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Global warming and migration

Is migration an adaptive response to climate change?

Some African, south-Asian, Pacific and palaeoanthropological studies trying to answer

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Calore e processi vitali: cellule, organismi e società umana

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Preface

I started investigating on this topic looking for information about heat-caused mass migration from the Sahel countries. The image in my mind represented persons or groups of persons who decided to move mainly because of the extreme heat or the impossibility of growing their crops in the fields they were used to, maybe as the sand of the expanding desert covered the ground or as multinational companies put their drills for petrol and their combustion processes near villages in the countryside.

Where would these migrants go? To Europe, of course, as every time a European hears the word migrant, he thinks that the only arrival of every migration is Europe. It is curious that many Europeans think that we should help Africans at their place, but still nobody of these Europeans would conceive Africa as a place to live, while surely many Africans are supposed to do so for Europe.

Anyway, it came out that climate induced migration isn't the kind of migration that brings masses of Africans to Europe. For real, my research unveiled a high quantity of contested elements about the entire climate induced migration subject. At first I was disoriented because of the prolific but somehow fragmented literature about the precise relation between climate change and migration. I could note from the beginning that it was divided between those who accepted almost automatically that the media-overexposed migratory routes were in great part also due to an unbearable heating climate and those who tended to demolish every easy construction in this sense and to pose a problematic view. At a certain point, thanks to the readings I had made and to the useful suggestions from my teachers and some NGOs' kind exponents, I began to develop an autonomous conception, despite the great epistemological lack that I didn't do any field-research for this work and therefore I couldn't test on my own skin the experiences I was talking about.

Of course, I spoke about this project to some friends from Africa, most of which are asylum-seekers, and asked their opinion. Yet the answers I collected often sceptically sounded like: "So you really think that migration is caused by climate change?". I could say that, to the benefit of my research, those conversations can't be considered any professional nor reliable field-work, even though they really helped me in understanding something more about African geography, environments, ways of thinking. So this is an admission: this work is a literary critique exercise -which is said with full acknowledgment of the reality-pregnancy that features literary activity.

Gradually, I recognised the frequency, the importance, the positions and the limits of certain names involved in this literature: El-Hinnawi, Black, Findley, Suhrke just to name some and often, besides the more obvious IOM and IPCC, the World Bank. Yet the most illuminating ones for me were the others that made a balance of those works, such as Gregory White and Richard Black himself, who provided a quite wide vision upon this panorama.

Moreover, I got aware that it was sometimes (actually almost always) a useful exercise that of studying the collateral issues to the main branch, and therefore I spent much time in analysing the context of provenience, also to give the correct dimensions to the questioned migratory phenomenon. It made clear that migration isn't the only available option for people experiencing global warming, also when it concretises extremely, as the history and the adaptation efforts of many communities all around the world show. The support of humanitarian associations can help, but it isn't necessary to induce the always existing human agency.

And, of course, the Sahel isn't the only place in the world in which there exists a relation between global warming and migration, even if it is a region of the earth particularly sensitive to climate change.

This essay doesn't aspire to give a complete or general vision of the entire phenomenon of climate induced migration, instead it tries to collect some material of different provenience about some contexts of climate induced migration and dismantle the eurocentric conception of both migration and climate change, investigating how these two are related. The heterogeneity of the elaboration may sometimes create a discontinuity, incongruence, disorientation, incompleteness sense that I tried to reduce as much as possible, but not to annul. It is reality that flows in this manner.

It could be useful to consider that, even if there exists a harmful and disaster-provoking anthropogenic global warming nowadays, climate induced migration, adaptation to it and adaptation to the climate and to the environment in general have existed since the birth of humanity and have probably caused the widespread of *Homo sapiens* out of Africa itself, which should help understand that "governing the migration" in the sense of "let it be authorised and approved" by the states, as if the "normal" condition of humanity was to remain in your own "nation", is quite ridiculous.

