



Delta Alliance Young Professionals Award

Innovative solutions for delta challenges worldwide

Final report

June 2014



Supported by the Dutch Ministry
of Infrastructure and Environment



Ministry of Infrastructure
Environment

Delta Alliance Young Professionals Award

Innovative solutions for delta challenges worldwide

A contribution to the Rio+20 theme
'Green economy in the context of sustainable
development and poverty eradication'

Final report

Partners:



2014

Delta Alliance

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Delta Alliance Young Professionals Award: <http://www.delta-alliance.org/ypa>

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1. Introduction

In June 2012, the United Nations Conference on Environment and Development (Rio summit) celebrated its twentieth anniversary with the so-called Rio+ 20: the United Nations Conference on Sustainable Development 2012. Rio+20 followed the concept established at the Earth Summit 2002 in Johannesburg, where particular emphasis was put on the establishment of partnerships for sustainable development, consisting of a coalitions between governments and private parties (stakeholders, companies, etc.) which dedicated themselves to fulfill a certain task together. The Netherlands also participated in these partnerships. In Rio+20, special attention was paid to these partnerships again.

In preparation of the Rio+20 Conference the Ministry of Infrastructure and Environment had offered Delta Alliance the opportunity to present itself during Rio+20 as a partnership organisation, that creates bridges between knowledge providers and private and public sectors.

Delta Alliance is an international, knowledge-driven network organization with the mission is to strengthen the resilience of deltas worldwide through fostering the exchange of knowledge, expertise and practice experiences on common delta topics such as spatial planning, integrated water resources management, food security, nature conservation, disaster risk management, water governance and climate adaptation. Started in 2010, the ambition of Delta Alliance is to develop into a network of active participants focusing their efforts on sustainable planning and use of deltas. Currently, the organization consists of knowledge driven networks (so called Wings) in 11 river deltas (in Vietnam, Bangladesh, Indonesia, China, USA (2x), the Netherlands, Egypt, Mozambique, Argentina and Brazil). Several more deltas (among others in Ghana, Kenya, Benin, Italy, Rumania, Mozambique, Senegal, Taiwan and Myanmar) have already stated their interest to join. The broad participation strengthens this network of knowledge institutes, governments, private companies and NGOs.

The mission of Delta Alliance fits well with the two central themes of the Rio+20 conference:

- Green Economy in the context of Sustainable Development and Poverty Eradication (GESDPE) and
- Institutional Framework for Sustainable Development (IFSD).

2. Delta Alliance Young Professional Award (YPA)

In order to present the work of Delta Alliance and to acknowledge that sustainable development is dependent on creative and future-oriented thinking, it was decided in close consultation with the Ministry of Infrastructure and the Environment, that Delta Alliance would organize a Young Professionals Award, in which young professionals from all over the world would be challenged to find innovative solutions for future sustainability of river deltas. In line with the Rio+20 theme Green Economy the solutions to be submitted should be oriented to the acute challenges that deltas around the world are facing.

3. Activities

This reports describes all the activities undertaken by Delta Alliance in a chronological order within the framework the Delta Alliance Young Professionals Award.

3.1 Activities in 2011

Creation of a partnership

In line with the emphasis on the creation of partnerships the activities started in 2011 with the identification of partners, that would like to contribute to the Delta Alliance Young Professionals Award. The following partners committed themselves to participate in an active way:

- ARCADIS
- Grontmij
- WWF Netherlands
- ITC-University of Twente
- Both ENDS
- Deltares
- Alterra Wageningen UR
- Partners in the other 11 Delta Alliance Wings

All the Netherlands based partners committed themselves:

- To contribute in cash and/or in kind (up to a value of 5 k€/partner) in the preparation of the competition.
- To host, guide and support an Award winner (or winning team) within the framework of a tailor made project to further develop the Award winning solution.
- To contribute to a good reporting of the tailor made projects.

Partners in a number of the other Delta Alliance Wings would be asked to contribute to the development of the tailor made projects, that would result from the Award winning solutions.

The international call for innovative solutions for delta challenges was prepared in close consultation with the partner organisations.

Creation of a webpage

A special webpage (<http://www.delta-alliance.org/ypa>) has been created, where all announcements, activities, progress and results have been presented systematically. This webpage is still accessible.

