculture. Thinking must be long term. FAO plays a very important role with various stakeholders in promoting socially responsible and sustainable fisheries and aquaculture practices.
INSPIRED: A DATA-DRIVEN TOOL FOR CONTINUOUS IMPROVEMENT IN SEAFOOD PROCESSING

By Sudari Pawiro

INSPIRED - Integrated, Sustainable, Productive, Innovative, Resource Efficient Enterprise Development - is a data recording tool designed by the UNIDO-supported SMART-Fish Programme for the Indonesian seafood processing industry. Pilots in seaweed, pangasius and frozen tuna plants have demonstrated its effectiveness not only in enhancing external and internal traceability, but also allowing plant operators to monitor productivity and performance, as well as to identify the percentage of manufacturing time that is truly productive, leading to better cost effectiveness, less energy and raw material wastage, and higher yields.

Introduction

It is almost impossible to run a successful business in this digital era without having good data recording practices. For seafood processors, in particular those who sell their products to the global market, there is also the necessity to record and maintain different types of data e.g. procurement, production, sales and other data, to meet importing countries’ and buyers’ requirements. In recent years, data related to traceability, seafood safety certification etc has become particularly important to update and store.

Unfortunately for small and medium enterprises (SMEs), in particular seafood processors in developing countries like Indonesia, many still use paper-based data recording, while different sections within processing companies record and keep their data separately. Hence, it is difficult and time-consuming to retrieve data in the event of urgency, for example in the case of rejection of shipments in importing countries or to handle complaints from buyers.

For many seafood processors, this paper-based system is the extent of their “traceability system”, and often, the traceability data collected is only meant to enable companies to trace back their products in the event of rejection or complaints from buyers, which are generally rare occurrences. Rejection or consumer complaints received by a company is not something that happens every week, month or even in a year. Therefore data collected for traceability purposes could be combined with “other data” such as inputs, process, production, results of laboratory tests etc, to be used as a tool to drive productivity and efficiency within the companies. Combining such rich data to be easily retrieved and presented for management decisions to drive changes could be an incentive for companies to have good data recording practices.

Based on the need for comprehensive data collection as mentioned above, the SMART-Fish Programme in Indonesia (2014-2019) under the auspices of UNIDO (United Nations Industrial Development Organization) is piloting a data recording system called the INSPIRED Tool. The SMART-Fish Programme is funded by the Swiss Government (SECO) in collaboration with the Ministry of Marine Affairs and Fisheries of Indonesia.

INSPIRED: driving data systems and productivity

INSPIRED stands for “Integrated, Sustainable, Productive, Innovative, Resource Efficient Enterprise Development”. Designed for the seafood processing industry as a means to electronically record data, the INSPIRED Tool integrates an internal traceability system, and productivity and resource efficient measurements (Figure 1). It aims to enable seafood processors to trace their product, to measure and monitor raw material, suppliers, productivity, sustainability and resource efficiencies; and at the same time, monitor performance as the product moves along processing lines in order to drive productivity and efficiency improvement. Unique Identification Codes are assigned for every lot of raw material received, with data on supplier and origin given as a basis for establishing traceability.
For small seafood processing companies where processing methods are relatively simple and paper-based recording is still being used, the INSPIRED Tool is available in spreadsheet (Excel) format. It records, in general, three important or critical steps: Receive, Process, Dispatch.

In the “receiving” step, the Tool records data on origins, suppliers and quality of raw material which is essential in seafood processing. Many seafood processors have no direct control over raw materials as they depend on suppliers (middlemen/traders). Hence with this system it allows management to easily monitor the “performance” of their suppliers and implement incentive schemes for “good” suppliers to improve incoming raw material quality, and to identify “the best supplier and/or supplies”.

During processing, the Tool offers a range of reports and Key Performance Indexes or KPIs on productivity that include a set of indicators to measure Overall Equipment Efficiency (OEE)= Availability of equipment (%) x Performance rate when running (%) x Quality rate it produces (%). OEE is used to monitor the effectiveness of an equipment performance or overall plant performance and it allows for the identification of opportunities for improvement, as well as for the assessment of the impact and effectiveness of improvement initiatives. Simply put, it identifies the percentage of manufacturing time that is truly productive.

UNIDO has a programme called RECP (Resource Efficient Cleaner Production) implemented in some countries, including in Indonesia. The ultimate goal of RECP is to improve productivity and efficiency within the manufacturing sector through eight practices: Good Housekeeping; Input Substitution; Better Process Control; Equipment Modification; On-site Reduce, Reuse and Recycle; Technology Change; Product Modification; and Production of Useful By-products. In the INSPIRED tool the emphasis is on good housekeeping, better process control and 3R (Reduce, Reuse and Recycle) practices. These include recording resource uses such as water usage, waste, wastewater and energy consumption per MT of production. With 3R practices, for example, the use of water resources and energy (electricity or fuel) can be controlled; hence the cost can also be reduced.

By using the Tool, the management of the companies have a better understanding of the process limitations, will be able to identify areas for improvement, implement process changes to improve production efficiency, as well as save costs; hence improving competitiveness and profitability of the company. The end result is that these companies can implement continuous improvement at every stage/step of the production process.

The Excel (spreadsheet) INSPIRED tool, as indicated above, is suitable for small operations and family-based businesses. It however, requires skill in operating the spreadsheet to modify and make adjustments based on the specific needs for every process and company.

The INSPIRED Tool is also available in user friendly web and mobile-based application to accommodate more complex processes, offering better user and data management (Figure 2). The app was developed in collaboration with local IT service provider, PT. Koltiva.
With the INSPIRED Tool, problems and/or opportunities in the processing steps are easily identified; hence improvement of the identified area/step can be carried out continuously and systematically. In big companies, this process of continuous improvement (CI) is usually carried out by teams in every department, well known in Japanese terms as Kaizen (Kai = change, Zen = good) teams. These teams consist of employees who are actively engaged in improvement of the business operations in their respective departments/divisions.

The CI process cycle involves identifying a problem or opportunity, analysing the process, developing solutions, implementing the solutions and then assessing/evaluating the solutions. The implementation of solutions should be prioritised, particularly no or low-cost solutions such as incorporating good housekeeping and 3R (Reduce, Reuse and Recycle) practices. Changing equipment or technology may be implemented if necessary, after exploring low-cost options.

**Pilots report clear benefits**

The INSPIRED Tool cum CI approach has been tried and piloted in seaweed, pangasius and frozen tuna plants in different parts of Indonesia. The benefits reported by the companies were measured and monetised.

During the implementation of the INSPIRED Tool by a seaweed (agar) processing company, the CI team in that company identified that their agar powder produced had 8-9% moisture content (MC) despite the fact that its customers actually want a higher percentage of 12% MC. Customers may accept the lower MC, but the reduced sales volume nevertheless results in a huge loss for the company. With the price of agar at around US$15.0/kg and the company producing around 1800 kg of agar powder per year, the estimated yearly loss is around 54 tonnes valued at US$810 000.

Using the INSPIRED tool, the company formed a Kaizen/CI team and worked on the milling process, which was the main cause of the agar becoming drier (lower MC). The CI team, after consulting the management, decided to replace one of the blades of the miller and was able to achieve 11.0% MC for their agar, giving potential savings (i.e. avoiding losses) by an estimated US$675 000/year. The company also reported other benefits during the seaweed processing such as a reduction in water usage by 10% (using recycle and re-use practices); reduced energy usage for drying by 6% (shorter drying time); lower energy usage for cooking by 7% (shorter cooking time); less energy usage by 3% for milling/grinding (shorter time); and better waste management (e.g. use of wastes for fertiliser).

An INSPIRED Tool trial in a pangasius fillet processing company identified that the fillet yield corresponded with the number of dead fish that arrived at the processing plant – i.e. the higher the number of dead fish, the lower the yield and grade of the fillet produced. The CI team then worked on reducing/minimising the mortality rate of fish upon arrival at the processing plant, managing to halve it from 40% to 20%. The result was higher fillet yield and better quality product which in turn led to increased revenue estimated at US$50 000/year.

**The way forward**

In addition to the INSPIRED tool, SMART-Fish has also developed an external traceability platform for a seaweed value chain called SeaweedTrace, in collaboration with PT. Koltiva, the same IT service provider mentioned earlier. The SeaweedTrace platform is able to trace back in real time the source of raw material from farm/farmer up to the processing plant/receiving area.

Combining INSPIRED Tool (internal traceability) and SeaweedTrace (external traceability) is a good way for seaweed processing companies to establish better supply management of raw materials, improve productivity and efficiency within their plants and as a strong marketing tool.
The World Shrimp Trade Conference and Exposition (SHRIMP 2019), the seminal event for leaders in the global sustainable shrimp industry, took place in Bangkok recently, attracting over 200 delegates and 32 speakers from 26 countries, as well as exhibitors. With its theme “Modelling for Sustainability”, the Conference was a platform for participants to consider at length the present and the future of the industry, while focusing on moving towards sustainability at every level.

In her Welcome Address, Ms Shirlene Maria Anthonysamy, INFOFISH Director, thanked the sponsors of SHRIMP 2019 - the two Platinum Sponsors: Benchmark, and Thai Pet Food; Silver Sponsors: I&V, Jefo and Genix; and Bronze Sponsor: Seafood Trade Intelligence Portal.

She also recorded the organisation’s appreciation of the presence of the Hon. Semi Koroilavesau, Minister for Fisheries, Fiji, and the Guest of Honour, Mr Thaworn Jirasoponrak, Deputy Director-General, Department of Fisheries, Thailand, as well as the co-organisers the Thai Shrimp Association, Network of Aquaculture Centres in Asia-Pacific (NACA), China Aquatic Products Processing and Marketing Alliance (CAPPMA), INFOFISH sister organisation INFOPESCA, and media partner Aquaculture Asia Pacific for their excellent collaboration in promoting this conference. She said that Shrimp 2019 is the 4th in its series organised by INFOFISH since 2001.

A Special Address was delivered by HE Semi Koroilavesau, Minister for Fisheries, Ministry of Fisheries, Fiji, who referred to aquaculture as “the silver bullet” approach that would allow the industry to make up for production shortfalls to feed a hungry world. He reminded delegates that throughout the process of culturing shrimps, whether hatchery production, grow out or export, it is important to adopt an innovative and holistic approach.

The Hon. Minister went on to mention the need to be mindful of our actions, referring to the upcoming United Nations’ Decade of Ocean Science for Sustainable Development (2021-2030), and the Sustainable Development Goals.

Mr Thaworn Jirasoponrak, who declared the SHRIMP 2019 Conference and Exposition open, said that over the past few years, the Thai shrimp farming industry has faced numerous challenges, most importantly various diseases such as Early Mortality Syndrome (EMS). To ensure the sustainability of the Thai shrimp aquaculture industry, regulations on shrimp aquaculture have been tightened under the Royal Ordinance on Fisheries 2015.

**Plenary Session sets the stage**

In his Keynote Address “Modelling Shrimp Industry towards Sustainability” at the start of the Plenary Session, Mr Robins McIntosh, Senior Vice President, Charoen Pokphand Foods,
Thailand, said that many of the shrimp production systems in Asia have flat-lined after a go-go period, and that in the last ten years, the production growth has shifted to the Americas.

He described shrimp farming models over the past four decades in generational terms, beginning from “Generation 1” (large 5 – 30 hectare ponds with no aeration, producing 500 kg to 3 metric tonnes per ha), to “Generation 5” (small, 0.2- 0.5 ha ponds, total recirculation of water and waste capture, and production of 30-60 tonnes per ha). By adopting a 5th Generation approach, he said, Asia could increase production to 144 tonnes per hectare per year, i.e. a smaller footprint but with better outcomes.

In his presentation “Shrimp Aquaculture Challenges and Issue: The Thai Experience”, Dr. Somsak Paneetataysai, President of the Thai Shrimp Association, traced the history of the industry since the mid-1990s and acknowledged that there have been many challenges due to outbreaks of various diseases. At the same time, Thailand has been successful in the domestication of genetically improved broodstock, and is one of the pioneer countries in promoting bio-secure and probiotic shrimp farming, he said.

The rest of the Plenary Session, chaired by Dr Zuridah Merican (Editor, Aqua Culture Asia Pacific, Malaysia) featured global production, demand and supply, challenges in nutrition, and mitigation of pathogen risks during culture, in the presentations by Mr Marcio Castro de Souza (Senior Fishery Officer, FAO), Dr Olivier Decamp (Product Manager, Inve Asia Services Ltd, Thailand), and Dr Mellony Sellars, CEO, Genic Pty Ltd, Australia).

Mr de Souza referred to FAO latest data which shows that global farmed shrimp volumes are continuing to grow at a rate faster than equivalent aquaculture species. Much of the world’s shrimp is grown in Asia (notably, China, Indonesia, India and Vietnam) while in Latin America, Ecuadorian output has shot up to the point where it has overtaken Thailand as the world’s fifth largest shrimp producer by volume. The US, Japan, Spain and France remain the world’s largest importers of shrimp products.

Dr Decamp spoke of the importance of incorporating protocols combining nutrition, health and environment management which are vital in achieving sustainable production; for example, that the benefits of using feed with the correct physical and nutritional properties in the hatchery and nursery phases will be borne out in the later stages.

Dr Sellars pointed to the fact that shrimp diagnostics needs to be low cost, easy to use, and have a quick turnaround. A common diagnostic method used is polymerase chain reaction (PCR), but it is not able to test more than three pathogens at a time, and farmers tend to use it only when they see signs of problems. She said that Genics Pty has produced a diagnostics kit which can test for 13 shrimp pathogens in a single assay at low cost and with a quick turnaround.

Session presentations were both informative and thought-provoking

The first day of the Conference ended with Session 1 presentations chaired by Mr Robins McIntosh, where the focus was on production and supply trends in India, China, Indonesia, Bangladesh, Ecuador, Saudi Arabia, and India.