How climate change affects human lives

I will start by considering some cases which allow to comprehend in what ways climate change can impact the life of communities, whether it drives to migration or not. Even though the entire essay will deal with diverse and numerous affected contexts, this start will firstly introduce the reader to a region much involved into the climate refugees and desertification discourse, the Sahel, where temperatures have increased by nearly 1K since 1970, nearly twice the global average. Here, drought struck in 2005, 2010 and 2012, while significant flooding has become a yearly occurrence. The IPCC expects the temperatures to increase by 4K by the end of the century. Gregory White, in his *Climate change and migration: Security and borders in a warming world*, 2011, reports: "Funk et al. argue that climate models demonstrate that declines in eastern and southern Africa growing-season rainfall are linked to anthropogenic warming of the Indian Ocean. [...] Similarly, Trenbeth et al., of Working Group 1 of the IPCC's AR4, argue that warming in recent decades has contributed to an earlier onset of the rainy season over northeastern Africa and a late start in southern Africa. [...] Despite some recovery from the worst of the '70s, the mean of the '90s is still below the pre-1970 level. Biasutti and Giannini demonstrate that the Sahel sever drying [...] is attributable to changing SST (Sea Surface Temperature) rather than anthropogenic land surface modification".

However, I will subsequently take a closer look to a smaller-scale Ethiopian dimension, in which climate change directly compels a lack of sources for the subsistence, e.g. water, therefore letting the readers expect a possible emigration hotspot, especially if they are highly exposed to the migration-as-an-emergency discourse. On the contrary, a 2011 documentary movie testifies that the Boranas, an Oromo group settled in southern Ethiopia that has been experiencing longer and longer dry seasons in recent years, choose rather to rely on their ancient wells than moving elsewhere. Still, the impact on life of these droughts is total: while it is unclear whether they will increase tensions and conflicts, it is certain that the relations of production of goods and societies themselves are changing.

Risks and conflict in the Sahel according to FRIDE

In *Climate change and state fragility in the* Sahel[1], Alec Crawford suggests that, even if "climate change is unlikely to be a direct cause of conflict in the Sahel [...] it is expected to contribute to conflict by acting as what United Nations (UN) Secretary-General Ban Ki-Moon refers to as a *threat multiplier*, [...] potentially triggering new conflicts when combined with existing conflict drivers like political and economic instability, poverty, inequality, weak governance, and historical grievances". These words were published through FRIDE, a private European think-tank settled in Madrid and Brussels mostly dealing with EU foreign policies. Alec Crawford leads the Resilience Program on Environment, Conflict and Peacebuilding at the International Institute for Sustainable Development.

The estimates from the African Development Bank are said to evaluate the costs of adaptation to reduce climate vulnerability to an acceptable level in Africa at 20-30 billion US$ per year over the next 10 to 20 years, which could contribute to a collapse of governments that already have difficulties in providing basic services to their citizens.

In this region, the population is growing quickly: it jumped 30% from 2000 to 2010, and continues to increase at nearly 3% per year. On the 14th July 2017, on the *Corriere della sera*, Michele Farina reports data

[1] Crawford, Alec *Climate and state fragility in the Sahel* FRIDE, n° 205 June 2015

of the UN Economic Commission for Africa according to which African population will be 26% of world population in 2050 (17% nowadays), and in the same year Nigeria will be the third most populated country in the world after India and China (it is now the most populated in its continent, with 184 million inhabitants). By the end of the century, the half of under 14 years old children will be African. Among the first ten countries for birth rate we find Niger (7.6 children per woman), Mali and Chad (6.2), Gambia and Nigeria (5.7), and other non-Sahelian African states such as Somalia (6.5), Angola (6.1), Democratic Republic of Congo (6), Burundi(5.9), Uganda (5.8).

