Climate Change and the acceptance of coastal sand mining on Wallis Island

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Abstract:
The use of coastal sand as building material or market commodity is a common practice on Wallis Island. Today, with the current threats posed by climate change, this practice increases the dangers associated with rising sea levels. Thus it is important to investigate the complex interplay between motivations, perceptions of need and risk, time scale and public acceptance that underlie sand mining. Political power dynamics and traditional land tenure are the two key factors that determine the future of this issue.

Even though climate change is frequently discussed in the media and scientific research starts to evolve around the subject, the growing global consciousness has had little impact on the perceptions of the people of Wallis Island. Most of the local population does not directly connect changes in the environment directly to climate change. The concept of climate change itself is not widely known, and since it doesn't present a direct and immediate threat to everyday life, the link between this highly theoretical concept and people's own lives in not easily established. (Leiserowitz 2006, Weber 2006)
In Wallis, climate change is something that people have heard about on television, and they feel highly empathetic for their pacific neighbours in Tuvalu or Niue, who seem to be in real trouble. Because the majority of the TV programming in Wallis comes from the French network RFO (Reseau France Outre Mer[1]), documentary broadcasts are international, rather than local in their scope and targeted audience[2]. Local broadcasts on Wallis' TV are limited to daily news and some special programmes. Those which cover environmental issues talk mainly about one of the big issues in Wallis' environmental protection debate: coastal sand mining.
Climate change and costal sand mining are closely related: sea level rise due to climate change minimises the available land surface, which is especially important on small islands. Coastal sand mining has the same effect: it minimises the available land surface since it accelerates erosion from the sea. Thus scientists argue that the human impact on coastal lines (which is not only limited to sand mining: Allenbach 1999) increases the impact of sea level rise. Whatever the scientific reason, it has been observed in many different places – not only in Wallis - that the coastlines definitely retreated – an evolution which is expected to gain in scale in the future

[1] http://wallisfutuna.rfo.fr/
[2] The coverage of the UNFCCC Climate Conference (Copenhagen 6. - 18. December 2009) might have had an impact on the perception – this was an event whose possible influence needs to be investigated further.

(Allenbach 2006:11, Mimura 1999:140, Mimura et al. 2007, Petit 2008:116). Since there is presently no known means for stopping or reversing climate change, it is imperative that we fully understand the human impact on the coastal environment. This is even more important when most of the concerned people voluntarily pursue these activities with a rather clear idea about the long term impact. An understanding of the reasoning behind certain behaviours can help to find exit strategies which are adapted to the human environment.

So why do people extract sand from Wallis' beaches?
The traditional *fale* (houses) in Wallis were made of organic materials, which required a lot of maintenance; also, they are not perceived as being very resistant to strong winds, cyclones and storm floods. The practice of building houses out of more stable materials like concrete became more and more frequent starting in the 1980s. The advantages are obvious: The foundations and roofs of these houses require almost no maintenance, and they have proven to be more resistant against strong winds and storm floods. In case of the latter "the water comes into the house, then it goes away again and all you have to do is a little cleaning and everything is fine" – as opposed to building an entirely new hut. Those who still live in the traditional *fale* nowadays are often considered as poor, as lonely elderly people without family. The concrete houses are constantly enlarged, starting with a terrace, a "carport", and then maybe a few supplementary rooms…the house is, amongst others, display of a family's wealth – less in terms of "beauty" in the conventional sense than in terms of size. A house's appearance thus serves as an important indicator of social status.

But where does the building material come from? Since Wallis is naturally poor in mineral resources, people use sand from the beaches for the production of concrete, a phenomenon also practiced on other Pacific Islands (Mimura 1999:140). After 30 years of sand mining, Wallis' natural beaches on the main island have disappeared, especially on the east coast, where the majority of the population lives. Sand mining has accelerated natural erosion, which changed the coastal line in two manners: first, in many places, the land has retreated substantially, sometimes as much as 100m. Second, in order to stop the land from disappearing, the construction of seawalls began in the 1980s – sometimes without the consent of the local population, and often without technical consultation. (Vanai 2000:141)
This is the reason why, from the northern village of Vailala, along the east coast until the south-western village of Lotoalahi, Wallis' seafront constitutes an almost continuous seawall. The seawalls were constructed without necessarily taking into account the laws of the forces of the sea swell (Carex 2002, Allenbach 2006:14). As a consequence, many of these walls are now in bad condition and have started to crumble into the water. They loose their protective function and the land behind them floods once more. (Allenbach and Hoibian 2008)
Nevertheless, these walls suggest a feeling of protection. In the few places where there is no seawall and a movement of the waterline towards the interior has been registered, people are eager to construct a wall in order to "correct" this gap in protection.