Mr Anil Kumar P (Joint Director - Aquaculture, The Marine Products Export Development Authority, MPEDA) reported that according to the latest half-fiscal year data (April to September 2019), shrimp production (90% vannamei) had increased, contrary to expectation of a drop by 20-25%. The reasons were thought to be better yields per hectare, increased hatchery output, and expansion of culture areas. Meanwhile, capacity building is continuing for the adoption of Better Management Practices (BMP), and the industry is looking at ways to reduce the use of antibiotics.

Imports of shrimp have risen significantly since 2018 and through 2019, one main reason being the trade war with the US. From January to August 2019, imported shrimp into China (not including unreported border trade) reached 364.5 thousand tonnes, mainly from Ecuador, India, Thailand, Vietnam, Indonesia, Argentina and other countries. On another note, China is expected to continue with its overseas investments (the One Belt, One Road Initiative).

Dr Cui He (President of China’s Aquatic Products Processing and Market Alliance) gave a differing view of production in his country. He said that widescale expansion of farming areas is not likely, with contributory reasons being a tightening of environmental laws and reducing profits due to diseases. The exception is for live shrimp, which fetches high prices in the domestic market.

Mr Syed Mahmudul Huq (Chairperson, Bangladesh Shrimp and Fish Foundation- BSFF) and Mr Nittya Ranjan Biswas (Project Team Leader, BSFF) presented on black tiger
In the Middle East, Saudi Arabia is the biggest producer of farmed shrimp (*vannamei*) with over 65,000 tonnes in 2018, followed by Iran (46,000 tonnes), then Egypt (7,000 tonnes). Saudi Arabia is also the home of the world’s largest single biosecure RAS facility, and production as a whole from the country is expected to reach 200,000 tonnes by 2025. “Prospects for further growth are high, especially along the coast of the Red Sea, as shown by the increasing interest by international investors over the past few years” said Mr Haydar H Al Sahtout (Adviser, Saudi Aquaculture Society, Saudi Arabia).

Dr Manoj M Sharma (Director, Mayank Aquaculture Pvt Ltd, India) analysed the position of *P. vannamei* in Indian shrimp culture, asserting that the sector is now showing signs of trouble. In order to determine the optimal conditions for *vannamei* culture, Mayank Aquaculture has embarked on trials and the results indicate that with some adjustments, it is indeed possible to successfully farm *vannamei* “the monodon way”. *(Editor’s note: The presentation by Dr Manoj Sharma can be read on pages 51-54 in this issue of the INFOFISH International).*

In Ecuador, said Mr Jose Antonio Camposano (President of the National Chamber of Aquaculture), the Sustainable Shrimp Partnership (SSP) was launched in 2017 in collaboration with the World Wildlife Fund for Nature, Sustainable Trade Initiative from the Netherlands, and Aquaculture Stewardship Council (ASC), in a bid to gain added recognition for the sustainability of Ecuador’s shrimp. Ecuador is expected to produce 600,000 tonnes of shrimp in 2019, up from 520,000 tonnes the previous year. *(Editor’s note: An email interview of Mr Jose Camposano can be read on pages 19-22 in this issue of the INFOFISH International).*

Session 2 of the Conference dealt with consumer demand, markets and trade

In a presentation on the US shrimp market, Dr Darryl E Jory (Adviser, Aquaculture Business Development and Support, USA) said that the value of retail-sold shrimp in the US has risen by 9%, while volumes have grown by 37% over 2018. Although close to half of US households are buying shrimp, 65% of the US’ total shrimp consumption takes place in foodservice, with shrimp sales increasing by 10 million pounds to 255 million pounds in 2018. With more effective marketing, he felt that the home sales could be improved. In terms of product, larger shrimp and peeled shrimp have seen significant growth.

Ms Fatima Ferdouse (International Expert on fishery trade and marketing) spoke about the “Expanding Demand Pattern for Shrimp in the Asia-Pacific”. The direction in global shrimp trade has shifted from conventional developed markets to emergent markets especially in Asia. Japan has lost its prominence in the global shrimp trade for more than a decade, while China has emerged as the “new star” (during January-June 2019, China was the second largest shrimp importer in global shrimp trade, overtaking the US). In addition, there have been large imports in South Korea, Hong Kong, Taiwan, Australia, Malaysia, and Singapore for local consumption.

Mr Mike Turenhout (Board Member of the European Fish Processors Association and European Federation of National Organisations of Importers and Exporters of Fish, The Netherlands) spoke about the huge EU market for shrimp, particularly *vannamei*). In 2018, imports of shrimp from third countries totalled 906,000 tonnes, with the leading sources being India (34%) and Vietnam (15%). The importance of ecolabels (ASC, MSC, organic) continues to grow and new trade agreements could influence future trade flows. Market drivers are prices, transparency and product integrity.

Ms Helga Josupeit, senior advisor with INFOPESCA, said that Latin American shrimp exports have more than doubled over the past five years to 870,000 tonnes, of which 510,000 tonnes comes from Ecuador, which has become the world’s second largest shrimp exporter. Imports into Latin America are steady at 47,000 tonnes, with Mexico being the main importing country (18,000 tonnes), followed by Peru and Chile (9,000 tonnes each). Brazil, normally a huge fish importing country, had laws in place to prevent shrimp imports, and only recently were Ecuador and Argentina allowed to export to Brazil. There is practically no domestic shrimp consumption in the producing countries of Ecuador, Argentina and Honduras.
Technology in farming, diagnostics, and disease were discussed in Session 3, where the focus was towards shrimp farming which is more science-based, controlled, sustainable, and more cost effective. These areas, and more, were dealt with in the presentations by Dr Loc H Tran (Founder-Director, ShrimpVet Laboratory, Vietnam), Dr Kallaya Dangtip (Head of Shrimp-Pathogen Interaction Laboratory, National Science and Technology Development Agency, Thailand), Dr Jumroensri Thawonsuwan (Fishery Biologist, Aquatic Animal Health Research and Development, Department of Fisheries, Thailand), Mr Frank Ping Han Chung (Marketing Manager, GeneReach Biotechnology Corporation, Taiwan), and Mr Antonio Bustamante (Manager, BIOLAN – Southeast Asia)

Diseases are still a major problem, particularly in Asia and parts of Latin America, and it seems that every few years, new strains pop up, causing farmers to resort to antibiotics. However, antibiotics-free shrimp farming is doable throughout the culture cycle, with the most common and effective measures being proper waste management, microbiota management, and use of probiotics. Functional diets, prophylaxis and fermented feed also have good potential in disease management. On-site assay methods available include the POCKIT combo, which is a mobile Polymerase Chain Reaction (PCR) laboratory providing test results for detection of the major shrimp diseases in 2.5 hours rather than the usual days.

Apart from antibiotics, a common additive is sulphites which are used to prevent melanosis in the shrimp. While melanosis itself is not a risk to human health, sodium sulphite may be. Biosensor technology has been developed to easily measure parameters of interest in food safety.

The devastating effect of diseases on shrimp farms was also a major theme in the presentation by Mr Ronnie Tan, Calysta advisory board member and former vice-president at Blue Archipelago, the largest integrated shrimp farm in Malaysia. Using the example of Blue Archipelago, he said that forecasts would be made and investments put in, but all it would take is a disease outbreak to wipe out the envisaged profits.

The Network of Aquaculture Centres in Asia-Pacific—NACA, Thailand, was represented by Dr Derun Yuan (Coordinator of the Education and Training Programme) and Dr Eduardo Leano (Coordinator of the Aquatic Animal Health Programme), who spoke about “Ecological Approaches to Better Sustainability of Shrimp Culture in China” and “Biosecurity in Shrimp Aquaculture”, respectively.

Technology in the Latin American context was presented by Dr Laurence Massaut (R & D Director, BioMar, Ecuador) including aspects such as broodstock maturation, hatchery techniques, stocking density, increase in water treatment capacity, water exchange, feeds and feeding, disinfection between cycles, attention given to bacterial load and prevalence of important pathogens, the use of probiotics, organic acids, and immunostimulants. The question of functional shrimp feeds and whether they are necessary was dealt with by Dr MA Kabir Chowdhury (Global Technical Manager, Jefo Nutrition Inc., Canada). These feeds would be beneficial in terms of conferring greater ability in disease prevention, better immunity, better gut health, higher tolerance to stress, etc.

Artificial Intelligence (AI) and its potential to change the way we farm was the subject of an interesting presentation by Ms Chelsea Andrews (General Manager – Asia & Pacific, XpertSea, Thailand). A major advantage of AI is that it allows for the collection of real time data, which then makes it possible for the system to predict diseases before they happen, reduce feed costs (real time alerts), and forecast market prices taking into account the state of the stock.

The last part of the Conference (Session 4) carried the theme of risk assessment and certification, which was presented by Mr Roy van Daatselaar (Global Improver, Programme Manager, Aquaculture Stewardship Council), Ms Evelyne Nusalim (Executive Director, Indonesian Food Safety Institute), and Mr Roy D Palmer (Executive Director, Association of International Seafood Professionals – AISP). Fraudulent practices was a common theme in these presentations; for instance, it was noted that the incidence of fraud for imported seafood products in the EU market is the highest, including practices related to unapproved treatment and/or processing (30%), the replacement, dilution and removal of products (30%) and mislabeling (33 percent) and others (7%).

Roy van Daatselaar presented on the ASC’s Improver Programme, which contributes to the overall vision of making aquaculture more sustainable across the globe, to drive impact at scale; and provide meaningful data that helps to tell a story of meaningful and measurable change. Meanwhile, ensuring food safety requires integrity by food business operators to only process and sell products that are considered safe according to the regulations of the countries of their consumers. Therefore a professional ethical code should be established as a code of conduct for the sector, said Evelyne Nusalim.

Roy Palmer highlighted some unintended consequences of accreditation/certification, and asked several sharp questions, including: (i) is certification really delivering? ; (ii) have we created a new ‘middle man’?; (iii) would we be better having standards built around Taste, Quality & Consistency for aquaculture? On an end note, as the last speaker at SHRIMP 2019, he asked “We have reviewed most aspects of the industry at this event but what have we missed and how can we improve as we move forward?”. (Editor’s note: An article by Roy D Palmer can be read on pages 8-11 of this issue of the INFOFISH International).
Snippets from SHRIMP 2019
The following comprises responses to questions, and comments on the event by some of the participants at SHRIMP 2019.

Mr Thaworn Jirasoponrak
Deputy Director-General, Department of Fisheries, Thailand

Mr Thaworn, referring to the ongoing global fight against IUU fishing, Thailand has shown its leadership in the region by ratifying ILO 188, as well as instituting national traceability systems in line with the Port State Measures Agreement, amongst others. How do you respond to critics who say that there needs to be an equal focus on ensuring that the rights and welfare of domestic and foreign (including undocumented) workers are recognised?

On behalf of the Royal Thai Government, the Ministry of Labour of Thailand ratified the International Labour Organisation (ILO) Work in Fishing Convention No.188, 2007 (B.E. 2550). The Convention aims to uplift working conditions for workers in the fisheries sector complying with international standards and to prevent human trafficking sustainably and efficiently. The Ministry conducted a gap analysis of domestic law and the Convention for the development of the legal framework in compliance with the provisions of the Convention. Moreover, public hearings among stakeholders including employers, employees, public sector, academic sector and relevant governmental agencies on drafting the Labour Protection Act BE 2562 were held, it was mostly agreed that the ratification of the ILO’s Work in Fishing Convention No.188, 2007 will benefit workers, employers, the image of Thailand and its fishery products. On 30 January 2019, the Ministry deposited the instrument of ratification of the ILO’s Work in Fishing Convention No.188, 2007 to Mr. Guy Ryder, Director-General of the ILO in Geneva, Switzerland. The Labour Protection Act B.E. 2562 was published in the Royal Gazette on 22 May 2019 and entered into force within 180 days after its publication i.e. on 18 November 2019. Pursuant to the Act, the concerned agencies shall make the subordinate legislation according to the fisheries context of Thailand in order to bring the level of protection of Thai and foreign workers to meet with international standards as well as to prevent risk from forced labour. The legislation will also create decent working conditions for workers such as limits on hours of work, accommodation, food, water, medical care, wage payment via bank transfer and inspection of living conditions and labour on board fishing vessels, etc. This will drive good governance in fisheries on the basis of ethical nature while increasing the number of foreign workers and addressing labour shortage in the fisheries sector.

“As we are facing more or less the same challenges this conference is a good platform to act collectively. For these reasons, UNIDO Global Quality and Standards Programme (GQSP) Indonesia supports the participation of five delegates from the Ministry of Marine Affairs and Fisheries, Shrimp Club Indonesia and academicians from IPB University to attend the conference. UNIDO GQSP Indonesia, the extension of the SMART-Fish Programme, is working together with shrimp stakeholders in Indonesia to improve quality and standard compliance for both local and international markets”.

Mr Sudari Pawiro
National Chief Technical Advisor, SMART-Fish Programme (Indonesia)

“Sustainability challenges and opportunities were the focus of our round table held at SHRIMP 2019, which was participated in by industry experts from multiple disciplines. Following the round table, a White Paper will be published by INFOFISH, outlining the range of views from industry experts and suggested points of action.”

Dr Doerte Laue
Group Marketing Director, Benchmark

“Although we had asked for more, the allocation in the Fiji’s National Development Plan 2019-2020 was the same as the 2018-2019 budget. But we were still able to develop aquaculture in the last six months with assistance from international partners, for instance in the development of hatcheries and infrastructure for our four research stations. Our partners in various aquaculture projects include Japan, Taiwan, Indonesia, and the Republic of China. This morning we had a good meeting with the Ministry of Agriculture and Cooperatives in Thailand, and it looks like we will have a team from Thailand coming to Fiji next year”.

His Excellency
Semi Koroiavaseau,
Minister for Fisheries, Fiji
On the sidelines of SHRIMP 2019, Benchmark Holdings, a market leader in the supply of applied biotechnology and knowledge transfer to businesses in aquaculture and agriculture related industries, organised a special “sustainability challenges and opportunities” roundtable. Discussants, who had been carefully selected as representatives of multiple disciplines such as genetics, advanced nutrition, feed mills and governmental organisations, exchanged views on opportunities for shrimp, key challenges across the supply chain, achievements to date, requirements for all stakeholders and potential game changers for the future.