However, Farina also reminds that even if Africa is the only continent with new land still available for agriculture, it is experiencing "the worst drought of the last 20 years". A drought that, according to Crawford, doesn't allow farming nor pastureland to increase at the same rate as the population. "Northern pastoralist are extending southwards into the Guinea Savannah, a zone traditionally dominated by crop agriculture. At the same time, farmers in areas like southern Mali are expanding crop production into migratory territories traditionally used by herders [...] According to the USAID, both groups are also now increasingly turning to each other's livelihoods to supplement their incomes [...] This results in increasing competition over the same dwindling resource base [...] The influx of small arms and light weapons into the region, following the Libyan civil war, increases the risk of tensions turning violent."[2]

Almost all of the surface water and groundwater resources are shared cross-border among the states in the Sahel, which accentuates the vulnerability in case of clash. All of Burkina Faso's rivers and waterways are shared with its neighbours. For Mauritania, none of the water sources is solely domestic, as the only permanent river, the Senegal, is the border with Senegal. Niger and Volta rivers and lake Chad are managed through cross-border basin agreements as well. A great number of refugee could be in danger if their access to water was compromised: Chad is hosting 460,000 refugees from the Central African Republic, Libya, Niger and Sudan, while trying to reintegrate 200,000 Chadians returning from Libya and Central African Republic.

Crawford even suggests that the terrorist groups operating in the zone, such as Boko Haram, AQIM and MUJAO (both linked to alqā'ida), could gain new forces from the marginalised ones, such as the growing, out-of-school, low-skilled rural young generations, if the governments turned out to be incapable to take on the impacts, needs and secure alternative livelihoods of the climate-dependent countryside.

Droughts in Oromia

A specific case study could be the one among the Boranas. The director-anthropologist Paolo Barberi, who used to teach Anthropology at Roma Tre and is now doing research at La Sapienza, tells quite well how climate change interacts with both their economics and sociality. The somehow militant documentary *The well- Voices of water from Ethiopia* shows an environment in which the lack of water is combined with a strong respect for the discipline in the use of the wells, through several narrating voices. I will let them speak by assigning to each a different colour.

At the beginning, an old man explains that there used to be two rainy seasons in the Oromia, a very short one and a longer one, but in the last years the rains decreased. The entire Boranas' economical life depends on breeding livestock such as cows, camels, ships, goats... therefore, in order to survive, during the dry season each of these must have access to the well, besides all the human members of the community that need it. It is immediately evident that animal and human movements are related to the quest for water:

[2] Crawford, Alec *Climate and state fragility in the Sahel* FRIDE, n° 205 June 2015

"Every dry season animals die and we suffer. People had to move far away with their animals looking for pasture"; "These people coming from Afar[3] because of the drought must walk long distances to fetch the water and let the animals drink."

What we hear first about the ancient wells is: "In the past the wells were divided equally between all the Borana clans. Even those which have been abandoned belong to a clan. There are no clans without a well." And about the abandoned wells we are told: "Several reasons lead to a well being deserted. Sometimes the tribes flee because of war and leave the wells behind them. Also people often leave because of drought. At other times rain may bring debris and cover the well's water tables or landslides may block the acce ss to the well."

As the wells are very deep and are excavated level by level, with almost concentric circular holes in the ground, people are needed to lift the water from the last wet level to the upper ground-level, where tanks are located for the animals' beverage. This continuous work is made by young men, that settle at each level of the structure and, while they take a full basket from the man under them, they pass to him an empty one from the man above them. To stand the effort and keep their coordination, they sing very rhythmic songs -which is why they are called the "singing wells". They sing "[...] to avoid getting bored, or simple music for the animals. The song celebrates the animals, describing when they graze, how they graze, their health..." The work-turn at the well lasts for three days. "The only duties we have during the dry season are tending the animals and working at the well [...] and there's no rest between the two".

Each day one clan has the right to use the water. If anybody else needs it, they can ask for it and if their reasons are recognised as valid, they are allowed to use the water. "Among the Borana, if anybody comes from far away in need of water, he can explain his problem and ask to use the well. And even other tribes can't be refused access to the water, such as the Gabra and the Garri, our neighbours. They can come and drink like anybody else, but only when we are not at war. Water cannot be denied to anybody"

If a well is made unavailable by any obstruction one day, the group in charge can use another one for that day while a team removes the obstacle.

