

#### Asia-Pacific Economic Cooperation

# APEC Women in Ocean Science Report

### **APEC Ocean and Fisheries Working Group**



OFWG 06 2021A PROMOTING WOMEN'S ROLE IN OCEAN SCIENCE TOWARDS SUSTAINABLE AND INCLUSIVE OCEAN GOVERNANCE

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APEC	Asia Pacific Economic Cooperation
BRIN	Badan Riset dan Inovasi Nasional/ National
	Research and Innovation Agency (Indonesia)
GMU	George Mason University (The United States)
IMARPE	Instituto del Mar del Perú/ Peruvian Marine
	Research Institute (Peru)
MONRE	Ministry of Natural Resources and Environment
	(Viet Nam)
NSYSU	National Sun Yat-sen University (Chinese Taipei)
NTU	National Taiwan University (Chinese Taipei)
OAC	Ocean Affairs Council (Chinese Taipei)
OECD	Organisation for Economic Cooperation and
	Development
OFWG	Ocean and Fisheries Working Group
SOIC	Ship and Ocean Industries R&D Center
	(Chinese Taipei)
UN	United Nations
UNDP	United Nations Development Programme
UNESCO	United Nations Educational, Scientific, and
	Cultural Organization

# BACKGROUND

With the notions of "Decade of Ocean Science for Sustainable Development" and "Sustainable Development Goals" declared by the United Nations, a consensus is emerging that oceans should be managed sustainably based on the best available science. The role that ocean science plays in the blue economy has yet to be fully proven but is undoubtedly significant; however, it is undeniable that discoveries in ocean science affect nearly all sectors of the economy, and drive its growth with what prosperity depends upon.

As the international community's commitment to valuing women's contributions has resulted in growing participation in ocean science, glass ceilings remain, preventing women from proactively engaging in the field. According to the UNESCO Global Ocean Science Report in 2020, women are still under-represented and only account for 39% of researchers in ocean science, particularly in the highly technical categories. The situation has directly limited female participation in the application of technological innovation in the field of entrepreneurship and economic development. Around 38% of Small and Medium-sized Enterprises in the APEC region are owned by women, and in 40% of APEC economies, early-stage entrepreneurial activities conducted by females account for half or less than their male counterparts.

This project, the APEC OFWG 06 2021A "Promoting Women's Role in Ocean Science towards Sustainable and Inclusive Ocean Governance," intends to identify the barriers which prevent the increase in the number of women in ocean science and related industries and to recommend incentives and best practices that have been developed in this area to promote the attraction, retention, and development of women in these sectors. **Research** and a **Workshop** exploring the status and benefits of women's participation in ocean science and industries in the APEC region have been conducted, and the Research results were presented at the Workshop and in this Report, serving as one of the major references for APEC members towards a more inclusive and equal APEC region for the entire gender spectrum.



## APEC WOMEN IN OCEAN SCIENCE RESEARCH

In recent years, there has been a growing recognition of women's rights and the importance of gender equality. Despite this progress, it is clear that women's full potential and contributions continue to be undervalued. According to UN Women, the gender gap results in a 15% loss of GDP for the OECD.

In particular, the underrepresentation of women in the field of ocean science must be addressed. In line with the APEC 2022 theme

### "Open. Connect. Balance."

and echoing the 2023 theme

### "Creating a Resilient and Sustainable Future for All"

and aligned with the United Nations Sustainable Development Goals, this research, including the **questionnaire** and **interviews**, aims to disclose gender differences and perceptions of women's careers in ocean science, and ultimately combine Workshop conclusions to propose feasible solutions and policy recommendations.

### STATISTICS

A questionnaire was distributed worldwide to ocean science experts, and a total of 132 responses were received, with the majority of responses originating from the APEC region.



Of the respondents, over 93% were female, the majority of whom are aged between 25 to 54 years old, with more than three-quarters of them having children. The vast majority of respondents hold some certificates of tertiary qualification.

The respondent base is comprised of a large group of adult women who are likely to have working experience and childcare responsibilities, providing valuable insights into the career situations of women in APEC.



54 YEARS OLD

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of organizations have significantly fewer female employees than male employees.



of respondents reported women facing more barriers to career progression in the field of ocean science than men.

