The Economic Benefits of Hydrography and Ocean Mapping

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Commission 4: Hydrography

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OVERVIEW

The Economic Benefits of Hydrography: A consideration of the wider context that Hydrography can contribute to.

Starting Point:

There is no clear case for Hydrography based upon Chart sales and Products alone.

Nations such as Chile and Croatia generate only 18% and 40% respectively of their hydrographic costs through sales.

Additional Stakeholders must be identified to increase the benefits and reduce costs.

In the Caribbean and Meso-American region this is the case.

Building Capacity is possible to support these needs.

This paper aims to demonstrate these points.

Hydrographic Products and Services

The traditional products and Services of a typical Hydrographic Office are considered to be:

Paper Charts, Electronic Charts, Notice to Mariners, Tides and tidal streams, Sailing directions etc

Nations are expanding and developing services to users through common spatial data infrastructures. This is an important step. ☺

But other groups undertake this type of work.

These special surveys may be to support a variety of customers:
Ports and harbour development and Marinas for small craft

Cruise Companies seeking new berths, locations

Nearshore environmental Surveys

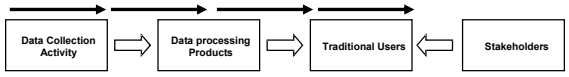
The survey data could often serve a wider User Community.

The role & responsibility for Hydrographic Data management may need to be identified.

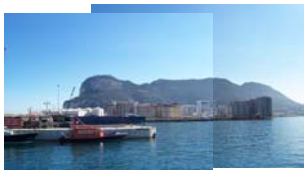
Stakeholders - The Value Chain

The Value Chain starts with Data Collection

The processed data creates products for the Users & Stakeholders



New Users may also wish access to traditional products but more likely they will require some new products or specific data.



Although the Value Chain indicates an increase of value we must minimise any negative impact.

What data is there?

Currently the coverage of Nautical Charting is not complete.

This should be a concern in a region so reliant upon the income from Tourism, Marine areas and Shipping.

The IHB has figures representing the amount of up to date survey that is completed (0-200m). It is interesting to note some examples:

- Cayman Islands: 80% Adequately surveyed
- Panama: 25% to modern standard & 75% surveyed but in need of survey to modern standards.
- Cuba & Guyana 70%
- Caribbean Island States Typically less than 40%
- Mexico, Costa Rica, Honduras Less than 20% .

This does Not include the many specific projects that produce local survey data. Nor how much is actually available.

Stakeholders and their Interest

So who exactly are the Stakeholders? They include:

Commercial Shipping: Cruise Operators & Freighters

Tourist organisations: Seeking new and "unspoilt" locations

Ports & Harbours: Customs & Excise, import, export & freight businesses that rely upon trade.

Local Communities: To monitor and understand their habitat.

Environmental groups: Preservation, Databases, Monitoring

Fishing & fish farming: Permitting, management and control

Administration Groups with interests in the Coastal Zone:
The effects and impact of use of land and marine resources.

Hydrographic information facilitates: the definition, delineation, establishment, administration, knowledge of and the sustainable development of, local & national maritime, coastal zones and near-shore resources.

Stakeholders: Commercial Shipping

The average growth in the region was 5.5+% GDP (2000 - 2005)

The value of trade by ship is increasing at over 5% per annum.

The region is a net importer: $346bn exports and $400bn imports.

Their respective rates of growth are: exports 1.4% imports 14.4%

The region of South, Central America and the Caribbean account for less than 4% of world's vessels (1000 Grt+).

With many island states, the majority of trade is by sea (over 95%) and by foreign vessels.

Vessel size is limited by the environment, however the world trend is to scale up the vessels and reduce the unit cost of cargo.

The $5.2bn development of the Panama canal is testament to the need for facilities to cope with the newer, larger ships.

Stakeholders: Commercial Shipping

The average age of the fleet of Central American, South American and Caribbean states is over 19.7 years. (world = 12.3 years).

The investment in new vessels will create a greater need for hydrographic products and services:

- Larger = Dredging and charting services
- Faster = Suitable routes & management schemes
- New navigation and bridge systems = Accurate charting and navigation markers to compliment the GPS, AIS and other technologies.

But will there be investment in new ships in this region if it is not attractive to operate services?

Stakeholders: Passenger Cruises

There is a huge dependence upon passenger Cruises:

Worldwide over 11.5m passengers embark on cruises.

Double digit growth is being recorded.

Over 4.8m passengers depart Florida each year. Another 1m depart from the Gulf of Mexico.