Times are getting harder for the Borana: the soil is increasingly unavailable, while non edible plants grow spontaneously. A woman says: "This is not a good place for us to stay. There's no rain, nothing grows and we can't farm the land, but soon we will move with our animals beyond Korm-Illu. If there is pasture land and no war then the cows will graze as far as Wayama. While the main village will stay in Korm-Illu where we have a permanent settlement. But if we go there, after a week we might need to flee from the war."

Still, many of the characters explain that, thanks to educated young people, improvements are possible. Some government-funded engineers designed a path that, starting from a certain distance from the well, with a progressive inclination, directly drives people and animals to lower levels, in order to reduce the length of the bottom-up human chain to lift the water. Education and academic science are recognised as positive and useful for the community. "Twelve years ago the wells were much deeper. Then, thanks to our work and the International Cooperation we achieved significant results. Before we needed seven levels of people working in the well, but after digging the ramps four levels are enough [...] only about eight sticks (800 animals) could drink each day, now [...] up to 22, 23 sticks (2300 animals) can [...]" Plastic bucket instead of leather bucket are also recognised as an improvement. However, a man interviewed at a well

[3] A northern Ethiopian region

says: "We don't know or have any alternative. As our grandfather suffered from this work we will continue to do so. [...] That's why we transport water every day"

"We don't have any plan or program. The government sometimes intervenes. Do you see that animal ramp level? Before it was that high! [signs very above his head] This solution came from educated people. And if you want to know what we need now, we need solutions from educated people in order to drink from up there."

Nevertheless, not all the innovations are approved. In particular, the use of a motor-well that lifts the water automatically, a facility built with some EU funds in 2004, is discouraged. There's no guard nor rule for this well, anybody who can afford the petrol that makes it work can use it, you only have to queue and pay.

Its usage is discouraged because of many reasons. A strong one is that the diffusion of money among the Boranas is substituting their previous economy, based on livestock bred for the clan and the community, with the economy of global market, with its exponential downturns for the poorer. Nowadays, with the hardships in breeding the animals, many try to make a living of selling their livestock at the markets to gain money. "Now children go to school and are educated. Now people don't want to work with cows as before because there's no productivity. People are changing their mind about the animals. Once when there was a drought like now we would slaughter the animals, we would choose best cows and fattest bull and eat them at home and it was during this period that weakened people ate and became stronger. Seeing these benefits, it's natural that people keeps the animals. But today the products are less nourishing and then benefits are smaller and people make money by selling. So now they prefer money over animal products. Today people like money, nothing else." The use of the motor-well is therefore supporting the new money-based economy. "During the dry season the price of the animals decrease, and feeding them is more expensive. To solve their problems, my people is prepared to sell animals at any price. We don't have anything to sell except animals. If anyone gets ill, he will sell animals to buy drugs"

It's at this point that the director insists on the equal and indiscriminate access that everybody has to the water in the Borana society, even in the scarcity -which deserves attention, study and maybe imitation.

I'd rather think that what emerges from this study is the way in which the Boranas conceal their historical livelihoods and techniques with the education and the market economy that the outside powers can strongly propose. Into this context, a particular conception of equality, focused on the survival of everybody according to their needs, and most of all very concerned about the respect for the different roles, is surely an important tool for adaptation to climate change.

"According to Borana law, if there are horses at the well, it's their turn to drink first, then it's the calves turn, then the women arrive to fetch the water, then come the cows and finally the camels. The goats and the ships find a place among the other animals."

"I will be the Konfi[4] for my whole lifetime. My father inherited the role from my grandfather as he did from my great-grandfather. And that is how we continue to serve our community." "The Konfi is the first to let his animals drink, then all the others follow. The animals can drink water each three days, and the wells are also used every three days. [...] If it's my watering turn and you bring your animals to drink, I can stop you and you cannot use force, but you ask me a favour." "The order of drinking at the well follows the order of slaughtering the animals during the excavation. Priority is given to whoever has slaughtered first and then

[4] The person in charge to guard the well

the second and the third will follow in order. Everyone has an assigned day in using the well, and if anything goes wrong with the well in that day, he is considered responsible." "A manager organises the daily shifts but the Konfi's clan decides the order of access to the well."