3.2 Activities 2012

Call for the submission of 'Innovative solutions for delta challenges worldwide'

Publication of the call

The call for 'Innovative solutions for delta challenges worldwide' was published mid-January 2012 and disseminated to more than 20.000 addressees worldwide through various networks:

- mailing list Knowledge for Climate used for the Rotterdam Conference 'Deltas in Times of Climate Change
- students and alumni networks of UNESCO-IHE, Wageningen University, ITC-University of Twente, TU Delft, VU-IVM, etc.
- Delta Alliance network, Wings and Newsletter
- networks of the partner organisations
- NWP Newsletter
- professional networks such as IAHS
- Water Youth Movement

The competition was open for young professionals (individuals or teams of 2-3 persons) up to an age of 35 years. The deadline for on-line submissions (a paper and a poster) had been set at 31 March 2012. For that purpose a special widget had been built for the Delta Alliance website.

Content of the call

Young professions were challenged to find innovative solutions for future sustainability of river deltas. The solutions to be submitted should be oriented to the acute challenges that deltas around the world are facing, such as:

- Counteracting the disruption of natural delta dynamics
- Mitigating of water scarcity & flooding
- Preventing and managing pollution
- Provision of water for food & agriculture
- Climate-proofing of infrastructure
- Adaptation of institutions to achieve integrated delta governance.

Proposed solutions should address two or more of these challenges in an integrated manner, contribute to the reconciliation of social, natural and economic functions, and demonstrate the added value of integrated (spatial) planning.

The Award

The Award winners would be invited to present their solution during a Delta Alliance partnership event at Rio+20. Moreover, the Award winners would also receive organizational and financial support to further develop their solution in a consortium with one or more Dutch partners of the Award and an institution within one of the other Delta Alliance Wings. Tailor made projects had been developed for that purpose, taking into account the subject of the

Delt Alliance

First call: Delta Alliance Young Professionals Award

Who can participate?
Young professionals (individuals or teams of 2-3 persons) up to an age of 35 years.

What is the topic?
In line with the 2012 Rio+20 theme: 'Green Economy in the context of sustainable development and poverty eradication', Delta Alliance is looking for innovative and creative solutions for the acute challenges that deltas around the world are facing:

- Counteracting the disruption of natural delta dynamics
- Mitigating water scarcity & flooding
- Preventing and managing pollution
- Provision of water for food & agriculture
- Climate-proofing of infrastructure
- Adaptation of institutions to achieve integrated delta governance

Proposed solutions should address two or more of these challenges in an integrated manner, contribute to the reconciliation of social, natural and economic functions, and demonstrate the added value of integrated (spatial) planning.

The Award:
Winners will travel to Rio+20 to present their solution at the Rio+20 summit (June 20-22, 2012) in Brazil (www.un.org/02/rio20/).
Winners will receive tailor-made organizational and financial support to further develop your solution in cooperation with internationally renowned organisations in the Netherlands and the other Delta Alliance Wings.
For more information go to www.deltalliance.org/awards

How to participate?
Prepare a poster and a paper with your innovative solution and upload both at:
www.deltalliance.org/awards

Deadline for submission: 31st of March 2012!

Supported by the Dutch Ministry of Infrastructure and Environment

Partners:

ARCADIS
Grontmij
UNIVERSITY OF TWENTE
Both ENDS
Deltares
ALTERRA
WWF

solution, the personal circumstances and interests of the Award winners, the area of interest of the partners, the most suitable location, etc.

Submission of innovative solutions

Delta Alliance and its partners were very pleased with the active, international interest and participation in this award competition, since the call drew an impressive number of 53 submissions originating from 29 countries worldwide.