Economic wealth is not evenly distributed in Wallis, only 1/3 of the population has a regular income (IEOM 2008:29). The majority of the population lives mainly on subsistence economy and in many families a few people (those who have a salary) pay the bills (electricity,…) for

several houses of the extended family. The family members in return supply them with favours and subsistence products (yams, fish,…). Being a modern hierarchical Polynesian society, the display of wealth plays a crucial role in the social structure. This is unveiled on several occasions, for example during celebrations through the customary "donation" of pigs, or the attachment of bank notes on dancers' heads. Traditions are highly valued and are seen as being the essence of Wallisian society, and at the same time modernity claims consumer goods to underline one's social status. This is why the pressure of monetising available resources is high, be it on the top end of society in the form of a particularly expensive car or a big house, or on the bottom end where the basic needs like food should be covered.
There are two quick ways of earning cash: Fishing and then selling the catch to supermarkets which hardly seem to saturate on fish[3], or effortlessly selling sand as a construction material to companies. These companies then come to the private person's land with an excavator shovel and extract sand on the beach just in front of the property, until there is nothing left but the dead coral. The price difference between the purchase price paid to the landowner and the resale price is astonishing. Nevertheless, it seems that this is a quick and easy way to increase the family's wealth – on the short therm. Long term goals are not taken into consideration, and the fact that this diminishes the surface of one's own land is considered a non-threatening, small scale side effect that one has to life with.
Mainly due to this activity, the coastline of Wallis has gradually deteriorated over the years, and calls for stopping this practice have become loud.

The Wallisian legislative and administrative system is unique under the French law: Wallis and Futuna is a French overseas collectivity, thus part of France put with a particular, half-independent status under the French law which also allows the existence of a very hierarchical customary power system with a king (*lavelua*) as the leader of Wallis. As some sort of parallel structure there is the French administration; in theory, these two power bodies have complementary competences. (Chave-Dartoen 2002) The management of land tenure is considered to be a purely Wallisian domain, where the French administration is not supposed to interfere – which also explains for example the absence of a land register. The land, being seen as the untouchable domain of the traditional leaders, has become the symbol of Wallis' attachment to its traditional structures. Private land ownership is a rather new concept that is applied partly on properties inland which have recently (between the 1970ies and 1990ies) been attributed to individuals by the Lavelua, and in some rare cases land has been signed over to an individual. However, traditional landownership implies a complicated system of genealogical land rights that always include many people from one lineage. This traditional system defines every person as master over his own land, and permits him to do whatever he wishes with this land – and this includes the beach sand, since the perception of land ownership extends "a few metres"[4] into the sea. Hence, the selling of beach sand was largely considered as a family issue. A part of the population has demanded the reform of this system of land tenure; this is one of the points that divide the Wallisian population into royalists and reformists. This

[3] The current price that supermarkets pay for fresh lagoon fish is at 600 cfp per kg; so from a good day's catch one could feed his family for a few days, but of course fishing requires certain knowledge and is an exhausting activity; this, together with diminishing fish resources, is why alternatives are most welcome.
[4] Exact definitions of the extent vary among the customary leaders.