US Passenger Cruises generate $32bn per annum of which $16bn is in indirect costs such as shore trips, flights, hotels, shopping.

The top performing economies of the Caribbean rely upon tourism for their income: British Virgin Islands: 45%
Cayman Islands: 70%

Cruise Operators have taken upon themselves to have Hydrographic surveys carried out to ensure new, safe, havens and anchorage in traditionally remote locations.

These Stakeholders require Hydrographic surveys to aid in the management of this important regional activity.

<u>It is a GROWTH industry!!</u>

Stakeholders: Local Communities

There is a huge dependence upon the sea, its resources and the marine environment to support traditional local communities.

Worldwide the pressure is increasing on this crucial natural resource.

Communities with less resources may lose out in preserving their rights, livelihood, habitat and culture.

The ability to protect this space requires good quality, objective data.

Hydrography plays its part by providing baseline objective data sets.

Stakeholders: Ports and Harbours

Hydrographic charts are essential safe marine transportation.

International trade is very competitive. Ports at their hubs.

Ports seek: Economic transportation by reduction in costs, easier routes and suitable anchoring zones close to Port.

Costs: Capesize: $5000-7000; Panamax: $1400 to $3450 per hour

There is strong demand. Can this influence or affect Surveys?

International trade is very competitive. Ports at their hubs.

Investment is key and MUST include safe passage, by ongoing hydrographic surveys, to ensure a sustainable capability.

At the <u>2001 Pan-African Ports Conference</u> a declaration stated:

"Reaffirms the need for African states and sub regional economic groups to adopt concerted development policies on transport infrastructure in general, and ports in particular (ports handle 90% of the continent's trade), in view of their role as trade hubs"

Such initiatives require <u>sustained</u> and <u>modern</u> Hydrographic services.

Stakeholders - Ports and Harbours

Case Study: Guyana

The ports of Demerera and Berbice benefit from regular surveys that monitor the presence of fluid mud or "Sling-mud".

Through repeated surveys vessels of 9m draft transit the delta area with only 6-7m of clear water, the rest being mud.

The growth in trade of a Nation is directly linked to its maritime trade growth which in turn is influenced by the ability of Ports and Harbours. Freight costs represent over 10% of the value of goods.

New container and inter-modal transportation developments need the basis of good <u>sustained</u> hydrographic products and services.

Reduced speed, or increased channel distances contribute to costs and a balance for the Port between improved passage and their maintenance costs needs to be achieved.

Stakeholder Investments: Ports and Harbours

The Ports of South and Central America and the Caribbean do receive investment. In recent years:

Jamaica:	$10m port infrastructure & expansion works.
Columbia:	$20m port works
Brazil:	$800+m for development of inland waterways
Dominican Rep.	$290m port development works
Panama:	$600m port development works
Panama Canal:	$5.2bn expansion project

Investments must be supported by suitable survey & charting.

These developments could feed sustainable Hydrographic programs.

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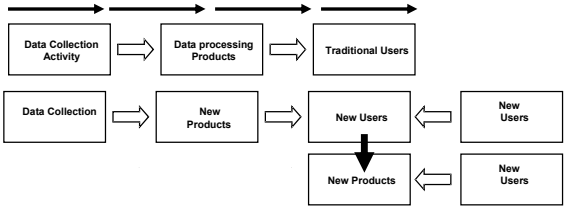


New Users may also wish access to these products but more likely they will require some new products or specific editions.

See:

http://www.gsiseabed.ie and Irish National Seabed Survey

Economic Uses of Hydrographic Products

Many traditional users require up to date and reliable information for decision making purposes.

Safe passage of cargo and passenger vessels.

Commercial fishing including policing fishing zones.

Recreational fishing and sailing including power boats.

Pollution Prevention.

Establishing and policing Exclusive Economic Zones.

Asserting any claims to territory.

Scientific research.

Complying with International Obligations

NOTE: Overall it should be recognised that national Hydrographic programmes are regarded as being a "Public Good". The necessary level of services will therefore not be supplied by market forces alone.

The Community and Stakeholder benefits

Maintaining growth, developing wealth but without destroying the very resource that it relies upon, requires management based upon good data from sustained survey activities.

Economic social and legislative benefits? How do we establish and define these?

Economic Benefits

An APEC Transportation Working Group Study (2002) recommends a nation to:

1. Carry out an audit of Hydrographic department to identify areas that need attention.
2. Carry out an economic analysis for the hydrographic requirements. (a model was developed to undertake this type of activity)
3. Ensure that the necessary development of the Hydrographic Office is included in any national or ministerial development plans.
4. Ensure five year plans exist to sustain national survey and charting.
5. Review Hydrographic work practices and improve cost effectiveness.
6. Review the institutional and co-ordination arrangements to assess the benefits of formal agreements.