Selection of the Award winning solutions

The international jury for this award competition consisted of:

- **Mrs Tineke Huizinga-Heringa** (Chair), Chair of the international Governing Board of Delta Alliance International, former Minister for Housing, Spatial Planning and the Environment, The Netherlands.
- **Prof. Charlotte de Fraiture**, Professor of Land and Water Development, UNESCO-IHE, Former Head of the West-Africa Office of the International Water Management Institute (IWMI), Accra, Ghana.
- **Dr M. Monowar Hossain**, Coordinator of the Delta Alliance Bangladesh Wing, Executive Director of the Institute of Water Modeling (IWM), Professor at Bangladesh University of Engineering and Technology, Bangladesh.
- **Dr Lifeng Li**, Member of the International Governing Board of Delta Alliance International, Director Freshwater, WWF International, Switzerland.
- **Mr Hans Huis in 't Veld**, Chairman Topsector Water, The Netherlands, former director TNO and former director DHV, member of the Supervisory Board of several international companies and organisations.

The jury appreciated the creativity and originality of the submissions, as well as their scientific quality. They had the difficult task to select the three Award winning solutions.

During a jury meeting on 1st of June 2012 entries were assessed on the basis of the criteria as published in the announcement of the award:

- Relevance for the acute delta challenges as referred to in the call
- Scientific quality
- Creativity & originality
- Innovativeness of the solution
- Degree of integration of the approach

To facilitate the task of the jury a preselection of the 20 best solutions had been made by the partners of the YPA before the jury meeting. Subsequently, in two selection rounds the jury has selected the three award winning solutions:

- **Thriving Deltas** (by Richard Fisher and Ryan Whipple) proposes the transformation of a location at risk in the Sacramento – San Joaquin.
- **Re-Generation Delta** (by Federico Curiél) proposes a strategy for large scale micro-algae harvesting, converting the farmland along the coastline of the Pearl River delta into a large scale open algae harvesting ponds.
- **Balance Island** (by Sander van Rooij, Emil Kuijs, Bert van Bueren) aims at reducing salt intrusion and restoring natural estuarine dynamics and ecology by creating a semi-closed estuary with a series of constructed sandy islands in the South West Rhine – meuse Delta in the Netherlands.

The Jury report

The following paragraphs give a justification for these three solutions by the Jury:

Rio aan de Maas

The Delta Alliance Young Professional Award project has been presented to vice-minister Atsma of Infrastructure and the Environment during the 'Rio aan de Maas' event on 30th of May 2012 and a booklet with posters of the 10 best solutions was handed over to him.

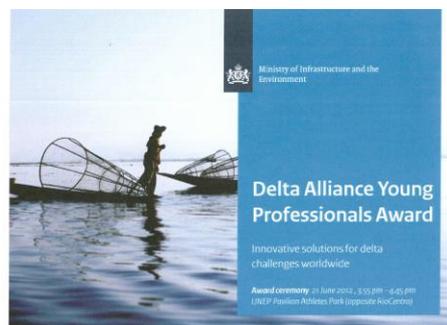


Award ceremony in Rio de Janeiro

A special event moderated by the Director of Delta Alliance, Mr Kees Slingerland, has been organised during the Rio+20 Summit in Rio de Janeiro on 21st of June 2012. The final program consisted of:

- **Tineke Huizinga** (Chair of Delta Alliance) addressing the keynote: *Delta Alliance, a global network for the resilience of deltas*
- **Louise Fresco** (chair of National Rio+20 Platform), presenting a column with *Reflections on Sustainability, with a focus on deltas*, in which she shared some personal experiences relating to the value and the vulnerability of deltas.
- Presentations by the Award Winning teams.
 - Thriving Deltas by **Richard Fisher and Ryan Whipple**
 - Re-generation Delta by **Federico Curiel**
 - Balance Island by **Sander van Rooij, Emil Kuijs, Bert van Bueren**
- Award ceremony: **Tineke Huizinga** and **vice-minister Atsma** handed the Awards to the winning teams received.
- Closing speech of **vice-minister Atsma** with reflections on the award winning solutions and on the importance of partnerships and the involvement of young professionals in developing sustainable solutions for vulnerable regions such as deltas.

During the event there was also an poster exhibition of the 10 best solutions.



Join us for the award ceremony of the Delta Alliance competition. One of 23 submissions from 23 countries the three most innovative solutions will receive organisational, financial and scientific support to further develop their ideas in cooperation with internationally renowned organisations in the Netherlands.