### Barriers to Career Progression of Female Respondents



## **TYPES OF BARRIERS**

In these situations, the female respondents also identified negative factors impacting their career development. Female respondents identified family demands and limited training or mentoring as having the most negative impacts on their career development in ocean science.

Adverse impacts from childcare and family demands include taking time off to raise children, work interruptions, difficulty balancing work and childcare, being unable to travel for business, and opposition from family to working in specific roles or having front-line work. Due to women being underrepresented in the field of ocean science, their training and mentoring needs are often overlooked, making it more difficult for women to succeed in the field than for men. This perpetuates a cycle in which women are less likely to remain in the field, further contributing to their underrepresentation.

Additionally, a lack of job sharing opportunities and inherent gender bias were identified as the second and third negative factors affecting career advancement for women in this field.



### NON-INCLUSIVE SITUATION

The situation for inclusivity in ocean science may be challenging, as discrimination still occurs, with over half (27.3% having observed it and 25% having experienced it) of respondents reporting related situations.



of respondents believed that reporting non-inclusive behavior would harm their careers.



of respondents felt that organizations do not take such complaints seriously and address them effectively.

This reflects a lack of trust in the organizations and highlights the need for the field of ocean science to improve inclusivity and efforts.

## **INTERVIEWS**

The situations mentioned above from the questionnaire were also confirmed in the interviews.

Ocean stakeholders play a crucial role in the ocean science community, as they contribute to the creation, sharing, and application of ocean knowledge.

Therefore, their experience and suggestions will be very helpful in understanding gender issues in the field of ocean science. Six semi-structured expert interviews were conducted.

The interviewees are from Indonesia, Peru, Chinese Taipei and the United States, and have held influential positions in the fields of science, business, management, policy, and research within ocean science.



# CHINESE TAIPEI

Despite improvements in gender equity in Chinese Taipei, prejudice and gender stereotypes persist in the field of ocean science. For example, women may face discrimination or assumptions about their abilities based on their gender.



"In ocean science and other fields with large gender gaps, women often face preconceived distrust, even though it's not a personal problem."

> – Dr. Shiau-Yun Lu, Associate Professor, NSYSU

This bias can be so pervasive that female researchers and practitioners must work harder than their male counterparts to achieve the same level of success, whether that level is measured in research output, positions, funding, or other factors. Women who are mothers in ocean science also face additional gender-based difficulties.

"When men saw that I am a woman and a mother, they would often be confused about my role. Despite being a doctor of engineering like they are, women are often labeled as responsible for taking care of children."

– Dr. Wen-Ling Hong, Deputy Minister, OAC

Other difficulties such as the inconvenience of caring for children while working, as well as a lack of supportive childcare



environments and equipment such as breastfeeding rooms and nursery rooms. These factors contribute to why families or women themselves may not support or feel comfortable pursuing a career in ocean science, resulting in a lower number of female participants in the field.

### "I rely on my cross-field expertise, communication skills, and most importantly, empathy, to demonstrate my suitability for my management position."



However, there are more and more women majoring in ocean science, in this case, women should participate in more than one-third of the organizations or committees. Of course, men's representation should not be lower than one-third either; more balanced representation would lead to more normal interactions and discussions on policies.

- Ms. Iven Lo, Head of the Yacht & Marine Department, SOIC

Organizations should expand support to include both men and women and work towards breaking down societal mistrust of female researchers in order to create more equal opportunities and fair treatment.

We should also assign a larger number of important positions to women, accustoming more people to working with women and having female supervisors, and providing gender equality education and training within organizations. This can help executives to become more aware of gender biases and promote the participation and value of women in the field.

With the efforts of policy and actions, the alternation of generations will gradually equalize the genders and create a more inclusive environment.

# INDONESIA

There are many talented women working in ocean science in Indonesia. In recent years, the BRIN established a new national marine research laboratory, and almost all of the technical and advisory teams during the construction period were comprised of women. The new building is designed to be inclusive and user-friendly, with various facilities including a dedicated section for women.



Despite an increasing number of women pursuing ocean science studies and careers, the underrepresentation of women in the field persists.

"When we had to select the new directors, I realized that there were no women candidates on the list. That's concerning."

