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Floating neighbourhoods as they were and will be; why dwellers would want to live on water

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Abstract

Hydrologists and planners in the Netherlands introduce living on water as a logical response to the predicted rise of the influx of water and at the same time the growing demand of space for housing. Next to contributing to water management, floating neighbourhoods can simply be very attractive to the modern dweller, considered that real estate on shore land is usually more expensive than regular land.

Yet there is a lack of insight in the relationship between the history of living near and on water, and the new developments. The core of this paper will be the following reasoning:

1 – throughout history people have liked to live near water because of certain “classic values” of the water, such as the possibilities for transportation, recreation, pleasing reflections, etcetera; 2 – some people did not build a house on a shore but moored a houseboat near a shore, because of at least one of the following motives: low costs, bohemia, manipulating legislation and the benefits of mobility; 3 – if the floating houses of the future want to facilitate the mentioned “classic values”, they should be technically advanced. It is more expensive to provide these values for a house afloat than on regular shore land; 4 – the historical motives to live in houseboats can in some settings be transformed to serve for the future development of floating houses but they will not be strong enough to create a breakthrough.

This leads to the conclusion that the future of floating neighbourhoods depends on the “new Dutch water task” and the requirements for water storage. The rewards of local water storage for regional water management, combined with the benefits of the water for the dweller, should pay for the floating technology. Floating dwellings can create an attractive living environment, but that can only be economically feasible in the right urban setting and with high water storage requirements.

In dense urban areas the water storage per floating house is small, and there is not enough water to enjoy. In areas with a low density and low land value, water management and dwellers will not pay for the expensive floating technology. In medium density areas, the water buffering per house is high and there is enough water to enjoy – floating neighbourhoods can then be the most feasible option.

Introduction

A new way of living afloat is emerging in the Netherlands. Planners, hydrologists, architects and others introduce living on water as a logical response to the weather forecast for the 21st century, which foresees a dramatic rise in the influx of water. We face a “new Dutch water task”, comparable to the delta works of the 20th century[1]. Housing project developers promote living near water as never before (figure 1a). Realtors sell houseboats using phrases as: “a permanent holiday feeling”, “living with the seasons” and “a feeling of freedom”.



Figure 1a: project developers promote living near water as never before.



Figure 1b: houseboats in a marina setting; the most innovative of the current vocabulary.

Nothing seems to stand in the way of a flood of floating houses overflowing the Netherlands. Architects and builders are waiting for a political, legal and planning breakthrough. But so far, the technological and architectural vocabulary to describe and create attractive floating neighbourhoods is still poor. Urban and landscape planners hardly think of other structures than houseboats alongside a canal or in a marina setting (figure 1b). Developers and realtors use classic values to sell tomorrow's floating houses. Media either address the current legal problems (figure 1c) or present futuristic concepts (figure 1d). There is a lack of insight in the relationship between the history of living on water and the new developments. Values and feelings related to living on water, from the perspective of the dweller, haven't yet been objectively described. This paper will attempt to fill that gap.

The research is based on interviews, popular media and literature (although nothing scientific written on floating houses in particular was found). Secondly, a number of travels to floating neighbourhoods in Asia, the USA and Europe (especially the Netherlands) have provided further insight. The paper serves a PhD thesis on “living afloat”. The thesis inquires the perspectives of the various stakeholders (problem owners) and engineers (solution providers), related to the contribution of floating technology to the “new Dutch water task”, in order to develop concepts and prototypes for innovations on urban, architectural and product levels.



Figure 1c: this houseboat couple in Leiden got caught in an eight year lasting law suit with town hall and neighbours, here presenting all newspaper articles that appeared on their case.

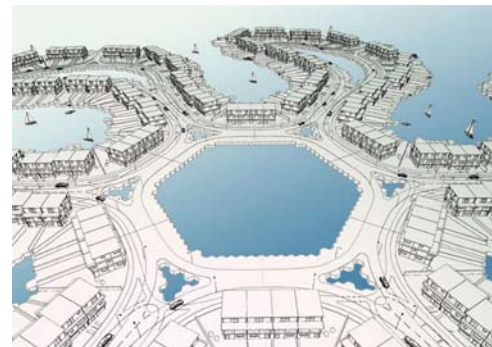


Figure 1d: one of the many futuristic concepts of a floating neighbourhood.