Programme

Moderator: Kees Slingerland, Director Delta Alliance International

• **Keynote:** Delta Alliance, a global network for the resilience of deltas
Tineke Huizinga, Chair Delta Alliance International

• **Keynote:** The role of partnerships, the example of Delta Alliance
Joop Atsma, Dutch State Secretary for Infrastructure and the Environment

• **Column:** Reflections on Sustainability
Louise Fresco, Chair Dutch National Platform Rio+20, University Professor Amsterdam

Presentations by the Award Winners

The three Award winners will be announced during the session. They will present their innovative solutions for respectively the Pearl Delta (Republic of China), the Rijn-Schelde Delta (The Netherlands) and the Sacramento - San Joaquin Delta (California-USA).

Delta Alliance is a public-private partnership. We stimulate innovative and creative solutions for the challenges faced by deltas around the world. We work together with governments and knowledge institutions to develop concrete solutions.

Summary of the Award winning solutions

Thriving deltas: An adaptive approach

By Richard Fisher and Ryan Whipple

Deltas are pinnacles of life: they provide environmental wealth to support biodiversity, human population centers, and industrial and agricultural production. Land use, water diversion, flooding, subsidence, salt water intrusion, and ultimately levee failure threaten these complex ecosystems and it is therefore important that dynamic approaches be taken to avoid disaster, and sustain thriving Deltas. This report focuses on the Sacramento-San Joaquin Delta but the lessons learned can be extended across the globe.

The Sacramento- San Joaquin Delta is the primary water resource for California's urban and agricultural development. Sherman Island sits on the western edge of the Delta and is a critical geographic feature in balancing the flux of saltwater in the Delta. However, Sherman Island is at risk of catastrophic failure. Flooding, saltwater intrusion, and ongoing subsidence are current threats that become further exacerbated by global climate change. Through collaboration with industry representatives, inhabitants, academics, and local government officials, the environmental, social, and economic impacts of these issues were holistically addressed. The synthesis of stakeholder input with natural and engineered environments led to the design of an Adaptive Water Management and Agricultural Diversification System (AWMADS) composed of a levee enclosed flood storage and wetland habitat area that can dynamically support hydroponics (soil-less agriculture), aquaculture (concentrated production of aquatic species), and many other optional components over the system's life. Engineering, socioeconomic, environmental impact and life cycle analyses, and exploration of mitigation strategies demonstrate the theoretical success of the system to protect against flooding, sequester carbon, restore habitats, and reinvigorate the local economy.



Re-Generation Delta

By Federico Curiél

The project presents a multi-layered strategy for a sustainable management of the Pearl River Delta (PRD). Re-Generation Delta proposes a large scale micro-algae harvesting system, converting the farmland located by the coastline of the PRD into large scale open air harvesting-ponds. The newly established infrastructure will be realized to function as a physical barrier preventing eventual water flooding.

After analyzing the political conditions, global and local issues, and foreseeing future needs and potentials of the metropolitan area of the PRD, the paper will explain how a single landscape strategy could be a solution to several global matters, exploiting the artificiality of the existing rural landscape and the specific conditions and needs of the different metropolitan clusters of the region.

All the energy is produced by micro-algae harvested on a large regional scale, processing into bio-fuel the CO₂ captured and collected from local polluting sources, releasing oxygen to the atmosphere and providing biological resources to different activities and spheres of production.



Balance Island

By Sander van Rooij, Bart van Bueren, Emil Kuijs

Balance Island's primary function is to decrease the salt intrusion in the Haringvliet. This is achieved by creating a gradual transition from salt to fresh water, while conserving the dynamic nature of a living delta. By reducing the salt-intrusion, it is expected that the 'Kierbesluit' can be operated more effectively. The 'Kierbesluit' is a measure to stimulate fish migration by frequently opening the sluices of the Haringvlietdam. A lower salt-intrusion allows a more frequent opening of the sluices. This stimulates the migration of fish and retains a minimal salinity near the location Middelharnis, which is recognized as 'zero effect' line.

The Haringvliet is a show case of this innovative Dutch Delta Technology for many other estuaries around the world. With the forecast of sea level rise and on-going

salinity problems, Balance Island offers a sustainable, simple and easy to maintain solution.



Follow up with Award winning teams

In October 2013 a meeting with the YPA partners has taken place in order to discuss the award winning solutions, to formulate comments and suggestions for their further development and to organise the matchmaking for support between the award winners and the YPA partners.