way of dealing with sand mining is obviously in conflict with public interest; so the customary leaders had to interfere -the public demanded that this issue needs to be dealt with.
2005 represents a turning point in Wallisian history. The attempt to depose the Lavelua from his office deeply divided the population and resulted in the introduction of a parallel customary power structure. This means that most customary positions (hence a big part of the power pyramid except the Lavelua) was occupied by two people – one reformist, one royalist. This weakened respect for the traditional hierarchy. Before 2005, there was a growing awareness that sand mining had to be regulated. This entailed an official prohibition from the customary leaders of the extraction of beach sand for any other use than the construction of one own house, thus the interdiction of trade with sand. It was concluded that in case of disrespect there should be a punishment for the person who doesn't respect this rule. As an alternative, it was proposed that people would be allowed to dig holes in the soil of their inland properties in order to use the sand at the interior of the island instead of the beach sand, as long as they fill up these holes with other material (earth).
This regulation seemed to be relatively effective, as the holes on the interior became numerous. But in many cases, the Department of Public Works had to fill up the holes created by inland sand mining. Since 2005, the division within the customary power body has only partly changed, and tensions still exist, especially in the Northern District of Hihifo. People have lost trust in their leaders and, depending on whether they are royalist or reformist, tend not to respect the decisions made by the authority on the other side. For example, if a royalist is told by a reformist district leader to stop the extraction of sand, it is almost a question of principle to continue the extraction. Each group sees the other as not intervening sufficiently in this issue.

But politics alone does not sufficiently explain continuous sand mining. Customary management of land and Wallisian social structure are generally orientated towards meeting "needs" and can be very flexible depending on the situation. Despite the existence of a regulation forbidding sand mining, the social identity of the individual extracting sand is most important. Those who have close ties with people in power are less likely to be chastised for selling their sand. Likewise, if the customary leaders believe a certain family has a real need they will not interfere with sand extraction. Though customary leaders understand the importance of protecting the environment, they feel it is more important to feed families and send children to school. Often the leaders will mention that they attempt to work with people to find solutions other than sand mining, but there are few alternatives. Life in Wallis is based around the family, so the argument "for the children" can't be turned down.
At the same time, the issue of what represents "real economic need" can be defined differently. Observers sometimes cannot understand what the need would be if the children are already grown up, the house is built and the four-wheel-drive is bought….

It can be stated that there are three general purposes of sand mining, with varying degrees of acceptance by the public:

1. *Extraction for private use as a building material*

This is generally tolerated, since this is defined as a "need". The quantities are limited. Unfortunately though, this sand contains salt and is thus not an appropriate building material, since salt accelerates the corrosion of a building's steel scaffolding and endangers the stability

of a house. Beach sand needs to be treated in order to eliminate the salt so that it can be used as a safe building material (AESN 2007). Because this procedure is not performed in Wallis, houses often deteriorate rapidly. This, too, is a long-term consequence that is often not taken into consideration, especially if the house is supposed to be built quickly. Houses are not built for generations; they are supposed to serve an immediate need.

2. *Extraction with the purpose of selling the sand*

Publicly, this practice is condemned, even though it is widespread. Sometimes individuals extract sand during the night, in order to draw less attention to the activity. This is where environmental associations may try to interfere and to dissuade the person (or family) in question – with varying success.

3. *Small quantities of white sand* which are used on All Saints Day to decorate the tombs of the deceased, or decoration in private gardens. This use is not contested at all; these are practices that are very common in the South Pacific and the quantities used are negligible.

There are two methods of extraction, which are closely linked to the purpose:

a) Extraction with the hand-shovel: quantities are obviously limited and serve mainly purposes 1 and 3. This is considered as a private issue.
b) Extraction with the excavator shovel: in case of purpose 2, the presence of excavators and trucks to transport the extracted sand represent a very powerful and threatening image. Here the purpose is very clearly orientated towards commercialisation and personal enrichment, so this is subject of discussion; any further investigation depends on the circumstances mentioned above.

It can be stated that in the public opinion the quantity, the purpose and the method of extraction are the determining factors if the activity is tolerated or not.