Some studies about the consequences of climate change and its relation with migration

The World Bank report

The Social Development Department of the World Bank funded a survey entitled *Assessing the impact of climate change on migration and conflict*, for a workshop of their whose name is *Social dimensions of climate change*. The authors Raleigh, Jordan and Salehyan, respectively from the Universities of Sussex, Florida State and North Texas, focus on the relation between environmental challenges and migration. At the beginning of their work, they write down their five conclusions.

First, both disasters and the responses of people to them vary depending on the context: "focusing on how people are vulnerable as a function of political, economic and social forces leads to an in-depth understanding of post-disaster human security."[5] Second, "individuals and communities in the developing world incorporate environmental risk into their livelihoods. [...] Diversifying income streams is the predominant avenue through which people mitigate increased hazards from climate changes. [...] labour migration is typically internal, temporary and circular." Third, "during periods of [...] increased soil salinization or land degradation, the most common response [...] is to intensify labour migration patterns. By doing so, families increase remittances and lessen immediate burden to provide." Fourth, "with the onset of a sudden disaster or the continued presence of a chronic disaster (i.e. drought or famine), communities engage in distress migration patterns. [...] generally communities face three choices in relief: 1) to depend on social networks for relief 2) to be processed by agencies to access aid [...] 3) to relocate to camps for temporary or long term resettlement assistance". Fifth, "as environmental migration is typically internal and short-term, the potential for instigating conflict is quite minimal. However, unstable urban and rural demographics are related to higher risks of civil war and low level communal conflicts during periods of environmental stress are common."

They also claim: "contrary to conjecture from security researchers, we find little evidence that migration will exacerbate already volatile situations in the developing world. [...] As the people most affected by climate change are typically the poorest and least powerful within a country, they are less capable of waging significant conflicts to redress grievances against neighbours or governments."

They start by assuming the change of perspective that the International Panel on Climate Change adopted, by abandoning the apocalyptic tone of "millions displaced by shoreline erosion, coastal flooding and severe drought" (IPCC, 1990:20) and converting to considering the vulnerability to climate change undergone by the poorest. In the 2007 IPCC, migration is addressed as a consequence of climate change through two channels: drought and cyclones. In relation to sea-level rise, migration is not considered a direct consequence, but a projected cause of poorer health.

Not all the poor are vulnerable in the same way, depending on physical and social conditions. "The Maasai of Kenya provide an appropriate example of the interaction between physical and social vulnerabilities. They are considered marginalised as their access to social services, physical infrastructure and political representation are routinely well below national averages in remote and low population density pastoral

[5] Raleigh, Clionadh & Jordan, Lisa & Salehyan, Idean *Assessing the impact of climate change on migration and conflict* Social Development Department, The World Bank, p. iv

areas. If drought should affect large swaths of Maasai and non-Maasai territory, Maasai would be most vulnerable to severe and crippling economic effects, as their margin for disaster is so narrowly constructed by forces partially beyond their control."[6]

Moreover, each kind of hazard should be considered singularly. The rate of migration due to chronic drought conditions initially follow pre-established labour migration patterns, and may not differ in intensity from areas with established high rates of temporary, circular migration. The root causes of increased flood risk are linked to degradation of food plain land, but also unequal patterns of asset ownership and income, rural land tenure systems, population growth in marginal areas, and governments land access policies[7]. On the other hand, the activity of cyclones, hurricanes and waves is increasing, even though it's uncertain how much climate change may affect it. Available estimates point to a 5-10% increase in peak intensities and 20-30% increase in precipitation rates. This kind of events leads to distress migration, until the population returns to rebuild.