The new Dutch water task

“As the sea level rises, we’ll have to learn to float.” The relationship between the new Dutch water task and living afloat is more complex than this.

The threat of the water is approaching us on various scale levels and from various directions. In addition to rising sea levels, the land is sinking due to settling peat and plate tectonics. Therefore it takes more energy to pump the surface water against gravitation into the sea. The Royal Dutch Meteorological Institute predicts an increase of 15% in precipitation and a 7.5% increase of river water influx (figure 2)[2]. This water has to be carried away by groundwater flow, by rivers and by canals (natural disposal (figure 3a)) or by pumping stations (forced disposal (figure 3b)). Each disposal system has a flow rate and a buffering capacity. The coming years, the average flow rate as well as the buffering capacity has to be improved or strengthened in order to keep the system as a whole functioning. In some areas higher dykes will have to be built, strengthening the capacity of the rivers. On certain locations the capacity of the pumping stations will have to increase. Also, more area will have to be freed for buffering purposes to deal with water influx peaks. Buffering areas are called water storage zones. They consist of one or several interconnected sweet water reservoirs that, apart from buffering, may function in several useful ways.

In many low lying polders the water is silting by the infiltration of sea. As the sea level rises, the pressure of the infiltration increases. In order to keep the surface water healthy, the brackish water has to be flushed by sweet rain or river water. The reservoirs also serve to keep the ground water table in adjacent polders at the right level in times of drought; not only for vegetation but also to prevent the rotting of the wooden piles supporting the foundations of many historical Dutch houses.

The Dutch ministry of transport, public works and water management, the ministry of spatial planning and environment, the district water authorities, geohydrologists and landscape architects all concur on a “new Dutch water task”, in which water buffering plays a predominant role. The influential report of the 21st Century Water Management Committee states that till the year 2015 more than 40.000 hectares (99.000 acres) of extra storage surface should be created[3].



Figure 2: the threat of the water is approaching us on various scale levels and from various directions.



Figures 3a and 3b: natural and forced disposal of surface water.

Multiple use of space

At the same time the Dutch secretary of Housing commits to adding another 445,000 dwellings to the existing housing stock within the next five years (resulting in a shortage of only 1,5 % [4]). In areas such as the Zuidplaspolder and the Haarlemmermeer, water storage capacity has to be added, while at the same time there is an urgent need for urban development. This means that local authorities, project developers, builders and architects have to find ways to reconcile these two seemingly conflicting demands (see diagram 1). Not the only solution, but at least an obvious one, is to create floating neighbourhoods. In short: global climate change, settling peat and plate tectonics require a more flexible water management system. One of the flexibility requirements is storage capacity. Other claims as recreation and urbanisation will also increase. Water storage and urbanisation can be combined by living on water, such as on floating constructions.

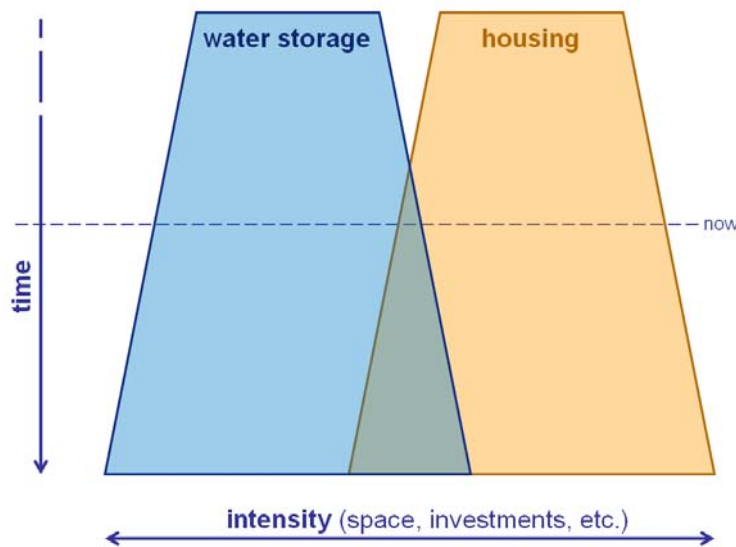


Diagram 1: multiple use of space (for example floating houses in a water storage area) can reduce the space and investments by integrating benefits and spreading costs.