> – Dr. Intan Suci Nurhati, Head of Research Center for Deep Sea, BRIN

In response to the underrepresentation of women in senior management positions, the "Srikandi Bahari" project collaborated with social scientists to conduct interviews with a group of female ocean scientists, including managers and those focused on pure science, to gain a deeper understanding of the issue.

This project discovered that many women are hesitant to pursue high-level executive positions because they often have to balance multiple responsibilities, such as family and work, which can be challenging to juggle.

### "We can identify our own privileges and utilize them to make a difference." – Dr. Intan Suci Nurhati, Head of Research Center for Deep Sea, BRIN

When people (women) face difficulties, we can take the initiative to effect change. One way we can do this is by identifying our own privileges and utilizing them to make a difference.

For instance, despite being petite and finding underwater work to be physically demanding, Dr. Nurhati began delegating tasks and identifying highly skilled technical personnel in her field. Similarly, when she observed the low representation of women in directorial roles at the ocean research institutes, she initiated the "Srikandi Bahari" project to address this issue.

Regarding the workplace, the work-from-anywhere policy is particularly advantageous for employees, especially mothers, who can balance their responsibilities at home and work through digital attendance.



In the past, government agency meetings were usually held in out-oftown hotels, which was inconvenient for female colleagues. Dr. Nurhati was impressed to see her female colleagues opting to commute back home and return the next day for multi-day meetings. However, since the organization has improved its meeting spaces, small meetings can now be held at any time within the organization, eliminating the need for long commutes.

# PERU

Female researchers in Peru still face challenges balancing work and family.

For instance, as both a female scientist and a mother, Dr. Sara Purca Cuicapusa had to allocate part of her research time for her family, and when she needed to travel for work, she had to rely on her mother to care for her children.

"I noticed that some of my colleagues chose not to have children in order to fully concentrate on their research."

> – Dr. Sara Purca Cuicapusa, Researcher, IMARPE

This shows that female researchers may face a dilemma where they have to balance family participation and work effectiveness. Despite these challenges, Dr. Cuicapusa noted that the current environment for women in the workplace in Peru has improved.

There are now nurseries and daycare facilities available within the organization. Additionally, with flexible working arrangements now available, researchers who have children can choose a work location that best suits their family needs.



Additionally, Dr. Cuicapusa felt that the field of ocean science should attract more students and encourage their involvement.

To further this goal, she decided to organize annual children's workshops after winning The L'oreal National Prize- UNESCO-CONCYTEC for Women in Science 2017. Through these workshops, she guides and inspires these "mini scientists" by providing them with a deeper understanding of her work. She not only wanted to attract more students to the field of ocean science but also believed that the field needs a higher representation of female scientists to bring in diverse perspectives.

It is essential to have a wellstructured mentorship program for women, with local women serving as mentors in different areas of Peru. In this way, they can truly understand the needs of newly-joined women in the field of ocean science and provide the necessary support and guidance.



# THE UNITED STATES

Dr. Jennifer L. Salerno shared an interesting observation that in the United States, ocean science has become a female-dominated field.

However, when it comes to higher positions such as professorships or laboratory leaders, the situation is quite different, with few women occupying these leadership roles.

"Unfortunately, there is income disparity in our field where women are not paid as much as men for the same positions."

> – Dr. Jennifer L. Salerno, Assistant Professor, GMU

This highlights that women in ocean science face various disadvantages, as the field often requires fieldwork, their capabilities are still biased against, and non-inclusive behaviors persist. Furthermore, women often perform the majority of child rearing and family care work.

"I think about how women dealing with being mothers and working in ocean science are things people would have not really talked about at all."

> – Dr. Jennifer L. Salerno, Assistant Professor, GMU

Hence, Dr. Salerno not only shared her specialization with her students but also aimed to help them understand her life as a working mother. She wanted female students to see that it is feasible to balance professional and family life while encouraging male students to learn how they can better support their partners.

Moreover, there were few female role models who were married and had children in the field. Therefore, she hopes to be a person whom female students can approach with confidence and discuss any obstacles that they may encounter. "In terms of encouraging representation, it starts young too, because a lot of young girls drop out of science and math early on. I think that's changing."



Fortunately, society has become more inclusive, particularly in the United States.