IPCC forecasts future sea-level rise range between .09 and .88 meters between 1900 and 2100. The countries most at risk include Kiribati, the Maldives, the Marshall islands, Tokelau and Tuvalu. "Managed retreat" or the "progressive abandonment of land and structures in highly vulnerable areas and resettlement of inhabitants" is frequently mentioned as a possible adaptation in reference to erosion and SLR. However, to date, no such movements have been taken.

The meaning of sea level rise

Here it is important to point out that even sea-level rise forecast is an essentially contested concept, not only in its quantitative relevance, but also in the meaning that scientific, political and social discourse provide to it in the same moment they describe it. Cultural anthropology is the discipline that fits the task of exploring how concepts and practices are differently constructed and given significance at the different levels of individuals and groups that constitute society and humanity. It highlights that every knowledge is a situated knowledge and that information reported without its context tends to hide relations of power. So, even a measurable, physically and statistically approachable issue such as sea-level rise can produce, strengthen and weaken both imageries and political issues in which specific groups pursue their specific interests.

A research conducted in 2010 by Carol Farbotko (Australian Centre for Cultural Environmental Research, University of Wollongong, Australia) and Heather Lazrus (National Centre for Atmospheric Research, Boulder, USA) reveals the distance between what the authors call the "global narratives" and the self-perception of Tuvaluans. They worked as cultural anthropologists both on the island field and by reading the literature about the climate-refugee discourse applied to sea-level rise in the Pacific.

With a foucaultian gaze they highlight the importance of the relations of power generated in every interaction occurred between men, especially when involving language. If journalists, ENGOs and political movements come to cooperate in building a certain imagery by describing Tuvalu's future scenario as a necessary climate-refugee-crisis without considering the local perception of this, they are depriving Tuvaluans of their agency and capability of behaving as human beings facing a complex and uncertain present and future.

[6] Ibidem, pag. 5

[7] Wisner, Ben & Blaikie, Piers & Cannon, Terry & Davis, Ian *At risk: Natural hazards, people's vulnerability and disasters* 2nd edition Routledge: Taylor and Francis, 2004

"Firstly, who is insisting that populations will migrate to the developed world[...]? Secondly, what policy mechanism may enable populations to migrate in ways that do not result in the necessity for refugee status and are congruent with local practices and preferences? When such questions are bypassed, the sensationalism of the term *climate change refugees* is too easily answered by reactionary policies preventing movement without generating concern for the welfare of populations involved."[8]

And if they happen to be refugees, will the Geneva convention definition fit them? Will it be necessary to modify it? What political actors will take such decisions?

An image of migration as crisis is built and Tuvaluans are represented as victims or climate heroes.

For the first case, we can see how the Australian Green Party proposed a bill to legislate a climate refugee visa in 2007, according to the piece of information spread by the media that New Zealand was accepting 75 climate refugees from Tuvalu per year. However, New Zealand was actually accepting up to that number of migrants per year from Tuvalu as a part of the Pacific Access Category, an economic rather than humanitarian measure. For the second case, we should look closer to *Alofa Tuvalu*, a French NGO, that romanticises Tuvaluans as strictly bound to nature, as if the "indigenous populations" were rooted in their territory, in juxtaposition with the developed and therefore mobilised West. Their purpose was to transform the island into a place powered by 100% renewable sources, such that "the climate victims" could teach "respect for nature" to the others.

However, it is interesting how Tuvaluans position themselves with respect to the description of their condition. Siuila Toloa, the director of the Tuvaluan NGO *Island Care*, was recruited into a Climate Justice Tour organised by *Friends of Earth* and as a *WWF South Pacific Climate Witness*, and had the chance to say: "How often have you heard someone argue that climate change is not their business? [...] The small low island states [...] contribute insignificantly to global emissions, but suffer most" (2004) Although she agrees that climate change has an impact on small islands, she underlines the inequality issue and the responsibility of the main polluters, rather than asking for a refuge.