Figure 4: the government campaign “the Netherlands live with Water” logo

The government campaign “the Netherlands live with Water” (figure 4) seems to be effective. Most Dutch somehow feel that there is more water coming into Holland. At the same time we realise that a large part of the Dutch identity is formed by living close to the water and by the many engineering solutions we have invented to deal with the water [5]. Would that be enough to start living on the water, afloat? To answer this question, the experience of the dweller will be approached from two directions: a short investigation into living near water and an overview of the history of houseboats.

Living near water

Human beings are not drawn towards the water. They are attracted to the borders between water and land. Of the 25 biggest cities in the world, 21 of them are near an ocean, sea or major river [6]. People have settled near the water because it moderates the climate and provides drinking water. Shore land is low and often flat. Furthermore it offers possibilities for transportation and trade, fishing, protection and recreation.

For the individual dweller, the water has practical and aesthetic advantages: mooring of boats, fishing, water birds, wide and far views, pleasing reflections, glittering and twinkling, etcetera. More mystic attraction is described by for example Henk Hofland: “water rejuvenates” [7] and Frits Schoute: “water pacifies” [8]. For these advantages one pays through the land value of the land ashore.

In the seventeenth and eighteenth century open water in the city has more or less become a sewer system that smelled and spread diseases. Many houses were built with their backs towards the canals. The rich Dutch merchants and their heirs wanted to get out of the city and many chose the sides of the river Vecht. They built strong houses and castles, designed gardens, developed the infrastructure and



Figure 5: the river Vecht

maintained the river. Due to the ongoing maintenance and development the value rises exponentially. It is now one of the most wanted areas in the Netherlands (figure 5). This value accumulation of shore land has happened similarly throughout Europe and the rest of the world.

In the late twentieth century the city surface water has been cleaned up. Water now is “hot” in new housing projects, for several reasons. Developers are subject to water related regulations and guidelines, such as minimum percentages of water surface in new neighbourhoods (the so called “watertoets”)[9]. Due to our strict building regulations the houses that are nowadays built tend to look alike; water can create a neighbourhood that is “different from the others”[10]. Developers’ slogans refer to islands, holidays and havens (see table 1).

Table 1: an arbitrary list of currently developing projects of houses near the water

<i>Slogan</i>	<i>project name</i>	<i>developer</i>	<i>location</i>	<i>number of houses</i>
Een echt eiland in Eilandenrijk	Eilandenrijk	Bouwfonds/Fortis	Terwijde	154
Thuis... op vakantie	Villapark Wieglande	Jachtwerf Arie Wiegman	Breukelen	35
Wonen aan het water	Thomashof	Thomashof BV	Workum	300
Recreatievilla's aan 't water	Belterwiede	Residentia	Westeinde	63
Een opmerkelijke thuishaven	Woonplan Riva	Dura Vermeer	Almere	75
Uw natuurlijke buitenplaats op de Vechtoever	Châlet Park Vechtoever	Arcabo/ Duntep	Nederhorst den Berg	225
Wonen in de Nordics, zuiver en fris	Nordics	Euro-woning	Almere	300

Fear of the water

“God created the world, but the Dutch created Holland” is an often heard saying about the Netherlands. It refers to the fact that a roughly a third of the country is reclaimed land from the sea or lakes. Our water related engineering efforts go further than that: over the centuries we created a landscape of basins and canals with extremely regulated water levels. People put full trust in the pumps, operating day and night. If they failed, the west and north of the country would be drowned within two days.

The biggest civil works were conducted after major floodings. Secretary of infrastructure and civil engineer Cornelis Lely responded to the flood of 1916 with the Zuiderzeewerken (mainly the closure dam between Friesland and Holland and the IJsselmeer polders). The 1953 flooding was followed by the

famous Delta Works. The system is not perfect: in 1993 and 1995 over 200,000 people had to be evacuated because of high river levels[11].