Governments and organizations now provide a variety of formal and informal support measures, including professional development training, mentoring programs, and group networks.  Dr. Jennifer L. Salerno, Assistant Professor, GMU

For instance, at Dr. Salerno's university, there is a women's science lunch series that discusses issues specific to women and hosts events on topics such as resumé building.

Further, there have been changes in the education system, with more institutions providing students with earlier exposure to research opportunities and allowing students to enter the field of ocean science directly. This allows women to engage in research early on and gain a better understanding of the field.

Also, peer-to-peer mentoring programs have been established, connecting female scientists of the same age through platforms and allowing them to rely on each other and navigate challenges together. These initiatives have become a way to increase the representation of women in ocean science.

# **RESEARCH DISCUSSION**

This research, based on a survey and interviews, highlights the situation of women in the field of ocean science, including factors that influence their engagement and progress at work, their perceptions of career advancement, and their career aspirations.

The study involved both quantitative and qualitative analysis of survey data, and several key findings derived from the analysis will be discussed.

# Women are under-represented in the field of ocean science.

The under-representation not only leads to a lack of understanding of women's situations by men in the field, but also makes it harder for women to find peers and mentors, creating a barrier for women entering the field of ocean science.

2

#### Women face more barriers than men as a minority in ocean science.

The barriers can stem from factors such as motherhood, family responsibilities, societal prejudice, limited mentorship, and lack of opportunities. Further exploration of these influencing factors will help in finding ways to enhance women's participation in ocean science.



Women tend to delay their career development due to pregnancy or family responsibilities.

Taking time off for pregnancy and childcare, work interruptions, and societal expectations for women to prioritize childcare hinder women's participation in ocean science and contribute to their underrepresentation in the field.

# **RESEARCH DISCUSSION**



Limited training/mentoring and job-sharing opportunities are also barriers to women's career advancement.

Underrepresented women in ocean science face overlooked training/mentoring needs, making it harder for them to succeed when compared to men. This cycle perpetuates fewer women entering/remaining in the field, further contributing to their underrepresentation.

# 5

A non-inclusive culture within ocean science is also a factor that keeps women away.

Questionnaire responses and interviewee feedback confirmed prejudice/stereotypes in ocean science, including the belief that women should prioritize childcare, the lack of trust/recognition for women as leaders, glass ceiling restrictions, and a lack of support for women in all roles.



Promoting women's participation in ocean science should address more than the aforementioned barriers.

Stimulating students' interest in ocean science can draw more women to the field. Simultaneously eliminating barriers and retaining more women in the field will establish a positive cycle and achieve gender equality in ocean science. This research on APEC women's participation in ocean science has identified several areas for improvement in the future and will use the opportunity of the workshop to conduct constructive dialogue and exchanges with APEC economies.

The workshop will use experts' experiences and perspectives to identify practical measures, mechanisms, and policies for implementing women's participation in ocean science and governance in APEC.

#### APEC WOMEN IN OCEAN SCIENCE REPORT

APEC Workshop on Promoting Women's Role in Ocean Science towards Sustainable and Inclusive Ocean Governance.

### RESULTS FROM THE WORKSHOP

The Workshop on Promoting Women's Role in Ocean Science towards Sustainable and Inclusive Ocean Governance was fruitfully completed on March 16-17, 2023 at Kaohsiung Software Technology Park (Chinese Taipei).

There were a total of 90 on-site attendees, while 204 participants and 13 representatives from APEC member economies joined us online. The workshop featured two keynote speeches by global and regional experts with extensive experience, as well as two panel discussions where representatives from Chile, Indonesia, Peru, the Philippines, Chinese Taipei, the United States, and Viet Nam shared their experiences and discussed policies and innovative strategies for promoting women's participation in ocean science.

On the second day, participants visited Dragon Survey Company's vessels and heard from a female crew member about her experience, followed by a cultural yacht tour to learn about the history of Kaohsiung Port and the marine industry.

### **KEYNOTE SPEECH 1**

#### The Big Picture of a Women-Led Field of Ocean Science Ms. Chloe Nunn

Member of the Marine Environment Team, NIRAS, and Former Science and Operations Officer of UN Ocean Decade, IOC-UNESCO (United Kingdom)

The United Nations is promoting a plan for gender equality in ocean science, in which Ms. Chloe Nunn has also been involved. For example, the Society for Women in Marine Science discusses women's participation and governance in ocean science.