Subsequently, intensive correspondence between the Award winners and the Delta Alliance secretariat has taken place to prepare for the follow up activities. In reaction, the award winners have indicated how they would like to proceed. A project formulation sheet has been developed and sent to and filled in by the Award winners.

3.3 Activities in 2013

Follow up activities of the Award winners

For most of the year 2013 the Award winners have been working on the further development of their solutions. At the end of 2013 all three Award winning teams have delivered a final report with the progress made. These final reports are annexed to this report and can also be found at the Delta Alliance website.

Thriving deltas

For the further development of the presented solution, the jury had suggested to pay attention to a full integration of the various elements of innovation and alternative land and water use, the impacts on the neighbouring areas in the delta and a sound cost-benefit analysis. In this respect potential positive effects on upstream communities could help to increase the feasibility of the solution.

With these suggestions in mind, the Sherman Island Delta Project Team set out to develop a series of local development project evaluations which included site visits, economic, environmental, and engineering characterization culminating in the development of feasibility studies for the leading design option. Best presented as a 'Case Study Report', the document was compiled as the direct response to this suggestion as well as the team's serious consideration of the Delta Alliance's valuable insights for innovative, sustainable design investigation.

Organized as three major chapters, the case study report includes a thorough site characterization report, a stakeholder and goals assessment, and finally, an enumerated case study analysis. The results of these locally-sourced case studies are intended for use in the development of a single most practical, sustainable and feasible system of coordinated design elements for suggested implementation on Sherman Island in the Sacramento-San Joaquin Delta. In producing this document, the team endeavours to balance specific site necessities, the cost of implementation, and the potential stakeholder benefits from the outset so as to expedite an appropriate, research-backed development proposal. The contents of this report are the results of the work over the past year and are based on the tireless work of the project team who could not pursue this subject without the financial backing of the Delta Alliance.

The Case Study Report for the Sherman Island Delta Project is principally a foundation document to guide the specialist team, stakeholders and agency officials in creating a model design scheme for the project site. As equal, coordinated investment is necessary from each interest category, the Case Study Report allows all parties to review, reflect and invest in those design solutions they find both physically and politically ideal for this critical property. From this body of exhibited design success that has been demonstrated by like proximate developers, an approach to rehabilitating this 1,000 acre portion of Sherman Island can be defined without risking the continued marginalization of the island community. For the final report see the website: <http://www.delta-alliance.org/ypa/thrivingdeltas>

Re-Generation Delta

The award has been used to do a number of studies on the project site such as:

- Exploring and discovering the project area, the so-called Frontier Closed Area (FCA), with the purpose to explore how this area with a very rich ecosystem that is even part of the 'East Asia –Australian Flyway' can be protected from urban sprawl. By turning it into productive and financially advantageous algae harvesting ponds, without reducing the water presence and the nature density, it would be the optimal solution for the site. Among the accessible areas of the FCA, an area of 3 km² has been chosen as test ground for analysis and as a location for the future design proposal.
- Landscape analysis and comparative studies show that the existing infrastructure of former fish ponds can be used for the algae ponds.

In addition, two case studies have been performed in respectively:

- Ban Kad, Chiang Mai, Thailand on the Boonsom Spirulina Farm, with large growing ponds and 20 years of experience in this business.
- Sempana, Borneo, Malaysia with a company UniOne Group, a registered bio-tech company particularly dedicated to modern marine culture and integrated agriculture systems. They are producing, amongst others, also seaweed.

Finally the award was also used for presenting the Re-Generating Delta at two conferences in respectively:

- Venice, Italy: 'Architecture & archaeologies of productive landscape'
- Hangzhou, China: AICA BIT Congress on '2nd Annual International Conference on algae'

The Award winner, Federico Curiél, concludes that harvesting micro-algae has been proven to be the most efficient way of producing biofuel and biomass nowadays. It absorbs the CO₂ and releases the oxygen into the atmosphere as a result of photosynthesis. This process has obvious positive consequences on all the surrounding environment, interacting friendly with it and its fauna and preserving their natural condition. Scraps and waste can be recycled directly by the rural activities in the polder as cattle feed and fertilizer. On a broader scale there is a great potential in turning the rural landscape of the Pearl Delta into a system of harvesting ponds: all the hinterland area could benefit from this transformation, ensuring enough production of raw material for fueling a bio-electricity powerplant installed on the site, that could satisfy the demand of about 50.000 homes. In the next research phase the proposal will be concretised on the architectural scale design. The selected area of 3 km² will be the setting of the first set of algae harvesting ponds.