Many contest the migration crisis version by reminding the meaning that migration has had for a long time in Tuvalu. At the Tuvalu Campus Public Seminar, on the 12th August 2005, an audience member stated: "We have been moving in history [...] from place to place all the time [...] from island to island". As Epeli Hau'ofa, a Papuan writer and anthropologist, wrote: "Land, although extremely significant, does not delimit Pacific economic, social and cultural values. Rather, the ocean is an important bonding element and a bridge of connectivity between communities." An often circular migration turns out to be crucial in everyday life, with its webs of remittances, communities gathered abroad, mutual aid... migration is "a collectively negotiated mean of participation in transnational networks, a way to meet family obligations and desires" , as Doug Munro, historian, Associate Professor at the University of the South Pacific, said in 1990. Yet these considerations are consistent with the assertions of Raleigh's survey: kinship and neighbourhood good relations stood out as important in the Pacific Islands. Barnett (2001) found that people maintained habitation of the Pacific Islands during periods of "substantial exogenous and human induced environmental change", maybe thanks to cross-islands community efforts: they would help each other "through the distribution of food or allow the dispersal of people to other islands"[9]. Smaller scale

[8] Farbotko, Carol & Lazrus, Heather *The first climate refugees? Contesting global narratives of climate change in Tuvalu* Elsevier, 2011

[9] Barnett, J. *Adaptation to climate change in the Pacific Island countries: the problem of uncertainty* World development, 2001

migrations within home islands were observed in Samoa and Tokelau during the cyclone Ofa. Still, according to Campbell (1998)[10], there is some worry that these bounds are now substituted by the links between families and their abroad, maybe far members, considered that remittances are now the most consistent part of post-disaster aid.

Anyway, Tuvaluans reflect on the stereotypes related to migration and discuss them. The same audience member as before said: "Do we have to migrate in order to lose our culture? Because we could lose our culture by just remaining where we are [...] we could change it... culture is an evolving thing [...] wherever we go or wherever we stay, culture is still evolving and changing" And a second one: "Even if we migrate, I do not feel comfortable with the word *loss of culture.* Today in New Zealand, [...] a Tuvaluan community, they do maintain their identity [...] even though they have left Tuvalu for better opportunities [...]".

However, the main concern is the vulnerability that the refugee status may induce: "We wouldn't like to eventually get forced out of our place and be classed as environmental refugees. That has a negative attachment to it. It's like considering ourselves like second-class citizens in the future [...] because we are born equal and we should be treated equally" says the director of a Tuvaluan NGO in Funufati, interviewed on the 25th August 2005.

Emeretta Cross, on the 22nd September 2009, sent to Tuvalu Yahoo Groups mailing list: "What we want to demonstrate is that: we are not happy to be labelled as victims and where is the glory in being titled as the *first climate refugees*? We know our rights. We want support in gaining better education and medical facilities for our people. Stop using us as points in global indicators of Corporate misgoverning. Give us real solutions that will empower us to make sustainable choices as we adapt to our changing environment." According to the authors, "the population faces many challenges quite apart from climate change: harnessing and managing extensive fisheries resources; coping with the impacts of economic global downturns for the significant part of the population employed as a commercial seafarers; overcrowding on the capital; and lack of employment on the other islands. Yet it is climate refugee stories that sell news. [...] Further, it is the issue of opening or closing western borders to climate refugees that is frequently the scandal [...] rather than the plight of displaced people [...]".

The relevance of the issue was brought into the local institutions with a discussion held at the Tuvaluan Parliament in 2005. A motion that intended to control the activities of the journalists that came to the country was approved. "The government should have a particular body or contact point that can meet with these journalists. So when these people come they don't need to look around for information because there's these appointed people that could answer their question. But if these journalists still want more information from our citizens then everything could be organized by the contact point" (Hon. Kausea Natano), but also: "These people should be screened, they just can't enter the country to come and produce documentaries for their earnings, especially when they are big and well known companies" (Hon. Alesana K. Seluka). This security measure, while trying to impose the authority of the sovereign state on the big companies and interests, reaffirms its weakness in front of the contemporary challenges. On one side, it shows how the governments try to keep a central and undeniable role in facing the global problems but, on the other hand, it makes clear how weak such institutions are in front of the cross-border economic, cultural and environmental pressures that are constantly exerted onto the phenomena.