Through the workshop presentation, she hopes to get everyone to understand the organization's efforts in promoting women's participation in ocean science. Especially for women who are engaged in ocean science while also balancing family responsibilities, women in ocean science are not just conducting research in an "ivory tower" but also needing to engage with the community to make ocean science more inclusive and attractive.

Actually, when studies address the problems we face, women are often the driving force behind the societal transformation, making it more considerate and compassionate.



Therefore, we need to start at the level of the system to enable women to participate more fairly in the marine field.

Ms. Chloe Nunn said she was very fortunate to work in a female-led organization, where her supervisor is also a woman. However, there are relatively few female supervisors in governmental ocean science organizations. She hopes that there will be more opportunities for collaboration in the future so that women can have increased opportunities to enter the field of ocean science.

### **KEYNOTE SPEECH 2**

#### **Best Practices in a Women-Led Ocean Science Field**

Dr. Wen-Ling Hong Deputy Minister of OAC (Chinese Taipei)

Chinese Taipei ranks seventh globally in equal rights according to the UNDP Gender Inequality Index in 2021. Despite being among the leading economies in the Asia-Pacific region, there is still room for improvement.

Dr. Wen-Ling Hong stresses the three R's: Recruit, Retain, and Recognize, to promote women's leadership, commonly referred to as women's empowerment.

As an editor of Taiwan Women e Press, she aims to break professional field gender biases by sharing women's daily job roles. She suggests that career and personal life should be fully integrated so as to enhance women's participation in ocean science, and shared several examples, such as TurtleSpot Taiwan, FISH BAR, and Sea Women of Taiwan.

Following the framework promoted in APEC, gender equality can lead to more advanced science, including through publishing Gendered Innovation in different languages to re-examine research with a focus on numbers, institutes, and knowledge. This can help women participate more fully in the marine sector.



### **PANEL DISCUSSION 1**

#### **Policy Promotion of Women in Ocean Science**

(Chinese Taipei)

Chinese Taipei reviews policies every four years based on the Convention on the Elimination of all Forms of Discrimination Against Women implemented by the United Nations in 1982. It ranks among the top ten gender-equal economies, yet women are underrepresented in higher education systems and teaching positions.

Although there has been an increase in female graduates and outstanding female awardees, there has been no corresponding increase in professional careers. Thus, continued examination of legal norms and systems is essential to ensure fairness and to promote women's advancement.

After the Philippines gained independence in 1957, a women's committee was established to promote gender equality through policy reviews. Although high-level positions in the Philippines are relatively balanced between men and women, sexual harassment of women still occurs, and laws and regulations need to be reviewed to raise awareness.

Female scientists also face discrimination in speaking opportunities, and women often leave the workforce after starting families. To support women, the government has allocated 5% of the budget for gender equality initiatives such as nurseries and breastfeeding rooms. Dr. David's lab has an equal gender balance, and she advocates for the inclusion of the LGBT community in future policies to create a more equitable society.



Dr. Laura T. David Director of the University of the Philippines Marine Science Institute (The Philippines)



In Peru, there are fewer female graduates compared to males and the gender gap in doctoral degrees is even wider. Women's participation in engineering and research is also significantly lower.

To address this, the government has created a roadmap to increase women's participation in science and promoted women's right to an education through scholarships. Additionally, the regulations for researchers have been amended to provide maternity and post-natal parental leave, eliminating this disadvantageous issue for women in the workplace.

In Chile, statistics are necessary for the development of policy responses that address gender inequality. Women are underrepresented in high-level positions and perceive themselves as inferior to men. The government aims to promote women's participation in various organizations and eliminate unequal treatment.

In the aquaculture industry, women are often limited to specific roles. As a result, the Gender Equality in Fisheries and Aquaculture Law was introduced to close the gap between men and women. Additionally, the government seeks to ensure that women can participate in policy formulation fairly by providing guaranteed positions for them on various committees, not just those involved in operations.



Ms. Susana Giglio Undersecretary of Fisheries and Aquaculture, Aquaculture Division (Chile)

### **PANEL DISCUSSION 2**

# Case Studies and Innovative Strategies for Women's Participation



Head of Yacht & Marine Department, SOIC (Chinese Taipei)

Ms. Iven Lo, with her architectural background, serves as a bridge between the fields of architecture and ocean science, bringing advancement to the yachting industry of Chinese Taipei.