National Challenges

The UN undertook a study in 1989 and although relatively old indicates some institutional areas that need to be tackled:

- Delays in processing permissions, clearances and accessing resources due to partner organisations (Customs, port authorities, government departments)
- Outdated procedures and inadequate human resources
- Foreign exchange problems in payment transactions

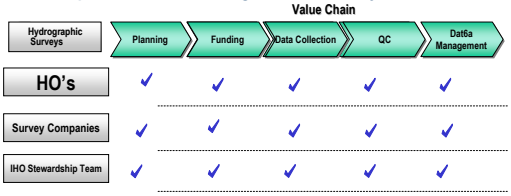
These are important and must be tackled in any strategic plan to address a sustainable capability or capacity.

Hydrography & Hydrographic Surveying is no exception.

Applications throughout the Survey Chain

The Survey market can be looked at as a chain or sequence of events. Estimated value $500m pa

To make progress with Capacity Building the prime areas of expertise should be recognised and activity focussed.



- Market Growth : up to 10% of annual commercial activity $50m
- Industry can deploy technologies and develop certain alliances with Standards

CASE STUDIES: - Canada

Canada undertook a review of the cost benefits of the Canadian Hydrographic Service (CHS) in 1992.

The charts can be compared to roads and their use for transportation. Better roads (charts) = better, safer, quicker, cheaper transportation.

The annual cost of the CHS were estimated to be in excess of $30m and on this basis the benefits to the above sectors were over $450m on the basis of the value of the charting.

This gives a cost to benefit ratio of 1/10.

Other users and sectors not included would also be likely to benefit:

Government agencies involved in coastal management, mineral exploration, construction engineers and ocean scientists.

On review Benefits may be increased by expanding the user community, controlling costs and by reducing net costs.

CASE STUDIES - Bangladesh

Bangladesh received assistance from SHOM and its associate department NAVFCO (the French naval Company for Training and Advice). Over 20 countries have received support and assistance.

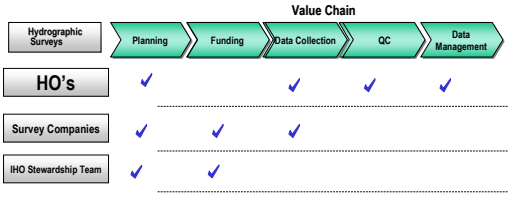
The aim of the HYDROBANGLADESH project was to develop the Hydrographic capability and provide modern equipment to enable the creation of suitable Nautical Charts.

Phase 1: Initial Training, Supply of Equipment and In-country technical assistance for support purposes.
This led to the completion of a Nautical Chart (1997)

Phase 2: Supply of GIS, systems and cartographic training
Supply of resources for essential route surveys
Modernisation of the Bangladesh Training School
A small team to provide in-country training and assistance

Applications throughout the Survey Chain

The value chain could be developed to more focus on the strengths of the Actors and therefore benefit the Stakeholders



- To develop Capacity Building all participants need to gain something
- Standards, education and cooperation projects must continue

CASE STUDIES: - Red Sea Area

An example of international co-operation by several Nations and the "stewardship" of the Hydrographic programme by an external Hydrographic office.

PERSGA Red Sea Survey Project

The UKHO supplied expertise and guidance in the assessment and the setting of priorities. Also in setting the specifications and assessing the tendered proposals.

Data collection was awarded via a open contracting process.

A Commercial Survey company was appointed and completed the survey.

This project demonstrated the positive collaboration of several Nation Stakeholders in a data collection programme and the assistance of a leading HO to guide and advise in the process. ☺

Summary

HYDROGRAPHIC SERVICES are not really self-funding. Studies have indicated that access to new Stakeholders will help.

Most economies have only small numbers of skilled or experienced survey and cartographic personnel. Training IS needed.

BUILDING CAPACITY is possible and can support the sustained wider use of Hydrographic Data.

Several nations are improving the cost effectiveness of Hydrographic services with technology and outsourcing.

Co-operation within regions are produce benefits in these areas.

Increased regional co-operation should therefore be considered.

STAKEHOLDERS do exist and in a competitive world, look for AND OBTAIN, benefits from Hydrographic data and services.

Successful national Hydrographic programmes can be developed to take account of these points and gain ECONOMIC BENEFITS.

THE END

Contacting the FIG Commission 4 Work Group

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