Themed ‘shaping together the future of shrimp production’, the roundtable came at a time of increasing awareness amongst all stakeholders on the environmental, ethical and economic impacts of aquaculture.

In her briefing at the start of the roundtable, Dr Doerte Laue, Benchmark’s Group Marketing Director asked discussants to think about one fundamental question: “How can we shape the future of shrimp production together”? They were asked three Teaser questions (Figure 1).

In the ensuing breakout sessions (three groups), discussants were asked to put themselves in the shoes of certain people (governments, feedmills, genetics, hatchery, farmer, broker, processor, retailer, consumer) and ask what they would want from someone else (for example, consumer from retailer).
At the end of some lively debate, the findings were condensed as follows:

- The need to have PLs at low/reasonable cost, fast growing with good survival on low cost diet, and small size variation; predictable output; adapted to stocking density; healthy animals with good nutritional profile
- Feed adapted to genetic material
- Where can the farmer obtain trustworthy information?
- Needs to be consistent as it is challenging to adapt feed composition according to country. For example, the inclusion of krill is not allowed for export to the UK
- High inclusion of fishmeal in diet may be accepted or not, or may even be a positive factor for some markets
- Development of finisher diets to improve the nutritional profile of harvested shrimp
- Incorporate what the retailer wants into feed specification and genetic selection
- The retailer determines the specifications of the products and sells a story to the consumer (limited impact of customers)
- For some markets, there is a request for specific colour to appeal to customers (e.g. Japan)
- Government has a responsibility to confirm the nutritional value of products for human consumption
- Expect government to provide more information/requirements on the RMs authorized for inclusion in diet
- Connection between feed – genetic – pond management needs to be defined
- In producing countries there are discrepancies in quality and requirements of shrimp for domestic vs export
- Different grades of products are treated differently during processing, e.g. a few hours between harvest and processing for high grade vs 24 hours for low grade
- Challenge of aquaculture as a provider of cheap food and also higher cost food (commodity vs luxury)
- Consumer perception of seafood as a healthy source of protein rather than main source of protein
- Lack of confidence in western countries regarding the certifications done in developing countries. Need for EU/US government agencies to approve their certification from third countries in order to reassure consumers
- Questions on the role of academia to provide reliable data on products/role of academia as intermediary between farmers and government.

Following the roundtable, a White Paper will be published by INFOFISH, outlining the range of views from industry experts and suggested points for action.

A new thought leadership magazine, ‘Benchmark Insights’ was launched in conjunction with the INFOFISH World Shrimp Trade Conference and Exposition.

The publication, entitled ‘Technologies shaping the future of shrimp production’, is based on interviews with experts from multiple disciplines. Olivier Decamp, Segment Director, Benchmark Advanced Nutrition commented “This is an extremely valuable publication as it combines a succinct overview of the evolution of the shrimp sector with expert insights into the latest developments. It outlines many of the hurdles facing shrimp producers across the world as well as some of the most innovative and environmentally sound ways of overcoming them.”

https://www.benchmarkplc.com/media/brochures/
SHRIMP 2019
Event
According to SPATnz programme Industries and the Cawthron Institute, with Sanford, the Ministry for Primary programme, developed in partnership the results of its seven-year breeding company SPATnz recently released New Zealand-mussel breeding acceptance by local communities). and social and regulatory (e.g. permits, operational (e.g. biological challenges), consumer acceptance, premium prices); marketing (e.g. profitability); general) to change the aquaculture game over the next decade. Nevertheless, de Jong points out that there are four main categories of risks: financial (e.g. profitability); marketing (e.g. consumer acceptance, premium prices); operational (e.g. biological challenges), and social and regulatory (e.g. permits, acceptance by local communities).

Successful breeding programme for mussels

New Zealand - Greenshell mussel company SPATnz recently released the results of its seven-year breeding programme, developed in partnership with Sanford, the Ministry for Primary Industries and the Cawthron Institute. According to SPATnz programme manager Rodney Roberts, the results showed that hatchery mussels can grow up to twice as fast as those caught in the wild, taking an average of 16.7 months to grow from seed to harvest size of around 55 grams as compared to 28.3 months for wild-caught varieties.

Sanford chief executive Volker Kuntzsch said the success of SPATnz was an excellent example of the benefits of innovation and collaboration. He said wider utilisation of the spat would see a potential increase in sales for the New Zealand mussel sector of NZ$229m a year by 2026, which meant a thriving mussel industry, more regional jobs and stronger regional economies. Another avenue that is being explored is to use the same selective breeding method to focus on other characteristics, such as enhancing the anti-inflammatory qualities of the mussels.

Meanwhile, the Fisheries Minister will seek a briefing on consultation and engagement with TeOneroa-a-Tohe locals who have expressed concern over the use of heavy machinery to harvest mussel spat.

New floating fish farm

Singapore - A sustainable fish farm floating off the shores of Singapore gives a glimpse of what it is like to produce seafood with less energy and cleaner water, as the Government aims to reach the goal of producing 30% of the country’s nutritional needs by 2030. Situated 5km away from Changi Point Ferry Terminal, the facility called Eco-Ark looks to be one of the first floating closed-containment fish farms in the world, its developer said. Built and run by Singapore food producer Aquaculture Centre of Excellence Group, it uses patented technology to rear three types of fishes for consumers: Asian seabass, red snapper and hybrid grouper.

Eco-Ark, which cost US$ 4 million to set up and will be fully operational soon, is set to generate a higher yield of fish within a smaller space than other coastal farms. It can produce 166 tonnes of fish a year, 20 times more than the minimum production level set for each coastal farm by the authorities.

Project to enhance shrimp and fish health

Bangladesh - The University of Stirling’s Institute of Aquaculture (IoA) has developed a pioneering, computer-based tool under the PEDIGREE project that will minimise environmental and occupational health risks associated with the use of probiotics in shrimp farming. The interdisciplinary team is launching the tool in Bangladesh as it is currently experiencing a growing demand for probiotics due to intensification in shrimp and fish farming, but the scientists believe a wider roll-out in the future could benefit other countries in a similar position.

PEDIGREE (2019-2020) is a one year ‘research into use’ project funded under the Biotechnology and Biological Sciences Research Council (BBSRC) International Flexible Interchange Programme (I-FLIP). PEDIGREE builds on the findings of an earlier project IMAQulate, which developed an indicator-based prophylactic health product (PHP) inventory, risk & efficacy prediction tool based on label information and other secondary indicators.
As probiotics do not fall within the definition of drugs, they are in a regulatory grey area. Consequentially, production practices and product quality are highly variable with many products of limited effectiveness applied under equally variable farming conditions. The project research also identifies potential risks to the environment and shrimp farm workers, and indicates that the marketing of these products as benign may be misleading. A key partner in this work is the Bangladesh Aqua Products Companies Association, which represents major probiotic importer-distributors in the country.

**Salmon broodstock JV signed**

**Norway** - Benchmark Genetics Norway (formerly SalmoBreed) and Bolaks have signed a 10-year agreement for the production of Atlantic salmon broodstock and eggs from the SalmoBreed strain, reported a press release from Benchmark Genetics. This is a continuation of a long-standing collaboration of almost two decades.

The agreement includes the production of broodstock at Bolaks in Hordaland, as well as production of ova at the facility in Lygrepollen in Fusa. A newly formed joint venture will own and operate two applied fishing licenses in southern Norway, which will create a stronger business model with broodstock spread more geographically. The agreement also includes a 10-year supply agreement for eggs from Benchmark Genetics Norway AS to AS Sævareid Fiskeanlegg, where AS Bolaks is the main shareholder.

**Research network set up in sub-Saharan Africa**

**Africa** - The GDRI-Sud AfriMAQUA Research Network for Sustainable Marine

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Aquaculture in Africa (AfriMAQUA) was launched in September 2019 to bring together research teams in the field of marine aquaculture from West Africa (Senegal, Ivory Coast), Southern Africa (Namibia, South Africa), East Africa (Tanzania, Kenya, Mauritius) and key players from UMR MARBEC (France) in order to exchange knowledge, pool research efforts and strengthen research capacity. The network is funded by The French National Research Institute for Sustainable Development (IRD).

At this stage, four convergent and priority research themes have been identified in AfriMAQUA, based on an ecosystem approach to aquaculture, which contributes to the development of a blue and sustainable economy, respecting the biodiversity of various ecosystems. One of the parties involved in AfriMAQUA, the University of Cape Town (UCT), plans to launch One Health, a marine aquaculture project.

**Tiger pufferfish in hot springs**

**Japan** - The Yumesozo company, which is the first in Japan to successfully farm puffer fish (Takifugu rubripes) inland, has reported an output of 25 tonnes a year, sold to around 150 stores. The farming area consists of pools within plastic greenhouses set up on a former swimming pool site in Nasukarasuyama, Tochigi Prefecture. The water is low salinity, and derived from nearby hot springs. It normally takes 1¼ years for fish raised in sea farms to be ready for market but in this case the tiger puffers grow to about 35 centimetres in length and one kilogram in weight by about a year. The cultivation technique has spread to other areas in Japan.

**IPRD technology combines raceway and RAS**

**Pakistan** - In-pond raceway system (IPRS) technology is making a mark in aquaculture, having adopted features of raceway technology, cage culture, recirculating aquaculture systems (RAS) and pond culture. Developed in 2006 at Auburn University, it was introduced in China (2013 to 2014), Vietnam (2016), Mexico (2017), and India and Egypt (2018).

IPRS technology has most recently been set up in Pakistan (Southern Punjab) through mutual collaboration between SoyPak, Pvt. Ltd., the Punjab Fish Farm, the Higher Education Commission of Pakistan (which provided some funding) and Lahore College for Women University, which will carry out trials on the effects of high stocking density on growth performance of fish provided with ample aeration, constant water flow and improved feed management.

Among the expected benefits of the IPRS technology are increases in plankton production and beneficial bacteria, and acceleration of waste load assimilation which cannot be achieved in traditionally managed commercial aquaculture ponds.

**Rs. 13.17 billion on aquaculture development**

**Ecuador to take steps for removal of ‘yellow card’**

**EU/Ecuador** – In October 2019, the EU gave Ecuador a ‘yellow card’, requiring the country to improve its legal framework within a certain time frame to eliminate any future possibility of having its tuna as coming from illegal fishing activities. Ecuador is the second largest tuna producer in the world, after Thailand, and in 2018 it registered some US$ 1.4 billion in tuna exports to the EU.

“Ecuador is a major trade partner for fishery products. We have a huge responsibility towards the EU consumers to make sure that the imports from this country only stem from legal fishing activities. The European Commission has detected shortcomings that hinder the capacity of Ecuador to provide this assurance,” said the EU Commissioner for environment, maritime affairs, and fisheries, Karmenu Vella.

The EU recommended that Ecuador develop an enforcement and sanctioning system to address IUU fishing activities, look into adequate control of the activity of processing...
plants (especially those exporting to the EU), and address limitations in the fisheries legal framework. This includes the update and renewal of a fishing law that dates back more than 30 years. Following the issuance of the yellow card, Ecuador’s Ministry of Production, Exports, Investments and Fisheries was reported as announcing that the country has adopted the National Tuna Action Plan (PAN TUNA) which will work as an administrative tool with the following aims: reducing bycatch; strengthening the monitoring and management of environmental impacts; strengthening traceability; developing environmental education programs and improving scientific research.

In late April 2020, “a technical commission will arrive in Ecuador to assess what is being done to clean that yellow card,” said the Ambassador of the Delegation of the European Union in Ecuador. The evaluations will continue with technical visits every six months until the yellow card is lifted or a red card is issued instead.

**Pledges to continue reforms on IUU fishing, forced labour**

**Thailand** – The Thai Deputy Prime Minister has confirmed that the government will continue to reform its seafood industry despite mounting pressure from domestic fishing groups. Thailand has already implemented substantial reforms, designed to eradicate illegal fishing and address human rights abuse at sea but in recent months the National Fishing Association of Thailand has been lobbying to roll back many of these progressive measures. Thailand in 2018 became the first country in Asia to ratify the International Labour Organization’s P29 Convention, which promises protection for victims of forced labour and sanctions for the perpetrators, and this year ratified the ILO’s Work in Fishing Convention (C188), which sets basic standards of work in the fishing industry. The progress has been recognised by the European Union and the country’s yellow card trade warning over illegal fishing was lifted in early 2019. In addition, the country’s monitoring, surveillance, and enforcement capabilities have also shown good progress.

**EU recommendations adopted to combat IUU fishing**

**Vietnam** - The European Commission (EC) issued a yellow card to Vietnam in October 2017, warning the country that the EU could ban its seafood products entirely unless effective measures were taken to halt illegal fishing. In spite of some of the progress made, exports of Vietnamese seafood to the EU have...
been on the decline and thus, removing the yellow card remains a key task for the Government. The EU’s yellow card also had an impact on the ratification of EU-VN trade agreements such as the EU-VN Free Trade Agreement (EVFTA) and the EU-Vietnam Protection Agreement (EVIPA).

According to Deputy Minister of Agriculture and Rural Development Mr. Phung Duc Tien, Vietnam has taken concrete steps based on the EC’s recommendations. A national committee was founded in May to co-ordinate efforts made by central agencies and local authorities to combat IUU. Further, the country’s 28 coastal towns and provinces have each established their own anti-IUU units to supervise and inspect fishing activities. Fishing boats coming in and out of seaports are being asked to file reports on their cargoes, origin of product and ships’ logs.

Work is also continuing on improving the legal framework and installing trackers on boats to monitor seafood product origin and enforce maritime law. Mr. Tien added that the country’s 2017 Fisheries Law and a number of Government decisions and guidelines have allowed agencies and localities to combat IUU more effectively. Boat tracking and seaport monitoring systems have been put to use for better surveillance of the flow of seafood products. A major achievement in the fight against IUU, according to VN Directorate of Fisheries’ deputy head Mr. Nguyen Quang Hung, is greater awareness among central agencies, local authorities and Vietnamese fishermen and businesses. He said that the number of IUU cases reported in the country has declined in recent years. However, there are still cases of Vietnamese boats fishing in foreign waters. Based on the EC’s recommendations, Vietnam has set up communications channels with neighbouring countries to spot and handle IUU violations. Mr. Hung added that Vietnam has started to establish quotas within its territorial waters.