Chinese Taipei is the 4th leading yacht manufacturer in the world, but its output value has stagnated due to declining birth rates and labor shortages, hindering improvements in the manufacturing environment. Urgent measures are necessary to attract young people to the shipbuilding industry.

We all agree that increasing women's participation is beneficial to promoting women's contributions, so Indonesia promotes women's participation in ocean science through the policies of the BRIN.

At Dr. Intan Suci Nurhati's research center, women focus on research, not administrative tasks. This strategy allows women to improve their contributions to scientific research. In Indonesia, women are encouraged to prioritize research quality over quantity, and are given flexibility to choose their promotion timeline to accommodate family responsibilities. This approach promotes women's participation in ocean science.



Dr. Intan Suci Nurhati Head of Research Center for Deep Sea, BRIN (Indonesia)



Dr. Jennifer L. Salerno Assistant Professor of Department of Environmental Science and Policy, GMU (United States)

In the US, bias, discrimination, and harassment are the main reasons for the underrepresentation of women in the field of ocean science. For example, women earn 17% less than men on average and face competence biases during hiring. Lack of training, flawed reporting mechanisms, and risks in fieldwork contribute to sexual harassment. Despite women accounting for 50% of graduate students in ocean science, they still hold fewer senior positions.

To improve women's participation, mentoring, professional development, family support, funding mechanisms, and women's science groups can be established.

Viet Nam's 3,200-kilometer coastline demands significant efforts. In recent years, the economy's socio-economic development has undergone changes, necessitating the creation of more jobs for women, especially in ocean conservation, which requires substantial investment.

As Viet Nam shifts from agriculture towards marine aquaculture, women's involvement becomes essential. The economy's wetlands are vital for environmental protection, but industrial development is causing their destruction. Hence, women's contributions to wetland conservation and other related work are necessary for the future.



Ms. Nguyen Thanh Thao Acting Director of Department of Science, Technology and International Cooperation, MONRE (Viet Nam) PAGE 24

# RESULTS OF THE FIELD TRIP

Kaohsiung, March 17, 2023 Chinese Taipei

Female crew member





















Introducing the development of Kaohsiung Port









# CONCLUSIONS

The goal of this project is to identify factors that hinder women's participation in ocean science and to identify ways to improve their participation. Based on the research results and workshop discussions, the following conclusions can be confirmed:

The underrepresentation of women in ocean science is the most commonly cited impediment. There are many reasons for this phenomenon, including a lack of career advancement opportunities, unfair wages and treatment, and a non-inclusive culture for women in the field.

2

Apart from their professional roles, some women also bear the responsibility of motherhood, which has presented significant challenges. "Maternal wall" may interrupt their careers, delay research progress, and make it challenging to take on administrative duties.

3

Measures proposed to increase women's representation in and reduce their family burden on ocean science include breaking gender bias by highlighting women's achievements, re-examining gender equality regulations, allocating budgets to supporting women, increasing female students' interest in ocean science, promoting women to senior positions, providing flexible working methods, and establishing women's groups.

# RECOMMENDATIONS

Women's career development in the field of ocean science is often influenced by institutions, systems, culture, and social attitudes. Thus, government and organizational initiatives should actively listen to and respond to women's voices. More initiatives can be implemented to increase women's participation and advancement in the field. Based on the conclusions and taking these factors into consideration, the following recommendations are made:

Minimize barriers and facilitate women's career advancement

Efforts to promote women's careers in ocean science should minimize barriers and maximize facilitators to enhance their job satisfaction, career satisfaction, and reduce turnover.



Offer support for women in their role as mothers

Showing that a career and family can coexist can not only help to retain female talent, but also inspire more women to pursue careers in the ocean science.



#### Conduct gender equality education and training

Engaging men in diversity and inclusion efforts can break down gender-based prejudice and stereotypes, increase trust in women professionals, and improve the visibility of women's contributions in ocean science.

#### Incorporate ocean science experiences in education

By increasing awareness of ocean science and providing educational opportunities, such experiences are capable of fostering students' interest in the field, leading to increased participation with higher female student representation.



Asia-Pacific Economic Cooperation

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