For the final report see the website: <http://www.delta-alliance.org/ypa/re-generationdelta>

Balance Island

The implementation of Balance Island (an artificial island in front of one of the branches of the Dutch Delta) has as primary goal the reduction of salt water intrusion in the Haringvliet by creating a gradual transition from salt to fresh water while maintaining the unique dynamic nature of the delta. The jury of the Young Professional Award of the competition suggested to perform more detailed modelling studies on the real impact of Balance Island on the reduction of the salt water intrusion.

In the follow up study it has been checked on concept level whether a reduction in the salt content can be reduced through the construction of the island and what factors influence that salt content. Through various simulations with Delft3D a first insight is obtained into the effects of Balance Island on the salt intrusion in estuaries. The model calculations show, that when the Balance Island is constructed in the mouth of the Haringvliet a reduction of the salt content in the Haringvliet can be expected. Various model runs show that this reduction can be up to about 30%. It turns out that it is important how the island is positioned in the mouth of the estuary in relation to the incoming tide, how big it is and what form it has. It is expected that the creation of artificial islands in the mouth of delta river branches can also be applied in other deltas worldwide to achieve reduction of salt water intrusion.

For the full report see the website: <http://www.delta-alliance.org/ypa/balanceisland>

4. In conclusion

The offer of the Ministry of Infrastructure and Environment to Delta Alliance to present itself during Rio+20 as a partnership organisation, that creates bridges between knowledge providers and private and public sectors through the organisation of the organisation Delta Alliance Young Professionals Award, has been highly appreciated.

Appreciated by the young delta professionals worldwide, proven by the large number of very creative and innovative submissions (53 in total, originating from 29 countries) with often a high quality standard. The three Award winning teams have been able to further develop their solutions with the received awards in the form of financial, technical and organisational support.

Appreciated also by the Delta Alliance network and organisation since the Young Professionals Award itself and the Award ceremony during Rio+20 have largely contributed to its international profile and also to the creation of new partnerships. To mention a few of those partnerships:

- Delta Alliance has launched in partnership with the Global Water Partnership and support of DGIS the Enabling Delta Life Initiative: a Global Programme of Action on Deltas. A 10 m€ programme has been formulated, for which GWP and Delta Alliance are currently in the process of acquiring the necessary funding.
- Delta Alliance has been asked by UNDP-DHI to participate in the River Component of the GEF funded Transboundary Water Assessment Program, for which Delta Alliance is currently performing the vulnerability assessment of 26 deltas.
- GWP and the Bay of Bengal Large Marine Ecosystems Project (funded by GEF and coordinated by FAO) have requested Delta Alliance to assess the vulnerability and resilience of the Ayeyarwady Delta in Myanmar.
- Delta Alliance is also one of the founding fathers of the Action Platform for Source to Sea Management initiated by the Stockholm International Water Institute (SIWI) and supported by organisations like UNEP, UNDP, GWP, Stockholm Environmental Institute (SEI), etc.
- And last but not least, Delta Alliance has developed a strong partnership in the Netherlands between Deltares, Alterra Wageningen UR, TUDelft and UNESCO-IHE. A partnership that is prepared to function as knowledge portal and knowledge broker for the (Dutch) Delta Approach. Discussions on this role for the Delta Alliance with the Ministry of Infrastructure and the Environment, the Ministry of Foreign Affairs and the Dutch Delta Commissioner are in progress.

Finally, the partnership between the Ministry, the knowledge institutions (Deltares, Alterra Wageningen UR, ITC University of Twente), the private sector (Grontmij, Arcadis) and the NGO's (WWF and Both Ends) has been experienced as very productive and enriching. All partners are acknowledged for their active contribution to the success of this Award competition.

ANNEXES/REFERENCES

1. Report 10 submissions Young Professionals Award

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