Meanwhile, the EU Parliament’s Committee on International Trade Chairman Mr. Bernd Lange confirmed that there has been progress made on Vietnam’s side to combat IUU fishing. A delegation from the EU’s Directorate-General for Maritime Affairs and Fisheries will conduct on-site surveys and working sessions with Vietnamese agencies from November 2019 to evaluate the country’s efforts to fight IUU fishing.

IPNLF signs MoU with tuna sector

Maldives - The International Pole & Line Foundation (IPNLF) announced that it has signed a Memorandum of Understanding (MOU) with the Maldives Seafood Processors and Exporters Association (MSPEA). This five-year agreement, ratified between the two parties in Malé in the Republic of Maldives, establishes a dynamic and collaborative commitment to support the local tuna sector. The initiative aims to improve the livelihoods of communities connected to these fisheries and ensure that the Maldives remains at the forefront of the global one-by-one tuna supply.

According to IPNLF, they want to continue to build a stronger and more commercially competitive Maldivian one-by-one tuna sector, thereby ensuring that it is better positioned to meet the future needs of the many dependent coastal communities, as well as the ever-growing demands of consumer markets.

New Ministry for fisheries

India - The Indian government has set up a separate Ministry for animal husbandry, dairy and fisheries, a move which had long been awaited for by the sector, which previously fell under the much broader Ministry of Agriculture.

Fishing has transformed over the decades from a small-scale artisanal practice into an increasingly industrialised sector with widespread adoption of mechanised boats. There are over 14.5 million fishermen and several thousand people engaged in the supply chain of fish products.

India’s fish catch has risen from an estimated 0.53 million tonnes in 1950 to 3.83 million tonnes in 2017 and marine exports for the country crossed US$7 billion in 2017-2018, up from just $5 million in 1971. The sector contributes 1.1% to GDP.

First exports of farmed tilapia from Sarawak

Malaysia - Following talks with Singapore’s Sheng Siong Group, in August 2019, Sarawak exported farmed red tilapia totaling 12 tonnes for the first time to the island state. The fish were produced by Borneo Ecofish Sdn Bhd which owns Sarawak’s largest red tilapia cage culture farm in the reservoir of the Batang Ai hydroelectric dam. The company has plans to double the production capacity (currently about 50 tonnes monthly) and increase the number of cages from 3 000 to 5 000 in 2020. The shipment was organised by Sea Horse Corp Sdn Bhd, which has experience in exporting shrimp and jellyfish to Singapore and other overseas markets.

Sarawak Deputy Chief Minister Datuk Amar Douglas Uggah Embas said that this first shipment of tilapia was a good step forward for the agriculture sector of Sarawak, especially inland fisheries. Chief Minister Datuk Patinggi Abang Johari Tun Openg added “Sarawak
red tilapia fish are being reared in the hydroelectric dam, therefore they don’t have that muddy taste. So we will rear the red tilapia fish in the Bakun and Murum dams to increase the output for export to Singapore”.

**Blockchain pilot to track Indian shrimp**

**India/USA** - Walmart is piloting the use of blockchain technology for end-to-end traceability of shrimp sourced from Andhra Pradesh in India and shipped to selected Sam’s Club locations. This is the first known use of blockchain to track shrimp exports from farmers to an overseas retailer.

Walmart worked with Andhra Pradesh-based seafood processor Sandhya Aqua and US-based supplier Stanley Pearlman Enterprises to add the shrimp supply chain to the blockchain-enabled IBM Food Trust and create shared value for the entire shrimp farm-to-table continuum. “This end-to-end blockchain pilot is the first of its kind in India and has the potential to create long-term economic opportunity for the shrimp farming community in Andhra Pradesh, directly benefiting the farmers through new skills training and development,” said Chowdary Kunam, managing director of Sandhya Aqua.

**Continued ban on wild-caught Indian shrimp**

**India/USA** - The U.S. National Marine Fisheries Service has recommended the continuation of a ban on all wild-caught shrimp from India, and other countries which the NMFS says is not complying with rules set by the U.S. State Department with regard to the protection of sea turtles. While the bulk of the shrimp exported to the US is farmed, thousands of fishermen in Kerala rely on exports of wild-caught brown and deep-sea shrimp for their livelihoods.

The Marine Products Export Development Authority (MPEDA), India, has protested the ban, stating that the vessels that are not using turtle excluder devices are usually situated in areas where the presence of any sea turtles is negligible. Nevertheless, the Central Institute of Fisheries Technology, which has developed a turtle exclusion system, will modify it as necessary.

**Mekong Delta develops shrimp brands**

**Vietnam** - The province of Bac Lieu in Vietnam will work closely with FLC Group and Viet Uc Group to develop brands for local shrimp products under a cooperative deal inked between the provincial People’s Committee and the two corporations.

According to the People’s Committee, Bac Lieu is the second largest shrimp producer in the country, with more than 135,000 hectares dedicated to shrimp breeding and a production of some 150,000 tonnes per year. The province earns US$600 million on average from shrimp exports annually and is striving to become the national shrimp hub.

**Seaweed focus in ASEAN agriculture deal**

**The Philippines** - A memorandum of understanding (MoU) was signed on 15 October 2019 between the Philippines and other members of the Association of Southeast Asian Nations (ASEAN), agreeing to focus on growing exports of seaweed products to markets outside the region. The MoU aims to promote a scheme that will enable products of member-states to strategically position themselves on matters affecting trade in the international market and ensure that ASEAN products are being produced through sustainable means. The agreement covers seaweed, seaweed-based products and coconut oil products from the Philippines.

According to the Philippine Statistics Authority (PSA), the export value of dried seaweed in 2018 was US$11.19 million, up 118% from 2017.
**Marine eco-label likely to be made international standard**

**Japan** - The domestic certification system for protecting marine resources, Marine Eco-Label Japan (MEL), is expected to be approved as an international standard by the end of this year. Established by the Japan Fisheries Association in 2007, MEL is a certification system aimed at maintaining high benchmarks in the fisheries industry. Certified merchants can attach labels to their products to differentiate themselves from others. As of October 2019, a total of 23 organisations have been certified in Japan.

The Marine Eco-Label Japan Council, the operator of MEL, applied to GSSI in September last year and if approved, it will be the ninth such standard in the world and the first in Asia. The Japanese government believes that GSSI’s approval of MEL would boost its efforts to expand exports of domestic fishery products.

**GAqP standard to boost fisheries export**

**Myanmar** - In a bid to be more competitive internationally, the country’s fisheries industry is finalising guidelines to meet Good Aquaculture Practices (GAqP) standard requirements by next year 2020. These guidelines will focus on food security and safety, and according to the Myanmar fisheries department it would make products from the country more competitive in the international market, particularly the European Union. The department has held consultations with fish breeders, experts and officials, including those from the GAqP technical committee from the EU in Yangon.

**K-Fish promotions in the US, Russia and Indonesia**

**South Korea** - The Korean fisheries national brand, K-FISH, was launched in 2017 to promote the quality of Korean seafood and enhance its global competitiveness. Each year since then, two-week-long promotions entitled, “K-Seafood Global Weeks” have been held in many countries simultaneously such as the US, Russia, and Indonesia from 2-17 November 2019.

This event showcased the 14 seafood products available for export: *gim* (laver), *miyok* (sea mustard), oyster, abalone, sea cucumber, fish cake, red snow crab, seasoned squids, conger eel, flatfish, tuna, baby clam, roe and mackerel. Food Bazaar, a supermarket chain that has 25 locations throughout the northeast, is hosting the K-FISH tasting events.

**Joint roadmap with China guarantees shrimp exports**

**Ecuador** - In September 2019, China had issued a ban on shrimp imports from five large Ecuadorian shrimp exporters due to fears of disease, but a joint roadmap between Ecuador and China has now been established to resume regular flow of Ecuadorian shrimp to this Asian market. The roadmap, including exchange visits by representatives of Ecuador and China and discussions on technical protocols, was announced on 28th November by Ivan Ontaneda, Minister for Production, Foreign Trade, Investment, and Fisheries.

In a Twitter posting after the 27th November meeting with the Chinese authorities, Jose Antonio Camposano, head of the Camara Nacional de Acuacultura (CNA), said: “the Chinese authorities showed total openness throughout this process to find a mechanism that allows us to continue with our exports by fulfilling a series of agreed actions at the dialogue tables”.

*(Editor’s note: An email interview with Mr Camposano can be seen on pages 19-22 in this issue of the INFOFISH International).*

From January to September 2019, Ecuadorian shrimp exports generated US$2 885 million, according to the Central Bank of Ecuador. It is projected that up to December, this figure will exceed US$3 billion. Internationally, the shrimp are promoted as ‘First Class Shrimp’.

**Peruvian scallop exports to resume**

**Peru/China** – Following the signing of an agreement between the Ministry of Production (PRODUCE) of Peru and the Department of Political Affairs of the General Administration of Customs of the People’s Republic of China (GACC), scallops (*Argopecten purpuratus*) and Peruvian silverside (*Osontes regia*) will re-enter the Chinese market. The Vice Minister of Fisheries and Aquaculture, who also participated in the signing of the document, said that it would benefit the fisheries industry and artisanal fishermen in Peru. In turn, Vice Minister Hu Wei said that “Based on the confidence we have in them, I am glad to announce the return of the silverside and the scallops to the official list of China. The decision would be published tomorrow (December 7) on the official website,” he said.
Online fish marketing project

India - The Central Marine Fisheries Research Institute (CMFRI), India, has launched a research project for the development of an online platform in order to facilitate effective fish marketing systems. The project will encompass an updated database of market information, weekly fish prices, and an e-auction fish trade platform for commercially important fish species. As many as 1500 fish markets from all sectors will take part in the project.

In the first phase, information on 500 fish markets from seven coastal states will be collected. Data on geographical location, size, timing, access to transport, arrivals and disposals, species traded, infrastructure facility, and the average minimum and maximum prices of around 150 fishery species will be available on the websites of National Fisheries Development Board (NFDB) and CMFRI from October 2019 onwards. Later, a separate portal will be developed to showcase the market information online. A total of 50 markets will be covered in Kerala in the initial stage. This project is funded by the NFDB.

World Fisheries Day 2019

World Fisheries Day together. In line with the theme of ‘Social responsibility in the fisheries value chain’, the focus was on ensuring social sustainability throughout the long and complex value chains of the fisheries and aquaculture sectors. The message was that from developed countries to the developing countries, human and labour rights violations have been documented and there are still too many cases of unacceptable practices taking place.

Ms Maria Helena Semedo, FAO Deputy Director-General and Ms Alette van Leur, Director of Sectoral Policies Department, ILO, provided the introductory speeches. A discussion was held with the moderation of Mr. Sebastian Mathews, Executive Director, ICSF, and participated by Rev. Joe O’Donnell, Sr. Port Chaplain, Apostleship of the Sea, Scotland; Mr. Javier Garat Perez, President, Europeche; and Ms Enrica Mammucari, General Secretary, UILA Pesca. A later discussion involved Ms Julie Kuchepatov, Seafood Director, Fait Trade, USA; Ms Cindy Berman, Head of Modern Slavery Strategy, Ethical Trading Initiative; Mr. Abdellah Srour, Executive Secretary, GFCM; and Mr. Seraphin Dedi Nadje, General Secretary, Fisheries Committee for the West Central Gulf of Guinea. Concluding remarks were given by Msgr Fernando Chica Arellano, Permanent Observer Holy See to the FAO.

Photographic exhibition: Citizens of the sea

At the FAO International Symposium on Fisheries Sustainability in November 2019, a photographic exhibition portraying the life and work of smallscale fishers (SSF) in the Mediterranean was produced with the help of award winning photographer Carlo Gianferro, winner of the World Press photo in 2009. Due to overfishing SSF represents the opportunity for change towards a new, responsible and sustainable fishing model that will contribute to change the future of fishing, fishers and their lives in the sea. The exhibition was presented by WWF and General Fisheries Commission (GFCM) for the FAO and the photos are a selection from the photo exhibition “Citizens of the sea”, produced in the framework of an EU-funded project (Interreg MED Programme / FishMPABlue2) and shown at the Museo di Roma in Trastevere in Rome.

Geeks Without Frontiers

Non-profit organization Geeks Without Frontiers (GEEKS), is the recipient of an award by Space & Satellite Professionals International (SSPI) for its ‘Sustainability Models for the Global Fishing Industry’ project. This project consists of commercially sustainable, satellite-based connectivity solutions, designed to help tackle forced labour and human trafficking in the commercial fishing industry.

According to GEEKS, “in addition to addressing human rights concerns via vessel geo-positioning and providing connectivity to the crew, the solution is sustainable because of its commercial benefits for vessel owners, including the ability to transmit catch reports, monitor weather, conduct safe navigation and send distress signals.” The same model can also be used to better address illegal unreported and unregulated fishing, overfishing and seafood fraud. A critical element of the solution is also GEEKS’ regulatory and policy guidance for governments, to streamline licensing and spectrum allocations.
FAO International Symposium on Fisheries Sustainability

Speakers and participants at the Symposium discussed how to bridge the gaps between scientists, policymakers, and the general public to tackle the pressing challenges faced by the international fisheries sector. It ended with a hope to build positive narratives around oceans and fisheries.

The FAO International Symposium on Fisheries Sustainability was held in Rome, Italy, from 18-21 November 2019 with the theme of ‘Strengthening the Science-Policy Nexus’. It was participated by more than a thousand professionals including policymakers and practitioners of regional and global technical organisations; both state and non-state parties; researchers and academicians including natural and social scientists; fisheries, conservation and sustainability experts; representatives from financial institutions, businesses and the private sector; fishermen and indigenous groups; GOs, NGOs and IGOs. The Symposium included an innovation and technology forum, as well as 18 presentations.