Although some Dutch from the sandy high provinces of Brabant or Limburg truly have a sense of fear when they bike along a dike, most of the habitants of the western provinces nowadays don't feel any threat associated with living near the water. This is not the case for living afloat; respondents of a Bouwfonds questionnaire mention trouble during a storm and fear of children drowning as clear disadvantages of living in houseboats[10].

Still, over 20.000 Dutchmen live in them.

Houseboat gypsies

Analyzing various houseboat histories reveals a development that has more or less similarly taken place throughout the world. Living afloat starts by gypsy-minded folks, free spirits, artists or simply poor people, who are handy enough to build their own house on a floating barge or raft. Why floating? Some dwellers use the mobility of the floating foundation to move along with their work, such as fishermen in Cambodia (figure 6) or lumberjacks in Canada.



Figure 6: floating village on the Tonlé Sap Lake near Siem Reap, Cambodia. The shore migrates because of rain peaks. The fishermen can always be near the lake to fish, and close to the shore to trade.

In rough areas it can be easier to build on the water; it hardly needs to be prepared and the area is flat and low. Often attractive sites can be found along a shore. Blue on the one side, green on the other. Some attractive spots are even quite close to city centres.

Furthermore: the legal status is often vague. Many adventure-minded people turn this into (at least a temporary) advantage. Most waters are owned and supervised not by private land owners but by often several authorities, who sometimes (in their confusion?) turn a blind eye. And if they don't, towing away is often more likely than tearing down. Summarised: if you want to live temporarily, cheap and benefit from an undefined legal status, build your floating house.

Houseboat yuppies

In the Netherlands, the above described situation is taking place between the second world war and the eighties. In Canada and the U.S.A. it starts even earlier. In Asia, it is still going on; living afloat has a clear connotation to poverty. Things change when urbanisation and development spread and embrace the remote (in a geographical and legal sense) floating houses. The city of Bangkok, Thailand, is said to have

consisted of 300.000 floating houses half way the 19th century. Right now, all floating houses have been exiled[12].

In Europe and North America, civilisation and regulation is also leading to pressure on houseboaters. Associations are formed and educated or charismatic members come to terms with governments. Along with this development richer people start living in the floating dwellings, attracted as they are by the often quiet and attractive mooring sites, a 'bohemian' lifestyle and the location nearby major cities. In Seattle, during the 1920s living afloat is "the thing to do" for privileged youngsters[13].

The wealthier residents of floating neighbourhoods build finer boats, improve sewer systems and often have stable agreements with the authorities. Technological improvement, legalisation, mortgage and insurance, go hand in hand.

Some lucky dwellers now live in houseboats in Amsterdam or Paris at a better location, with more living space and at lower costs than most of the city's apartment dwellers. In the USA, the floating neighbourhoods of San Sausalito and Seattle's Lake Union have become legendary[14]. To the old residents the nowadays new moorings sell for prizes they could have never imagined[15].

Legislation, mooring fees and financing of houseboats are ongoingly changing and can be different on each location. There is no country with clear national laws for living on water. The Netherlands are close to becoming the first.

From living near water towards living on water

The Netherlands are dealing with complex urban planning challenges. Compared to other regions in history and throughout the world, we face tremendous pressure on the available space, a highly educated and democratised population and serious threats by water influx from many directions. To resolve the forces in the planning process, a toolbox of partial solutions should be available and ongoingly upgraded. Floating houses and buildings add to the Dutch toolbox as long as the advantages are worth the costs.

From the perspective of the dweller, a major part of these advantages refer to the "classic values" of living near water. Most people only appreciate these values if the disadvantages of floating are taken away.

To enjoy the peace and quiet of the waterfront, the floating house should be levelled horizontally and remain stable during storm. To have a holiday feeling, the site has to be provided with all infrastructural facilities, including parking a car nearby (in the "blauwe stad" in Leeuwarden a 300 meters walk to the parking lot was too far for many floating houses to get sold[16]). One can sit and watch the sun set over the water, but preferably on a terrace or in a garden that offers enough privacy. To attract lively water

birds, circumstances should be provided for plants and trees to grow. Most importantly, one should be able to benefit from the classic values of the water not only today but also many years from now. To enjoy it, but for most dwellers, to be able to sell it. A house should increase in value during its lifetime and it has to be protected from calamities taking a too high insurance. Above all, the house should be durable and unsinkable.