Case	**Quantity**	**Practice considered as "bad"**	**acceptance**
1a: Private use / hand-shovel	small	no	high
1b: private use / excavator shovel	medium	considered as necessary, but not appreciated	medium
2a: commercial use / hand-shovel	-	non-existant, not enough profit	-
2b: commercial use / excavator shovel	high	very bad	low, depending on circumstances
3a: use for tombs / hand-shovel	very small	no	high

In order to confront this issue, an Environmental Code “Code de l’Environnement” (2007) was created for Wallis and Futuna. But, if the internal division of the customary authorities represents one source of uncertainty, so are the activities of the administration not always supported by the customary authorities. (One, but surely not the only, reason for this lack of cooperation is the frequent change of traditional authorities; it is difficult to establish a productive collaboration if the person who occupies a position as a traditional leader is

frequently replaced.) Thus some leaders reject or even deny the existence of this document as they feel that it is not adapted to their cultural context. Furthermore, it is written in legal French – which is sometimes even difficult to read for French native speakers. This does not motivate the Faka-Uvea speakers to examine the document closely.
Nevertheless, the document requires a close cooperation between engineers, administration and customary leaders, and most importantly, the consent of the latter in environmental questions that are linked in any way to the land[5]. Besides, in the case of extractions of large quantities of sand (500m³ or more of extracted material), a lengthy and expensive impact study is required[6]. Furthermore, it was observed that even removing small quantities of sand can have a very negative impact on the coastline. In Wallis where decisions are first verbally discussed and then adapted to the specific situational context, this administrative detour does not make sense - it only complicates a basically simple process and the importance of the outcome is questionable. This regulation is thus widely considered as imposed, even more because this concerns one's private land where strangers are not supposed to interfere.

The issue of sand extraction on Wallis is highly complex and representative of the social dynamics in Wallis today: a lack of acceptance of authority combined with a lack of realistic alternatives for maintaining expectations for standard of living. Sand is the only resource that is easily accessible and has the potential to be commercialised by everyone.
As for the use of sand as a building material for private homes, it must be noted that houses can only be built when there is money available. No matter what the price, building with imported cement is always more expensive than using (free) local sand, and slows down the building process. This contradicts the logic of immediate need. Hence the public vision on the subject is twofold: personal needs paired with short term perspectives which try to circumnavigate customary regulations, and collective environmental interest paired with long term perspectives.
In other locations around the world, alternatives to coastal sand mining are also being sought. (e.g. AESN 2007, Anirudhan 2004). Offshore mining seems to be one of these alternatives, but it also needs careful and expensive preliminary impact studies on underwater geology, flora and fauna and hydrodynamics to determine whether the consequences for the chosen site and the nearby coastline are acceptable. Technically, the characteristics of the material collected underwater are close enough to its terrestrial counterpart so that it can be used as a replacement. (AESN 2007) The public interest for the combined problem of climate change and sand mining is constantly growing in Wallis, especially among the young people who have also worked on the issue as one of the themes proposed by the Secretariat of the Pacific Community[7] together with the Environmental Federation of Wallis *Hau fa ki ite u fenua*. The

[5] Article E. 110-3 (…) Les instances locales (…) en ce qu'ils ont des compétences directes ou indirectes en matière de gestion ou de préservation de l'environnement, devront veiller au respect du principe de souveraineté de l'Autorité coutumière dans le domaine foncier pour ce qui concerne les questions environnementales. (Code de l'Environnement 2007)
[6] Article E. 121-2 (…) faire l'objet d'une évaluation d'impact sur l'environnement, produite par le pétitionnaire ou le maître d'ouvrage - Extractions de soupe de corail ou de sable de plage, de matériaux de construction à partir des lits de rivières, supérieures ou égales à 500 m³. (Code de l'Environnement 2007)
[7] http://www.spc.int/corp/

discontentment with the current practices was also displayed on the occasion of a public conference on the topic "Conférence-débat sur les sables et les aménagements littoraux"[8].

In Wallis, local alternatives like mining in the lagoon instead of the beaches and importing sand or similar materials are currently being investigated (Allenbach 1999b, personal communication Allenbach 26.3.2010). If engineers are able to find a local solution, the Wallisian authorities would still face the challenge of managing the distribution. Given the current social dynamics in Wallis, the implementation of new regulations would need to take into account the personal interests of each family to endure. They would also need to be accompanied by educational measures to inculcate community consciousness of the negative long term consequences of sand mining for the community.

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