“Fish is a central element in the future of the sustainable food system”, said FAO Director-General Mr. Qu Dongyu during the opening high level session. “The UN Sustainable Development Goals (SDGs) are designed to leave no one behind”. He added that no region should be left behind in ocean sustainability and he also called for new ways to protect workers’ rights. H.E. Peter Thomson, UN Secretary General’s Special Envoy for the Ocean, urged people to treat the ocean with the respect it deserves. H.E. Michael Pintard (Minister for Agriculture and Marine Resources, Bahamas), H.E. Harald Tom Nesvik (Minister of Fisheries, Norway), H.E. Ricardo Serrao Santos (Minister of the Sea, Portugal), H.E. Mona Mehrez (Deputy Minister of Agriculture, Egypt) and Ms Rebecca Jayne Argo (fisherwoman, Alaska) were also present and spoke at this event.

On the first day of the Symposium there were three sessions: (i) Status of global and regional fisheries sustainability, (ii) Reconciling fisheries and conservation management objectives, and (iii) Fisheries and food security. Mr. Ray Hilborn from the University of Washington, USA, said that some areas need to be more transparent to fill the information gaps and increase understanding of the status of fisheries stocks and management. Ms Ana M. Parma, National Patagonian Centre, CENPAT-CONICET, Argentina, reiterated that evidence-based fisheries management is not just about tools but mainly about the capacity and process. Ms Elizabeth Fulton, CSIRO, Australia, stressed that our oceans are changing; we need to recognise the dependencies and interconnections between terrestrial and marine eco-systems, and we have to move forward to practical and technology-based solutions. Mr. Christopher Costello, University of California Santa Barbara, USA, mentioned that we need to support joint integrated biodiversity and food security objectives that recognise trade-offs that are nationally and locally relevant. Ms Shakuntala Thilsted, WorldFish, Malaysia, said that consumption of tasty, nutritious, safe, affordable and convenient aqua foods in public nutrition and health programmes can ensure a safer first 1 000 days of life. Mr. Christopher Deweir Golden, Harvard T.H. Chan School of Public Health, USA, proposed two intervention pathways for addressing the needs of nutritionally vulnerable populations: (i) environmentally-sensitive fisheries management and marine conservation; and (ii) technology improvements in aquaculture.

The second day of the Symposium discussed: (i) Securing sustainable fisheries livelihoods (ii) the economics of fisheries; and (iii) fisheries management in the face of a changing climate. Ms. Philippa Cohen, WorldFish, Malaysia, stressed that we have to recognise the role of women and make both sexes responsible for achieving gender equality. Mr. Mitchell Lay, Caribbean Network of Fisheries Organizations, Belize, suggested that we have to change the rhetoric around small scale fisheries and develop a positive narrative highlighting their contribution to food security and resource stewardship. Mr. Carl-Christian Schmidt, Nordic Marine Think Tank, discussed that fisheries does not take place in a vacuum, hence there needs to be improvement in policy decisions. Ms Claudia S. Beltran, International Consultant, El Salvador, mentioned in her presentation that mainstreaming gender-inclusive policies is important to increase the role, well-being and working conditions of women in the sector, including at the decision making level. Mr. Steven Gaines, University of California, USA, added that we have to develop spatial management mechanisms which will be able to adapt to the fast pace of climate change accounting for shifts in species
The final day of the Symposium saw sessions on (i) Fisheries information systems and new technologies; and (ii) Policy opportunities for fisheries in 21st Century. These were followed by a summary of the previous sessions and a side event to observe World Fisheries Day 2019 (21 November). Dr. Serge Raemaekers, Managing Director of Abalobi, South Africa, discussed that collaboration, interoperability, ‘techchoice’, integrated incentives and co-ownership can answer some of the big data questions about small-scale fisheries. Ms Donastella Castelli, CNR-ISTI, Italy added that the global scientific community could not only adopt the new technologies but also identify appropriate shared regulations, guidelines and best practices for information systems. Ms Lori Ridgeway, International Consultant, Canada, in her presentation mentioned that fisheries policy and management decisions should be inclusive, promoting respectful recognition of scientific evidence and prioritising local and traditional knowledge. Dr. John Kurien, Azim Premji University, India, discussed the three key policy considerations for making the fisheries sector sustainable: small scale fisheries, climate change, and blue economy. In concluding his presentation he quoted Mahatma Gandhi “The world has enough for everyone’s need, but not enough for everyone’s greed” which is equally applicable today in global fisheries sustainability.

Dr. Vera Agostini, Deputy Director, FAO Fisheries and Aquaculture Policy and Resources Division, presented the summary of the eight sessions. The conclusions from these sessions along with the other discussions throughout the Symposium will be compiled into a technical document to be presented at the 34th FAO Committee on Fisheries (COFI) in July 2020 to inform future work on sustainable fisheries.

Speakers at the closing ceremony were Ms Maria Helena Semedo, Deputy Director General, FAO Climate and Natural Resources, Mr. Syd Mouctar Dicko, Chair of the Committee on Fisheries (COFI), H.E. Thanawat Tiensin, Permanent Representative of the Kingdom of Thailand to FAO, IFAD & WFP and Chair of the Committee on World Food Security (CSF), and Mr. Arni Mathias Mathiesen, Asst. Director General, FAO Fisheries and Aquaculture Department.

Dr. Manuel Barange, Director, FAO Fisheries and Aquaculture Policy and Resources Division, concluded by announcing that the conclusions and recommendations from this high level important symposium are available in the Symposium website (http://www.fao.org/about/meetings/sustainable-fisheries-symposium/about-the-symposium/en/) and will be carried forward to COFI and a number of fora in the next year or two, to “build a new positive narrative of what we expect from the oceans, seas and inland waters as we move towards the 21st century to a world of nine billion people”.

Blue Innovation

A ‘Blue Innovation’ side event organised by the Symposium partners looked at emerging technologies in sustainability. Speakers dwelt on how ocean-sourced species and materials like sea cucumber, fish skin leather, fish bones, and algae can be used to produce fashion materials, medicine for wound healing, skin regeneration and alternative packaging material. Drone technology was also highlighted as being useful in the fight against IUU and to manage marine protected areas.

Mr. James Ambani, Founder of Victorian Foods, explained that the skins from Nile Perch fished from Lake Turkana, Kenya (the world’s largest desert lake) are made into leather. After three years of operation, the company produces 400 kg of leather per week which sells US$5 per square foot. The leather can be produced in large sizes because Nile perch can grow up to 6 feet. There are 10 women workers in the tannery, with plans to train more. Ms Barbara della Rovere, Founder, BarabaradellaRovere.com, mentioned that fish leather is much stronger than lamb or cow leather of similar thickness. Increased availability of fish leather could also reduce demand for snake and alligator skin which may come from endangered species. Mr. Daniel Halton, CEO of Commonwealth Fashion Council highlighted how ocean-sourced materials such as fish leather and algae can be used to make fashion items such as purses, dresses, shoes etc.

Dr. Wenhui Wu and Dr. Jeevithan Elango (both from Shanghai Ocean University) presented on marine collagen produced from sea cucumber and marine fish skin, bones and other by-products which can be used to provide medicinal support for burn victims and amputees. Ms Lucy Hughes, student of the University of Sussex and James Dyson, Award Winner for Marinatex, spoke about an alternative bio-plastic packaging material developed from algae.

Mr. Badr Idrissi, CEO of Atlan Space, presented on cutting edge technologies like drones and AI to fight IUU fishing and monitor fishing vessels.
2019 CHINA FISHERIES AND SEAFOOD EXPOSITION, QINGDAO, CHINA

China is by far one of the largest consumers of salmon worldwide; however it is one of the lowest in terms of per capita consumption. The increasing demand for salmon in China is indicative that it could very well be a producer itself. Extensive growth in the Chinese salmon market became strikingly evident in a series of presentations at the Intrafish 2nd Qingdao Leadership Forum on 31 October 2019. The Forum was held concurrently with the 24th China Fisheries and Seafood Exposition held in Qingdao from October 30th to November 1st 2019.

The Expo attracted a lot of seafood companies with special focus on the Asian markets, particularly China. Billed as the ‘World’s Leading Seafood Show’, it brought together about 1 700 companies representing 52 countries. According to the organisers of the show, Sea Fare Expositions, all the exhibit halls were filled at the Qingdao International Expo Center.

Companies from INFOFISH Member countries such as Papua New Guinea, India, Philippines, Pakistan and Malaysia showcased their fish and fishery products including tuna, shrimp, squid and other marine fish. These products were mainly in fresh/chilled, frozen and value-added forms. The Member countries benefited from the show as their products attracted a large number of buyers particularly from China.

The Expo attracted industry buyers, mostly importers and distributors, who were looking to source new products and discover latest market and consumer demand trends particularly in the Asia Pacific.

The next China Fisheries and Seafood Expo will be at the Hongdao International Convention and Expo Center (HICEC) in Northern China from October 28th to October 30th 2020.
The 34th session of the INFOFISH Governing Council (GC) was held in Malé, Republic of Maldives, from 16-19 December 2019. During the meeting, INFOFISH work and activities during the reporting period were reviewed as well as its financial status. The GC determines INFOFISH’s programme of work and its budget for the incoming year; also, it sets general standards and provisions for INFOFISH management guidelines.

The meeting was hosted by the Ministry of Fisheries, Marine Resources and Agriculture, Maldives. It was attended by six (6) member countries: Cambodia, Malaysia, Republic of Maldives, Fiji, Pakistan and Thailand with three (3) observers: representatives from the Food and Agriculture Organization of the United Nations (UN-FAO), Ministry of Agriculture and Agro-based Industry, Malaysia (MOA) and Southeast Asia Fisheries Development Center (SEAFDEC).

The occasion was graced by two Ministers: His Excellency Semi Koroiavesau, Minister of Fisheries, Fiji, and Her Excellency Zaha Waheed, Minister of Fisheries Marine Resources and Agriculture, Republic of Maldives.

In her keynote address, the Hon. Zaha Waheed stated that fisheries is an important contributing sector for the Maldives national economy, livelihood of its people and national security. Diversification within the fisheries sector aimed towards increasing its contribution to the national economy is the priority of the government. Other than the usual tuna fishing and tuna products that are being exported, sub-sectors such as product value addition and mariculture development are key focus areas. She emphasised that IGOs like INFOFISH have roles to play in the development of several developing countries or small island states like the Maldives, especially in the establishment of market linkages for local SMEs and business in accessing foreign markets.
Hon. Semi Koroilavesau said that Fiji is focused on sustainable use of the ocean for the sustenance and protection of the young and future generations of the country. As the country’s traditions and culture are rooted to the ocean, including as a means of support for livelihoods, effective fisheries management is essential. In line with its sustainable fisheries approach, the country is developing national potential in aquaculture as an option to reduce wild harvests from finite ocean resources. As a member country of INFOFISH, Fiji has easy access to information on markets and marketing, which helps in the planning and development of its fisheries industry based on market standards. In addition, knowledge sharing between INFOFISH member countries, especially on aquaculture, can help Fiji to keep up with innovations, particularly on new farming models and structures for improved farming techniques and feed production.

As part of the programme of the 34th session of the INFOFISH Governing Council, a field trip was arranged on the third day, during which Council members visited a tuna processing plant, Big Fish Processing Factory located on Himmafushi Island. Big Fish processes yellowfin tuna and MSC-certified skipjack tuna with fresh/chilled and frozen loins products exported mainly to the EU and the USA, respectively.

The next (35th) meeting of the INFOFISH Governing Council in 2020 will be held in Karachi, hosted by the Government of Pakistan.
A CRITICAL ANALYSIS OF VANNAMEI SHRIMP CULTURE IN INDIA

By Manoj M Sharma

Based on a presentation by the author at the recently held INFOFISH World Shrimp Trade Conference, this article mentions that *P vannamei*, regarded in 2009 as a saviour for the Indian shrimp culture sector, is itself now showing signs of trouble. Analysis reveals that a major causative factor has been the unchecked expansion of farming without the proper know-how and management techniques necessary to culture *vannamei* in place of *monodon*, taking into account their differing growth characteristics. In order to determine the optimal conditions for *vannamei* culture, one company has embarked on trials and the results indicate that with some adjustments, it is indeed possible to successfully farm *vannamei* “the *monodon* way”.

Currently, the shrimp farming area nationwide is approximately 150 000 ha, with some 80% of farmers using plots of less than five hectares each. Culture practices range from the traditional (seed + water exchange), through extensive (seed + feed + water exchange), semi-intensive (seed + feed + drugs + water exchange) and intensive (seed + feed + probiotics + minimum/no water exchange). The average production rate is about 4 500 kg per hectare and almost all (90%) of the farmed shrimp is exported.

Table 1: Declining survival rate for farmed *P monodon* (35-40 pcs/kg) in India, 2004-2008

<table>
<thead>
<tr>
<th>Year</th>
<th>Total seed Production (in billion)</th>
<th>Total shrimp production (in tonnes)</th>
<th>% success</th>
</tr>
</thead>
<tbody>
<tr>
<td>2004</td>
<td>7.1</td>
<td>125 000</td>
<td>70</td>
</tr>
<tr>
<td>2005</td>
<td>7.2</td>
<td>112 000</td>
<td>60</td>
</tr>
<tr>
<td>2006</td>
<td>7.0</td>
<td>115 700</td>
<td>59</td>
</tr>
<tr>
<td>2007</td>
<td>6.2</td>
<td>95 000</td>
<td>57</td>
</tr>
<tr>
<td>2008</td>
<td>5.5</td>
<td>75 000</td>
<td>50</td>
</tr>
</tbody>
</table>

Better output, but many questions remain

At the start of the *vannamei* era, major departments such as ICAR, MPEDA, RGCA, CAA, NFDB and Department of Animal Husbandry, Dairy and Fisheries formulated stringent and transparent rules and regulations for this highly promising species of shrimp. Since then, all the ancillary sectors like hatcheries, feed mills, aqua pharmaceuticals and chemical companies, processors and traders have done phenomenally well.

Introduction

India is the one of largest shrimp producers and exporters in the world. Between 1985 and 2009, the predominant species cultivated in the country was *P monodon*, to the extent that it became synonymous with the country, i.e. Indian black tiger. It remained the top favourite among the shrimp farmers in the country for more than 25 years and totally dominated in exports in all sizes and counts.