Most of the above presented technical measures to facilitate the classic values of the water are more expensive to provide afloat than on solid ground (such as sand or rock). Building on stilts in stead of afloat is expensive too and not in all cases very attractive. Still, it is an important alternative to a floating foundation as it can also contribute to water storage (figure 7).

As much as we use and like the water, only few live on it. But these few dwellers illustrate that there are reasons to live afloat. Understanding and perhaps transforming these reasons can help to develop the floating neighbourhoods of the future.



Figure 7: dwellings on stilts also combine water storage and housing

The future of houseboats

From the perspective of the dweller, four major motives to live afloat have been found throughout history: costs, bohemia, manipulating legislation and mobility. To what extent do these reasons remain, now that living afloat is being normalised and regulated? Will they disappear, or can we transform them towards the new circumstances?

Costs – the early low costs of living on floating shanties and second hand barges will not hold for future floating neighbourhoods. Compared to building on flat sand, modern floating houses are expensive. The foundation and the installations are technically more complex. But: floating neighbourhoods shouldn't be compared to regular neighbourhoods on sand or rock but to other alternatives at that specific site.

Floating neighbourhoods throughout the world will probably only appear in areas that are (partially) below sea- or flood level, that have a high population density and that are economically strong. In the Netherlands, regions with medium density and high water buffering requirements provide better chances for economic feasibility. With regard to the perspective of dwellers, it should be clear that living in the west of the Netherlands in the 21st century is simply getting very expensive.



Figure 8: just north of San Francisco the legendary floating neighbourhood in San Sausalito moves up and down with the tides. Its original artistic value has been cultivated and adds to the (meanwhile very high) mooring and houseboat prizes. New floating neighbourhoods can't copy bohemia; it has to grow.

Bohemia – only little of this attraction will be left. Early settlers face pressure on their bohemian identity by the urbanisation and normalisation process. Living afloat for the sake of alternativity can hold but that implies a difficult task for architects and planners: how to design a self-built floating neighbourhood that can grow with the free spirit of, for example, San Sausalito (figure 8)? Bohemia and comfort don't go hand in hand; trying to strike a balance, lessons can be learned from the "wilde wonen" (wild housing) experiments [17]. Dutch housing corporation Bouwfonds uses a derivative from bohemia as a selling point for floating neighbourhoods: "exclusiveness" [10].

Bohemia is associated with few connections to existing energy, infrastructure and communication grids. Especially for floating houses it is advantageous to use stand-alone technology. For example, self supporting water supply and sewer systems avoid expensive flexible connections.

Manipulating legislation – this motive obviously disappears in the normalisation process. The number of old mooring sites are decreasing, let alone people can find new secret spots to hide a barge. In many districts new local rules are made to legalise the existing houseboats and regulate new ones. Guidelines and requirements are designed on a national level. This is now going on in areas that are traditionally not zoned for housing, like the river forelands. New floating technology is now not manipulating but transforming legislation.

Mobility – when architects and designers come up with concepts for floating houses, they almost always draw objects that can rotate or move. Understandable, as it is the main fundamentally different aspect of floating buildings.

Yet only few ideas will generate more benefits for the dweller than the higher costs of the technology. For example, a rotating house can be aimed towards or away from the sun. The rotation system is probably too expensive and requires too much maintenance, since none of the current 10.000 Dutch houseboats rotate or move for this purpose.

It is quite common that floating dwellers buy a new floating house and sell their old one, so they can stay on the same spot. The opposite should also be possible: when (throughout Holland) enough mooring space is provided, people can move their houses along to the city where they are employed, to where their relatives live, closer to their kids' school, etcetera. It will enhance the feeling of freedom, often associated with living on water. When more mooring space gets available, houseboats "on the loose" (without a legal mooring site), can be provided with one.