The downfall of the species began in the late nineties with the onset of the WSSV (whitespot disease) which decimated stocks and in the last 15 years, the production of *monodon* stagnated due to repeated outbreaks. With an average survival rate of not more than 50%, output of *monodon* was under 80 000 tonnes (Table 1). To revitalise the shrimp farming sector, the hardier *P vannamei* was introduced into India in 2009, quickly displacing *monodon* as the top farmed shrimp species.
The most attractive features of *vannamei* for farmers were the availability of SPF/SPR/HI seed and its high production capacity, and within 4-5 years of its introduction, national production increased four-fold. However, since harvesting tended to take place at the same time, this led to bulk output in short periods and the lack of infrastructure capability in accommodating and processing such massive quantities was soon evident. So the sad part was that black tiger farmers lost money due to failure in production and having switched over to *vannamei*, they suffered because of over-production.

There have also been voices of caution in the industry, with some warning that *vannamei* seed demand would far exceed supply, that there is a possibility of spurious seed, excessive farming of the species, absence of effective regulation, and how India would fare against competition from Southeast Asian shrimp producers. One question is whether *vannamei* was introduced into the country to compensate for the failure of *monodon*, or should it be cultivated as a separate species. Table 2, in fact, reflects the problems now evident in the *vannamei* culture sector: although in 2017, a peak volume of 650,000 tonnes was reached, in reality the success rate has declined from 85% in 2010 to 35% in 2018.

<table>
<thead>
<tr>
<th>Year</th>
<th>Total seed Production (in billion)</th>
<th>Total shrimp production (in tons)</th>
<th>% of success</th>
</tr>
</thead>
<tbody>
<tr>
<td>2010</td>
<td>2.2</td>
<td>47,000</td>
<td>85</td>
</tr>
<tr>
<td>2011</td>
<td>4.5</td>
<td>83,000</td>
<td>74</td>
</tr>
<tr>
<td>2012</td>
<td>9.0</td>
<td>145,000</td>
<td>64</td>
</tr>
<tr>
<td>2013</td>
<td>18</td>
<td>247,000</td>
<td>55</td>
</tr>
<tr>
<td>2014</td>
<td>23</td>
<td>317,000</td>
<td>55</td>
</tr>
<tr>
<td>2015</td>
<td>32</td>
<td>353,000</td>
<td>44</td>
</tr>
<tr>
<td>2016</td>
<td>38</td>
<td>380,000</td>
<td>40</td>
</tr>
<tr>
<td>2017</td>
<td>60</td>
<td>650,000</td>
<td>40</td>
</tr>
<tr>
<td>2018</td>
<td>65</td>
<td>540,000</td>
<td>35</td>
</tr>
</tbody>
</table>

Moreover, the major culture issues in 2018/2019 have been a lower post-larvae survival rate, slower growth, higher FCR, water problems (e.g. algal blooms), disease (white gut, EHP), and body deformities (e.g. bamboo shrimp syndrome). The blame game then started: (i) seed quality; (ii) feed quality; (iii) quality of probiotics and health products; (iv) farm management (biosecurity); and (v) inexperienced technicians.

Whatever the cause or causes, the unchecked expansion of *vannamei* farming is clearly a major factor. Looking at the area of Dumas (Gujarat) in 2009, there were about 45 shrimp culture ponds but by 2018, this figure had risen into the hundreds, affecting water quality significantly. A similar picture was seen in Olpad and Mandroi, where the pressure of the ponds even changed the course of the creek that ran through these areas. Fluctuating weather patterns and a higher water temperature did not help matters. In the final analysis, the main finding was that in all these, and other *vannamei* culture areas, the pond carrying capacity had been greatly exceeded. The higher the organic load, the higher the risk of disease.

### Table 2: Survival rate for farmed *P. vannamei* (40-50 pcs/kg) in India, 2010-2018

<table>
<thead>
<tr>
<th>Year</th>
<th>Total seed Production (in billion)</th>
<th>Total shrimp production (in tons)</th>
<th>% of success</th>
</tr>
</thead>
<tbody>
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<td>38</td>
<td>380,000</td>
<td>40</td>
</tr>
<tr>
<td>2017</td>
<td>60</td>
<td>650,000</td>
<td>40</td>
</tr>
<tr>
<td>2018</td>
<td>65</td>
<td>540,000</td>
<td>35</td>
</tr>
</tbody>
</table>

**Farming vannamei the monodon way?**

Before *vannamei* was brought into India, the shrimp farming sector had been geared up for *monodon* in terms of technology and farming practice; set up; infrastructure; and production capacity (seed, feed, medicines, processing facilities). However there are several important differences between the two species (Table 3).
Table 3: Comparisons between P monodon and P vannamei

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>P monodon</th>
<th>P vannamei</th>
</tr>
</thead>
<tbody>
<tr>
<td>Growth rate</td>
<td>Slow compared to vannamei, especially up to 20 grams.</td>
<td>This species grows as fast as monodon, up to 3g/week until they reach 20g. After that, they continue to grow, but at a slower rate.</td>
</tr>
<tr>
<td>Stocking density</td>
<td>High stocking densities may create problems that require tight control over pond management practices and high risk strategies.</td>
<td>Easier to culture with high densities, typically 60-150 (up to 700) pieces per sq metre than monodon.</td>
</tr>
<tr>
<td>Salinity tolerance</td>
<td>5 – 45 ppt (optimum 10 – 25).</td>
<td>0.5– 35 ppt (optimum 5-25 ppt).</td>
</tr>
<tr>
<td>Dietary protein requirements</td>
<td>Require high protein (36-42%). FCR is higher than vannamei.</td>
<td>Require lower protein (20 – 35%). FCR will be lower than monodon.</td>
</tr>
<tr>
<td>Disease resistance</td>
<td>Highly susceptible to various viruses. SPF/SPR/SPT varieties are not available in the market.</td>
<td>Highly susceptible to TSV. Carrier of IMNV and MSG, comparatively less susceptible to WSSV. SPF and SPR varieties against TSV are available in the market commercially. Survival rate is higher compared to monodon.</td>
</tr>
<tr>
<td>Domestication of broodstock</td>
<td>More difficult.</td>
<td>Gonad develops easily in capture conditions.</td>
</tr>
<tr>
<td>Larval rearing in hatchery</td>
<td>Lower survival rate.</td>
<td>Better survival rate.</td>
</tr>
<tr>
<td>Post-harvest</td>
<td>Handling, transportation, and processing is easier than vannamei but meat yield is lower (62%).</td>
<td>Degradation in quality if not handled properly. Meat yield is higher (66-68%) than monodon.</td>
</tr>
<tr>
<td>Marketing</td>
<td>Good for bigger sizes.</td>
<td>Good for smaller sizes.</td>
</tr>
<tr>
<td>Origin</td>
<td>Local species in Asia</td>
<td>Alien to Asia and importation may cause problems with import of new viruses and contamination of local stocks.</td>
</tr>
</tbody>
</table>

What are the possibilities in store for farmers of vannamei, considering that their previous farming experience and the infrastructure and services in the sector had been set up for monodon? In 2009, stocking density trials for vannamei were conducted by Mayank Aquaculture, sited in Gujarat state, which contributes only 10% of the country’s production, but with high standards of biosecurity. Reportedly, the outcomes of the experiments were very encouraging: a stocking density of 15-20 pcs per kg and harvest size of 20-30 counts/kg was considered to be the most profitable as well as sustainable. Following the trials, the company decided to embark on farming “vannamei the tiger way”. The results indicated that it was better to focus on one crop rather than to try to have two culture cycles due to (i) the higher profit margin accrued from allowing the shrimp to grow to bigger sizes and the resultant higher demand from niche markets; (ii) better carrying capacity of the pond; and (iii) less disease risk in the seed and nursery phase.

Proper feed management

Feed management, amounting to 55-65% of the cost of production, was identified as the paramount factor in the success of shrimp farming. In other words, wrong feeding practices (such as over-feeding) is the mother of all problems in shrimp ponds, and one should not feed vannamei the tiger way. An example of the kind of feeding management required for vannamei is shown below and in Table 4:

- Initial stocking: 100 000 PL
- Survival: 80% at the end of culture period
- No of shrimp harvested: 80 000
- Total feed during peak: 35 kg (ABW: 15-20 gms).
- Maximum number of feed pellets consumed by a single shrimp : 4-5
- Estimated total pellets required per feed: 320 000
- Pellets per kg of feed (grower/finisher): 70 000 (@ 70 pellets/g)
- Feed per meal: Maximum 5-6 kg
- Feeding frequency per day: six times

Table 4: Feeding amounts for vannamei

<table>
<thead>
<tr>
<th>Average Body Weight (g)</th>
<th>Daily feed (kg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.0</td>
<td>70</td>
</tr>
<tr>
<td>4.0</td>
<td>60</td>
</tr>
<tr>
<td>6.0</td>
<td>50</td>
</tr>
<tr>
<td>8.0</td>
<td>40</td>
</tr>
<tr>
<td>10.0</td>
<td>30</td>
</tr>
<tr>
<td>12.0</td>
<td>25</td>
</tr>
<tr>
<td>15.0</td>
<td>20</td>
</tr>
<tr>
<td>18.0</td>
<td>17</td>
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<tr>
<td>20.0</td>
<td>16</td>
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<tr>
<td>30.0</td>
<td>15</td>
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<tr>
<td>33.0</td>
<td>14</td>
</tr>
<tr>
<td>40.0</td>
<td>13</td>
</tr>
<tr>
<td>50.0</td>
<td>12</td>
</tr>
</tbody>
</table>
Reducing the organic load

Related to feed management and water quality, the carrying capacity of the pond is directly related to its organic load, and feed input is the major source of organic load followed by algal bloom. Uncontrolled or inefficient feeding regimes may lead to heavy accumulation of organic matter, inviting diseases especially *Vibrio*. Heavy algal blooms and bloom crashes further act as catalysts. Sludge removal to reduce the organic load in ponds works to an extent, as long as the sludge is properly disposed of such that it does not then contaminate the external water environment such as rivers from where water is taken and exchanged in the ponds.

Profitability

Another important consideration for shrimp farmers is the cost of production: trials demonstrated that as the shrimp became bigger (up to 20 pcs/kg), the Return on Investment (ROI) was more positive (Table 5). In general, the ROI should be at least 40% for the venture to be profitable.

Table 5: Comparison of cost of production in the 70 and 20 counts range

<table>
<thead>
<tr>
<th>Count (Pcs/Kg)</th>
<th>COP/Kg (INR)</th>
<th>ROI (%) 17-18</th>
</tr>
</thead>
<tbody>
<tr>
<td>70</td>
<td>200</td>
<td>20-15</td>
</tr>
<tr>
<td>60</td>
<td>210</td>
<td>19-14</td>
</tr>
<tr>
<td>50</td>
<td>230</td>
<td>30-8.5</td>
</tr>
<tr>
<td>40</td>
<td>250</td>
<td>52-12</td>
</tr>
<tr>
<td>30</td>
<td>260</td>
<td>92-35</td>
</tr>
<tr>
<td>25</td>
<td>280</td>
<td>107-60</td>
</tr>
<tr>
<td>20</td>
<td>300</td>
<td>127-85</td>
</tr>
</tbody>
</table>

Note: Red indicates a negative ROI, green reflects a positive outcome.

Summary

With the know-how, *vannamei* as a species culture has definite growth and tolerance advantages over *monodon*. Apart from seed and feed quality, it is important that the organic load, stocking density, salinity, and water temperature are not too high. The health of the shrimp is also directly related to the source of water. *Monodon* culture will continue, but this will very likely take place in new areas and ponds, in addition to *vannamei* ponds.

Some take-away points are:

- The present top two shrimp producing countries in the world - India and Ecuador - are practicing low stocking densities of less than 30 pcs/square metre;
- Don’t get carried away with the success, keep faith in sustainable shrimp farming practices;
- Intensification and sustainability don’t go together;
- Learn from others’ failures, don’t repeat the same mistakes;
- Science and technology alone cannot grow shrimp, don’t underestimate the support from mother nature/ the environment;
- Always maintain optimal carrying capacity.

Vannamei of 19/20 counts from Mayank shrimp pond

Dr Manoj M Sharma is Director of Mayank Aquaculture Private Limited, Surat, Gujarat State, India, since 2009. He is active in the Surat and Gujarat Aquaculture Farmers’ Association. He won the ‘Best Fish Farmer Award’ from the Central Institute of Fisheries Education, Mumbai, in July 2015. Dr Sharma has an MSc in Fisheries Management from Central Institute of Fisheries Education (deemed University, ICAR), Mumbai, India, and a PhD in Fisheries Science (shrimp farming) from Swami Ramanand Teerth University, Nanded, Maharashtra, India.

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CONSERVING DECLINING STOCKS OF SCAD (GALUNGGONG) IN THE PHILIPPINES

By Bureau of Fisheries and Aquatic Resources (BFAR), Philippines

Galunggong or round scad is one of the most important fish species in the Philippines in terms of food security and livelihoods for thousands. Its declining production prompted the Bureau of Fisheries and Aquatic Fisheries (BFAR) to push for more science-based management measures in collaboration with major stakeholders. Accordingly, last January, BFAR convened the first ever National Galunggong Summit, out of which several resolutions were agreed upon. The BFAR is now working towards the formulation of a five-year National Management Plan for the fishery.

Introduction

Round scad (Decapterus spp.), known locally as galunggong is one of the staple sources of fish protein for Filipinos. A small pelagic species, it plays an important role in ensuring the ecological balance of the trophic system and serves as food for bigger fishes and marine mammals.

However, due to the high demand from the public as well as other contributory factors such as illegal, unreported, and unregulated (IUU) fishing, there is an observed consistent decrease in the production of galunggong from 2007 to 2017 (Table 1 & Figure 1).

Table 1: Production of round scad, 2007-2017

<table>
<thead>
<tr>
<th>Year</th>
<th>Volume (tonnes)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2007</td>
<td>244,671</td>
</tr>
<tr>
<td>2008</td>
<td>212,100</td>
</tr>
<tr>
<td>2009</td>
<td>171,628</td>
</tr>
<tr>
<td>2010</td>
<td>194,671</td>
</tr>
<tr>
<td>2011</td>
<td>172,499</td>
</tr>
<tr>
<td>2012</td>
<td>167,153</td>
</tr>
<tr>
<td>2013</td>
<td>200,393</td>
</tr>
<tr>
<td>2014</td>
<td>197,090</td>
</tr>
<tr>
<td>2015</td>
<td>164,443</td>
</tr>
<tr>
<td>2016</td>
<td>156,187</td>
</tr>
<tr>
<td>2017</td>
<td>126,533</td>
</tr>
</tbody>
</table>

The price of galunggong has soared over the years due to low production and ever increasing domestic demand. From being a “poor man’s” fish before, it has now become less affordable, especially for low-income earners. This situation has seriously jeopardised the country’s goal to achieve food security, as well as curtailed the livelihood and source of income of small-scale fisherfolk, commercial fishing operators and other stakeholders across the fisheries sector who largely benefit from catching galunggong in our major fishing grounds.
Current conservation measures

In order to address the challenge of decreasing galunggong stocks, the Department of Agriculture (DA), through the Bureau of Fisheries and Aquatic Fisheries (BFAR), has implemented mitigating and conservation measures to ensure its sufficient supply for the public nationwide.

Establishment of closed fishing seasons

One of the current measures implemented by the Bureau, in partnership with the Department of the Interior and Local Government (DILG), is the establishment of closed fishing seasons for small pelagics and galunggong in two of the country’s major fishing grounds.

DA-DILG JAO No. 2 (s. 2014) targets the conservation of small pelagics, which includes galunggong, in the Davao Gulf. This first took effect in 2014 and every year thereon, from June 1 to August 31. Those who are found guilty of fishing small pelagic fishes in the identified area within the Davao Gulf during the prescribed period are subject to imprisonment of six (6) months and one (1) day to six (6) years and/or fine of six thousand pesos (P6, 000.00), forfeiture of the catch and cancellation of the fishing permit or license.

As with DA-DILG JAO No. 1 (s. 2015), starting 2015, every year from November 1 to January 31, the fishing of galunggong off northeast Palawan in the Northern Sulu Sea is prohibited. Those who are found guilty of fishing small pelagic fishes in the identified area during the prescribed period are liable under Section 100 of the Republic Act 10654 of the Amended Philippine Fisheries Code.

Imports during low supply periods

Another measure taken by DA-BFAR is to import galunggong from neighbouring countries to fill the gap caused by the low production yield of the species during the closed fishing seasons. In September of 2018, the Philippines allowed the importation of 17 000 tonnes of galunggong to stabilise the supply of the fish in the local markets.

The First National Galunggong Summit

The conservation measures described above were not enough to cover all aspects in the conservation of galunggong. Hence, it was considered important to consult the industry and formulate science-based measures to ensure that the right policy and strategy yield positive results.

On January 24-25, 2019, DA-BFAR convened more than 600 stakeholders from different sectors in the first ever National Galunggong Summit to present the status of the fishery in the country. During the Summit, the Bureau called for commitments and action towards the science-based sustainable management of galunggong. The Summit arrived at four major resolution topics specified below:

Science and action research for science-based management

To carry out the research necessary in order to understand science-based management of galunggong, the stakeholders called upon:
• BFAR, the Department of Science and Technology (DOST), Local Government Units (LGUs), National Fisheries Research and Development Institute (NFRDI), academia, fishing sectors (both municipal and commercial), and the law enforcement agencies to improve *galunggong* production by protecting their habitats and spawning grounds, ensuring the critical water quality requirements, and reducing disruptions to their life cycle by providing updated information on their spawning location and biomass distribution;

• BFAR, NFRDI, academia, fishing sectors (both municipal and commercial), civil service organisations, and Fisheries and Aquatic Resource Management Councils (FARMCs) to push for targeted action research for the gathering and collection of relevant and necessary information to support the implementation of management measures including, but not limited to, closed seasons;

• BFAR, DOST, Southeast Asian Fisheries Development Center (SEAFDEC), NFRDI, and academia to explore viable technology for the stock enhancement or culture of *galunggong*;

• The Department of Agriculture to support fishery-related research by providing the necessary funds for its implementation and fruition.

**Sustainable galunggong production**

For the sustainable management of *galunggong* production, the stakeholders resolved the following measures:

• The stakeholders urge the BFAR, LGUs, and other concerned agencies to review and assess the on-going closed fishing season, and implement adaptive measures accordingly;

• They called upon the Science Advisory Group (SAG) and the NFRDI to facilitate assessments on catch and effort in various zones, including depths and distance from shorelines of fishing grounds, and the Congress to make the immediate necessary amendments of applicable laws thereafter;

• The rationalising of catch or capacity limits among subsectors within management areas was urged, in consultation with the stakeholders;

• The stakeholders also called upon all concerned government agencies and the private sector to provide appropriate livelihood programmes for the fisherfolk, particularly easy access to loans, alternative livelihoods, training, and capacity building.

**Supply, post-harvest and marketing of galunggong**

The Summit stakeholders also resolved the following measures to ensure the management of supply, post-harvest and marketing of *galunggong*:

• They called upon BFAR to review the existing import requirements and to allow the fish importation by all legitimate fish importers under FAO 259 series of 2018;

• They urged BFAR to regulate traders and middlemen;

• The government was asked to commit to the reduction of post-harvest losses through capacity building, provision/acquisition of postharvest facilities and operationalisation of three existing ones; and improvement of handling practices to ensure food safety and quality;

• The stakeholders also called for the government to set suggested retail prices (SRP) for frozen imported fish, backed-up with close monitoring, inspection and law enforcement.

**Governance and policy**

With regard to the governance and policy for the management of *galunggong* production, the stakeholders arrived at the following resolutions:

• The stakeholders urged the government to strengthen or intensify fishery law enforcement pertaining especially to the top three concerns (poaching, fine-mesh usage, and catching of juvenile species), and net violations relative to *galunggong*, and providing additional resources where necessary;

• They asked for the implementation of immediate and long-term regular research and studies in cooperation with universities, business/private sector as well as communities on identified areas in order to inform policy formulation and for public dissemination; and the addition of scientists at the BFAR field offices in the long-term;

• Also, they agreed on adopting conservation measures based on scientific research (e.g. seasonal closures in all *galunggong* fishing grounds), marine protected areas and sanctuaries, regulating fishing effort and gear, enhancing governance mechanisms including the role of FARMCs, as well as review of existing policies research,
to make management of the fishery more responsive to
the changing conditions in line with available scientific
information;
• The stakeholders also called for intensified monitoring
of imported galunggong across the value chain and
enforcement measures such as market denial to be taken
when needed, to balance the importation of galunggong
with export of high value species from the Philippines,
to spread the benefits by considering regionalised and
local approaches to avoid monopolies, and the allocation
of importation tariffs (if applicable) for the benefit of
affected galunggong municipal fishers.

What lies ahead?
After the successful conduct of the first ever National
Galunggong Summit, the Bureau is moving towards
the establishment of a five-year science-based National
Management Plan for the species. This Plan will eventually
address the major problems and issues related to galunggong
in the medium and long term basis, translating to food
security for Filipinos. ☞

The Bureau of Fisheries and Aquatic Resources (BFAR) is an agency of the Philippine government under the Department of Agriculture responsible
for the development, improvement, law enforcement, management and conservation of the Philippines’ fisheries and aquatic resources.
Water purification system wins Innovation Award

Benchmark has won the AquaNor Innovation Award 2019 for CleanTreat, a new water purification system that removes medicines from wellboat delivered bath treatment water before releasing the purified water back into the sea. According to the company, the system is the first of its kind to be used in aquaculture, and trials with sea lice medicinal treatment have proven its efficacy.

CleanTreat also filters and removes the organic material from the treatment water including sea lice, egg strings, fish scales and faecal matter, an essential step in combating parasitic resistance to medicines. The system therefore reduces the environmental impact of chemical based bath treatments and to date, the system has purified more than 300 000m³ of treatment water.

Thermal labels to determine fish freshness

Researchers from US company Cryotech, together with scientists from the Tomsk State University (TSU) Laboratory of Organic Synthesis (TSU), have developed thermo-active labels which change colour during the transportation of frozen fish. The labels are frozen along with the product, and if the temperature is higher than the permissible -18°C, then the label irreversibly changes colour from white to green. This means that even slight defrosting can be detected.

In contrast with other similar products out there, the TSU labels can be self-activating or not, depending on what the transporters prefer. A spokesman said that fish harvested in the Far East go through a difficult transportation route by road or rail, stored in different storage facilities. It is therefore difficult to find where and when the fish spoiled due to defrosting. An interesting fact is that this is the first project supported by the pioneer University Venture Fund in the Russian Federation. The Fund invests not only in universities but also regional startups.

Wild.Skinny.Clean

A new product line called Wild.Skinny. Clean. offers plant-based seafood items to consumers in the US. The Van Cleve Seafood Co. says the items were formulated as part of the current functional food trends where consumers seek to heal themselves with food, not drugs.

Its vegan crabcake and vegan shrimp (“made from Superfoods, not soy,” as part of the company’s mission to create “Food as Medicine”) are seeing rapid sales. The whole range is claimed to be low in calories and unhealthy fats, and can be prepared in under 15 minutes.

Bacteriophages reduce the need for antibiotics

In a bid to reduce the use of antibiotics in aquaculture, a Scottish company called Fixed Phage uses bacteriophages, a natural virus that combats specific bacteria. Bacteriophages are highly host specific, and a phage attacks only particular bacterial species or only certain strains within the species. Feeds coated with these active, specific phages have been shown to sustainably produce...
significantly improved outcomes. Examples include Early Mortality Syndrome in shrimps and flavobacterial infections in salmonids.

**Assessment of health from slime**

The most important barrier against any disease in any animal is the physical skin barrier. Mucosal Mapping (TM), produced by Quantidoc (Norway), documents slime cell responses, enabling health forecasts. The objective and comparable data produced links immunity with diet, environment and handling and enables customers to improve operations by preventing and handling diseases in a proactive way. Mucosal Mapping is currently available for 4 different tissues, based on documented protocols e.g. for salmon and trout: gills, skin (on several locations), fore gut, and hind gut.

**Natural trap for lice**

Another company involved in enhancing the health of fish is Blue Lice (Norway), which has come up with a way to prevent lice infestation in salmon. Taking advantage of the knowledge that lice in the larval stage use light detection and the smell of salmon mucus to aid them in their search to find a host, the company has produced traps which attract and catch the larvae before they attach themselves to the salmon. This reduces the number of infestations without harming the environment.

**Blue innovation event sees many interesting developments**

A side event “Blue innovation: emerging technologies and trends in fishery sustainability” was held alongside the International Symposium on Fisheries Sustainability organised by the FAO in November 2019. This was in line with the FAO’s Blue Growth Initiative launched in 2013, which seeks to balance the economic, environmental and social development connected to all policies related to the management of these aquatic resources and the communities that depend on them for their food and nutrition security and livelihoods.

As reported by the FAO, presentations included sustainable “Blue Fashion”, the medical use of fish skin, products made from recycled marine debris such as sneakers or sunglasses, bioplastics, creative uses of algae in clothing, healthcare products, cosmetic products, and biodegradable water pods, as well as the use of cutting-edge technologies like drones and Artificial Intelligence to ensure that the fish we eat is legally caught and that fishing vessels are adhering to laws and regulations.

A University of Sussex graduate Lucy Hughes used fish waste to create MarinaTex, a compostable alternative to single-use plastic that has won her this year’s UK James Dyson Award.

**Prawn health test check**

The new test uses CSIRO’s Shrimp MultiPath technology, commercialised by Brisbane based start-up company GENICS, which spun-out of CSIRO to tackle the global challenge of food security and quality. It comes as the domestic prawn farming industry recovers from losses from pathogens over the last three years.

The technology can detect 13 commercially significant prawn diseases, including WSSV, which wiped out many prawn populations in 2016, and IHHNV. Improved management of IHHNV using Shrimp MultiPath technology increased production by 3.7 tonnes per hectare, or AS$67 000 farm gate value. Consequently, a 50-hectare Australian prawn farm could see their revenues increase by more than AS$3 million per season.
Smart fish feed technology

Umitron, an aquaculture technology startup in Japan and Singapore, offers data platforms using IoT, satellite remote sensing and AI. The company recently announced the development of the Fish Appetite Index (FAI), the world’s first real-time ocean-based fish appetite detection system, which extracts relevant data from video streams that can then be used to accurately quantify fish appetite. When used together with its smart fish feeder, Umitron Cell, the feed time intervals and amounts can be automatically adjusted with minimal human interference. The Cell holds 400 kg of feed and includes a solar-power management system, onboard computer, weight sensors, dispensing motor and a camera for observing fish 24 hours a day.

Farm operators can utilise FAI to fine-tune their feeding schedules, ensuring fish are always satiated. This is easily done via their smartphones with the UMITRON app, where they can check and remotely adjust feed settings based on the FAI feedback. The company says that it is looking for partners interested in using FAI for species such as Atlantic salmon, rainbow trout, European sea bass, and gilthead sea bream.

First FDA-approved fish oil drug

On 13th December 2019, the U.S. Food and Drug Administration (FDA) approved the use of Vascepa (icosapent ethyl) capsules to reduce cardiovascular risk among patients with elevated triglyceride levels (150 milligrams per decilitre or higher), as an add-on to statin therapy. Vascepa, whose active ingredient is the omega-3 fatty acid, eicosapentaenoic acid, derived from fish oil, is the first drug approved by FDA for this purpose. John Sharretts, M.D., acting deputy director of the Division of Metabolism and Endocrinology Products in the FDA’s Center for Drug Evaluation and Research, said that the approval “will give patients with elevated triglycerides and other important risk factors, including heart disease, stroke and diabetes, an adjunctive treatment option that can help decrease their risk of cardiovascular events.”