A bit further in the future, the possibilities of mobility on the urban planning level can be radical. If an area doesn't function properly, it can topologically be rearranged and partially replaced. Crappy dwellings make way for new ones. Student houses get replaced by bookstores, schools by houses for the elderly and so on. Parts of a neighbourhood are towed aside when a project is designated in a particular area.

Innovation in building technology can give urban planners new tools for their plans. On the other hand, developers of floating technology need urban settings to implement the new products.

Innovation opportunities

We have seen human beings moving towards the water from two directions: wealthy people started building near the water, poor people on the water. These two ways of living are moving towards each other against the background of the new Dutch water task.

The second group is slowly transforming its identity and only for a few new modern floating neighbourhoods the classic houseboat motives will play a part. To fully provide the first group with the "classic values of the water", the floating neighbourhoods of tomorrow require smart urban planning and technical perfection.

Almost all of the current floating houses can sink. They are often not levelled horizontally and rock during heavy weather. Installations are expensive because of the pumps and flexible connections. There is only little exterior space and hardly any green. All of this can be improved by technical innovation. This should be budgeted in the water management costs and sold as extra benefits for the dweller.

For example, several houseboats can be connected to improve stability. Water and sewer connections can be applied through the water to prevent freezing in winter. Expensive flexible connections won't even be necessary if the house takes care of its own drinking water and sewage system. A house on a small Styrofoam island is unsinkable, very stable and offers high quality private space including plants and small trees (see diagram 2).

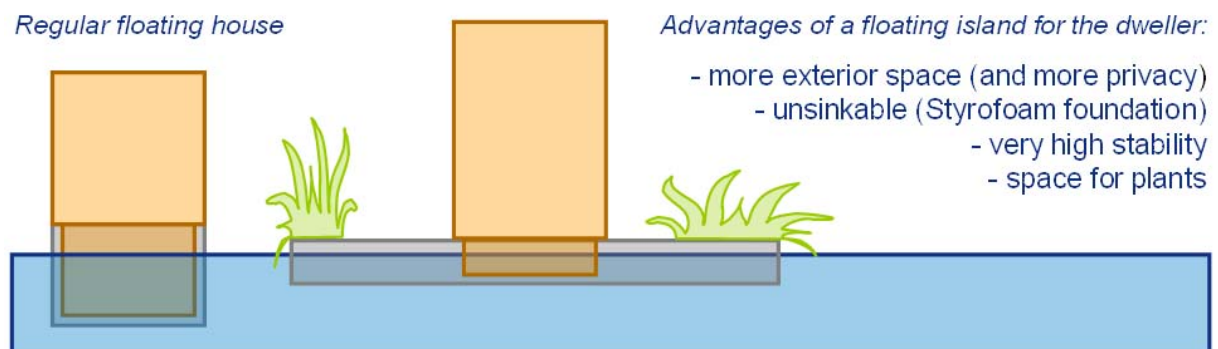


Diagram 2: a house on a small Styrofoam island is unsinkable, very stable and offers high quality private space including plants and small trees. The technology to provide for it doesn't yet exist.

Conclusion

People choose, based on the advantages they get for the expenses they make. As long as the classic values of the water are provided and the technology is reliable and comfortable, it will not matter to the average dweller if the house is on shore land or floating, he will choose the cheapest option.

In ten years, will the amount of floating houses have grown from 10.000 to, for example, 100.000? This mainly depends on the urge and volume of the required water storage. Urban planners have to consider all related aspects of a project to determine the total costs and benefits. The rewards of local water storage for regional water management, combined with the benefits of the water for the dweller, should pay for the floating technology.

In dense urban areas the water storage per floating house is small, and there is not enough water to enjoy – pumping the water out will be relatively cheap. In areas with a low density and low land value, water management and dwellers will not pay for the floating technology – building on the shore is cheaper. In medium density areas, the water buffering per house is high and there is enough water to enjoy – floating neighbourhoods can be the most feasible option.

If floating neighbourhoods take off and reach a large scale, the perspective will change. The new technology will become cheaper and on an urban planning level the possibility of movement can be more extensively used. Until then, small steps are necessary to improve technology and to gain insight in the interplay between the many concerns of the related stakeholders, including the dweller.

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