However, in clinical trials, Vascepa was associated with an increased risk of atrial fibrillation and bleeding events, the latter being higher among patients who were also taking other medications that increase the risk of bleeding, such as aspirin, clopidogrel or warfarin at the same time.
Pioneer fish canning technology

The Tunascan is marketed as the first scanner in the world that automatically classifies fish by species, sizes and quality. It can classify 10 – 50 tonnes per hour, equivalent to 400 tonnes in an 8-hour shift. As the 3D processing and classification by size and weight in specific containers is automated, human error is eliminated and work hazards are reduced.

Once scanned, the line distributes and packs tight the pieces in specific containers according to the client’s criteria. All data generated is sent to the company’s ERP in real-time recording. Efficacy in determining the species of tuna, and the weight is close to 100%.

The Tunascan is sold in 2 models: Tunascan V1 for sizes under 10 kg, with production of up to 50 tonnes /hour and Tunascan V2 for sizes between 10 and 60 kg.

Manufacturer: Hermasa (https://hermasa.com)

The FleXicut series in fillet processing

A range of equipment for precision trimming, sorting and cutting of fish fillets is available on the market, such as the FleXicut Salmon. This piece of equipment ensures maximum yield by using x-ray scans and adjusting the water-jet cutting angle according to the precise location of the bones, using both water-jet cutters and knives to portion the salmon.

The manufacturer says that FleXicut locates the pinbones to an accuracy of 0.2mm, as well as evaluates the weight of each fillet at a throughput rate of up to 50 fillets per minute. The Innova software enables operators to remotely control FleXicut, monitor the production in real time, and report on actual performance. The data produced can be viewed in detail via dashboards, allowing operations to be refined quickly and effectively. In addition, a new ‘FleXicut patterns’ app which remotely links to the FleXicut machine is now available in the App Store as well as Google Play.

Manufacturer: Marel (https://marel.com)

High pressure processing technology for seafoods

High pressure processing (HPP) is marketed as the most natural alternative for processing of a wide range of food products. Its advantages are said to be lower production costs as meat is easily extracted, yield is increased, greater food safety and shelf life extension, and no impact on sensorial and nutritional properties of the fresh product.

Using HPP, meat of crustaceans such as lobsters or king crabs will contract and detach from the shell, facilitating extraction with yields of almost 100%. The process also enables operators to work on smaller parts such as the legs or antennae of the
crustacean where meat is most difficult to obtain. As there is no need for cooking, the process enables the meat to retain its natural flavours.

Oysters, clams, mussels, crabs, shrimp, cod, hake, and RTE seafood meals, are other examples of products that are currently being processed with HPP. For example, for molluscs, HPP processors ranging from 200-350MPa denaturise proteins from the adductor muscle, causing the oyster to remain open and exposing the meat for easy extraction. This application avoids the handling of molluscs, which is a source of contamination, and a potentially dangerous knife manipulation while opening the shells.

Manufacturer: Hiperbaric USA (https://www.hiperbaric.com)

Drone for monitoring tuna stocks

An unmanned drone for detection of free schools of tuna is on the market. Both solar and battery powered, with an 18 nautical mile range and travelling speed of 35 knots, the drone is able to relay real-time high definition images with encrypted communications for security. It weighs 4 kg and has a wing span of less than one metre.

Manufacturer: Marine Instruments S.A., Spain (www.marineinstruments.es)

Monitoring sea lice populations

In order to get an overview of sea lice levels, manual counting is carried out. This is labour-intensive and only collects limited amounts of data. SpectraLice is a fully automatic sea lice counter developed for continuous counting and classification of sea lice on farmed salmon without involving handling. It provides farmers with better tools for decision-making on how to prevent sea lice and when to delouse the salmon.

The SpectraLice technology is based on hyperspectral sensors, which record not only red, green and blue – as limited by the human eye and a standard camera – but all colours in the visible light region. With the hyperspectral image of the salmon, it is possible to analyse the colour signature of each pixel, identifying sea lice based on their unique colour signatures.

Manufacturer: Ecotone, Norway (info@ecotone.com)
PACIFIC HANDBOOK FOR GENDER EQUITY AND SOCIAL INCLUSION IN COASTAL FISHERIES AND AQUACULTURE

Published by the Pacific Community, 2019.

This handbook is designed to give practical guidance on improving gender and social inclusion in coastal fisheries and aquaculture for staff working in fisheries agencies in Pacific Island countries and territories. It focuses on the responsibilities of Pacific Island governments to help promote sustainable development outcomes for all people relying on coastal fisheries and aquaculture for their livelihoods.

The modules are structured around the tasks involved in government work on coastal fisheries and aquaculture, that is, the planning and implementation of projects and programmes, including social analysis, monitoring and evaluation, policy development, community engagement, fisheries management, and livelihood projects.

The handbook can be downloaded at no cost from the Pacific Community website.

STEP-WISE GUIDE FOR THE IMPLEMENTATION OF INTERNATIONAL LEGAL AND POLICY INSTRUMENTS RELATED TO DEEP-SEA FISHERIES AND BIODIVERSITY CONSERVATION IN THE AREAS BEYOND NATIONAL JURISDICTION

By Harrison, J., Lobach, T., Morgera, E., Diz, D., Kuemlangan, B., Manoa, P. and Hamley, G. 2019. Published by the Food and Agriculture Organization and UN Environment, Global Environment Facility.

This step-wise guide aims to assist with the implementation of relevant international instruments pertaining to deep-sea fisheries and biodiversity conservation in areas beyond national jurisdiction, especially the high seas, into national policy and law.

It focuses on the incorporation and transposition of international rules, standards, and recommended practices and procedures into national policy and law. It addresses the key measures for making international obligations effective at the national level and suggests possible options for integrating those measures into the national legal framework. Legislative examples are also provided to illustrate how certain provisions have been incorporated into primary or secondary legislation.

The guide first addresses the establishment of a national policy, followed by a description and analysis of essential legislative provisions regarding deep-sea fisheries and the conservation of marine biological diversity in areas beyond national jurisdiction. This guide is thus relevant to policy-makers, parliamentary draft persons, and parliamentarians.

The guide can be downloaded at no cost from the FAO website.
A NEW ERA FOR MIDDLE EAST AQUACULTURE
Published by IntraFish, 2019

The latest IntraFish Business Intelligence report, “A new era for Middle East aquaculture,” offers a comprehensive overview of the revitalized and promising aquaculture industry taking root in the Middle East.

This report includes:

• A comprehensive country-by-country breakdown, including species raised, government growth initiatives, current production levels, farming systems used, and more.
• Dozens of charts analyzing aquaculture trends, production volumes and prices in the region.
• In-depth look at the major species now being farmed in the Middle East, including tilapia, seabass, seabream, shrimp and more.
• A collection of the most recent and insightful IntraFish articles covering the newest aquaculture developments in the region.
• Detailed profiles of dozens of leading aquaculture companies in the Middle East, including their growth plans.
• Insight into potential investment opportunities in a sector that is poised to grow substantially in the coming years.

This report is available for purchase from IntraFish (info@intrafish.com)

DECISION-MAKING AND ECONOMICS OF ADAPTATION TO CLIMATE CHANGE IN THE FISHERIES AND AQUACULTURE SECTOR

This publication reviews available information on the costs and benefits of climate change adaptation in the fisheries and aquaculture sector, highlights the challenges in applying conventional appraisal and decision support tools to adaptation and reviews emerging frameworks (including low-regret actions, addressing potential lock-in, and early planning for long-term adaptation) as well as economic tools to appraise adaptation options in fisheries and aquaculture.

The publication can be downloaded at no cost from the FAO website.
The FISH INFO-Netowrk (FIN) consists of seven independent partners who cover all aspects of post-harvest fisheries and aquaculture. Fifty national governments have signed international agreements with the different FIN services and are using the expertise of these services to develop the fishery sector worldwide.

The FIN pages are a regular feature in the four network magazines:
- INFOFISH International
- INFOPESCA Internacional
- EUROFISH Magazine
- INFOSAMAK Magazine

They present the FIN-wide spectrum of activities, showing actions and results.

The FIN has more than 70 full-time staff and works with more than one hundred international experts in all fields of fisheries. Through its link from FAO GLOBEFISH to the FAO Fisheries Department, it also has access to the latest information and knowledge on fisheries policy and management issues worldwide.

The execution of multilateral and bilateral projects is one of the main activities of the network. It is also widely known for its range of publications and periodicals as well as for the organisation of international conferences, workshops and training seminars. All eight services offer different possibilities for cooperation with the private sector, institutes, government offices and donors.

For more information on the FISH INFONetwork visit the website www.fishinfonet.org.

FAO symposium explores ways to increase fisheries sustainability

The world needs a new vision for fisheries in the 21st century, said Qu Dongyu, FAO Director General in his speech at the opening of the International Symposium on Fisheries Sustainability. The projected increase in global population to 10bn by 2050 will call for greater aquatic food production, he said, but without jeopardising the health of oceans and rivers, and while improving the social conditions of those dependent on fisheries, who are often the poorest in society. Although millions depend on fisheries for food and livelihoods the state of the world’s oceans is one of grave concern from the impacts of plastic pollution, climate change, overfishing and habitat degradation. Globally over one in ten people depend on fisheries to make a living and to feed their families, while one in three marine fish stocks is overfished. These challenges are not evenly distributed, however. In developed parts of the world stocks are being rebuilt, fisheries are becoming more sustainable and the conditions of those employed in the sector are improving, but progress in developing regions is slower. We need to reverse this trend if we are to achieve the Sustainable Development Goals, urged Dr Qu.

EVENTS

CACFish workshop on market access addresses multiple issues

On 12 and 13 November 2019 FAO and CACFish, the Central Asian and Caucasus Regional Fisheries and Aquaculture Commission, together with EUROFISH, the International Organisation for the Development of Fisheries and Aquaculture in Europe, and the Ministry of Agriculture and Forestry of Turkey organised a capacity-building workshop in Istanbul, Turkey, for government officials and industry representatives from Central Asian and Caucasian countries. The workshop, which focused on the areas of food safety, processing, markets, and trade, was opened by Dr Altug Atalay, Turkish Director-General for Fisheries and Aquaculture, Ministry of Agriculture and Forestry, and Viorel Gutu, Subregional Coordinator for Central Asia and FAO Representative for Turkey and Uzbekistan, along with EUROFISH Director Aina Afanasjeva. The purpose of the workshop was to better enable the region’s governments to assist their industry in gaining access to international markets, creating jobs and to raise national income through trade in fisheries and aquaculture products. The workshop addressed issues faced by fish processors and traders in developing countries and economies in transition arising from the increasingly complex fish value chains that include countless import regulations, international standards, and certification schemes. Experts from FAO and its sub-regional office, the Norwegian Ministry of Trade, Industry and Fisheries, EUROFISH, UNCTAD, and the Ministry of Agriculture and Forestry of Turkey, among others, spoke on market access and trade-related issues, implementation of traceability and labelling requirements, the impact of climate change on fisheries and aquaculture, HACCP, and other topics. Representatives from Turkey, Georgia, Kazakhstan, Kirgizstan, Tajikistan, and Uzbekistan described the fisheries and aquaculture sector in their respective countries, its strengths and weaknesses along with opportunities for improvement. A field visit to the processing company Sagdiclar rounded off the workshop with practical insights into good hygiene practices. Presentations and workshop images are available at http://cacfish.eurofish.dk/
2020

JANUARY

29-30
Aqua Expo
Santa Elena, Peru
http://aquaexposantaelena.cna-ecuador.com/

FEBRUARY

7-9
India International Seafood Show (IISS)
Kochi, India
http://www.indianseafoodexpo.com/

9-11
FISH INTERNATIONAL
Bremen, Germany
https://fishinternational.de/en/

9-12
Aquaculture America
Hawaii, USA
www.marevent.com/AA2020_HONOLULU.html

19-20
Seafood Show Osaka
Osaka, Japan
http://www.exhibitiontech.com/seafood_osaka/

19-20
Aquafarm
Venice Area, Italy
www.aquafarm.show/en/

27-29
AQUAEX INDIA
Hyderabad, India
www.aquaexindia.com

MARCH

6-8
Aqua Fisch
Friedrichshafen, Germany
https://www.aqua-fisch.info/

15-17
Seafood Expo North America
Boston, USA
https://www.seafoodexpo.com/north-america/

20-24
VICTAM and Animal Health & Nutrition Asia
Bangkok, Thailand

25-27
VIETSHRIMP AQUACULTURE INTERNATIONAL FAIR 2020
Can Tho, Vietnam
https://vietshrimp.net

APRIL

7-9
Aquaculture Asia
Melaka, Malaysia
www.aquafisheriesexpo.com

13-15
Aqua Pro Expo
Moscow, Russia
http://aquaproexpo.ru/

21-23
Seafood Global Expo
Brussels, Belgium
https://www.seafoodexpo.com/global/

MAY

19-21
Aquaculture UK
Aviemore, Scotland
https://aquacultureuk.com/

27-29
INFOFISH WORLD TUNA TRADE CONFERENCE & EXHIBITION (TUNA 2020)
Bangkok, Thailand
http://tuna.infofish.org/

JUNE

8-12
World Aquaculture 2020
Singapore
http://www.marevent.com

JULY

8-10
Indo Fisheries
Jakarta, Indonesia
https://www.indofisheries.id/

AUGUST

21-23
China International (Guangzhou) Fishery and Seafood Expo
Guangzhou, China
http://www.chinafishex.com/index.asp

26-28
VIETFISH
Ho Chi Minh, Vietnam

26-28
World Seafood Shanghai (SIFSE)
Shanghai, China

SEPTEMBER

1-3
Seafood Expo Asia
Hong Kong, China
https://www.seafoodexpo.com/asia/

21-23
Seafood Expo Russia
Saint Petersburg, Russia
https://seafoodexporrussia.com/en/

23-25
International Indonesia Seafood & Meat Expo
Jakarta, Indonesia
https://iism-expo.com/

30 Sept - 2 Oct
Japan International Seafood & Technology Expo
Tokyo, Japan
https://seafood-show.com/japan/
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