[10] Campbell, P. *Consolidating mutual assistance in disaster management within the Pacific: principles and application,* in Seventh Sputh Pacific Regional INDNR disaster mangement meeting…

So while global warming is actually an issue for Tuvaluans and their health and security, resulting not only into a progressive even though unsensational sinking of the island, but also into in increasing inundations and salinization of the field with damages to the crops, it deserves attention to study how the media and political actors build a discourse about "the first climate refugees" without consulting them.

Again on disasters

In general, an important mean to collect and gain information about disasters all over the world is the Emergency Events Database, launched in 1988 by the Centre for Research on the Epidemiology of Disasters and initially supported by the World Health Organization and the Belgian Government, which contains essential core data about over 22,000 mass disasters in the world from 1900 to the present day. It summarises that about 10% of world population has been affected by droughts, which grows to 13% in the case of low income (annual GDP per capita less than 3000$) countries. By affected population, it means the ones requiring immediate assistance such as food, water, sanitation... during a period of emergency. All the other considered natural hazards generally affect less than 1% of the population, which turns to 2% in the case of windstorms in the low income countries (15% in Polynesia), and, for the extreme temperatures, to 13% of population in West Africa. The population affected by drought in absolute figures reaches its peak in East and South Asia (up to 32 million people, while it doesn't exceed 5 million people in the rest of the world), while in the percentage it tends to be more uniform, around 10%, except for reaching 15% and 22% respectively in South and West Africa.

Raleigh, Jordan and Salehyan try hence to identify vulnerable hotspot drawing maps based on three criteria: the projected population for 2050 (US CIPD), the GDP per capita for 2000 (World Bank) and the number of disasters as coded in the EM-DATA from 1968 to 2007. Areas were recognised as highly vulnerable if the projected population and the number of undergone disasters were in the upper 30% for all countries, while their present GDP fell in the bottom 30%. It turned out that the most vulnerable for droughts are: Burkina Faso, Mozambique, Rwanda, Somalia, Tanzania. Floods: Afghanistan, Bangladesh, Malawi, Mozambique, Nepal, Nigeria, Somalia, Sudan Tanzania. Wind storm: Bangladesh, Madagascar, Mozambique. Mozambique appears in the three cases, Bangladesh in the two latter.

Here we have an important passage of the survey: "To be vulnerable to climate change does not make someone a potential climate migrant. The evidence connecting climate change to migration is quite limited, both because data are generally unavailable and the decision to migrate is based on multiple factors. We contend that we can only base our future predictions of migration on previous research on community responses to natural disasters."[11]

Migration is therefore conceived as one of the possible survival strategies. According to the authors, the point is understanding if and how much climate change intensifies the labour migration tracks and the patterns for the distress migration due to the suddenly onset disasters. They approach these problems by labelling the first one as internal migration and the second one as distress migration, even though it will be evident that, when communities "incorporate risk in their livelihood" as the introduction stated, this distinction tends to fall.

[11] Raleigh, Clionadh & Jordan, Lisa & Salehyan, Idean *Assessing the impact of climate change on migration and conflict* Social Development Department, The World Bank, 2008 p. 16

About the internal migration, rural-rural movements are the most common in the "developing" countries. Rural-urban migration has increased in China, India, Indonesia and Vietnam, but also in sub-Saharan Africa the 25% percent of urban growth is due to internal migration, because of perceived labour opportunities.

In relation to climate, the anthropologist Parker Shipton (1990) and Sally Findley (1994) demonstrate an intensifying and slight changing of Malian labour migration patterns during droughts or famines, in the sense that the absolute number of migrants did not rise significantly, but their composition varied: women and children temporarily migrated to nearby destinations in order to reduce food consumption. "Famine relief literature generally concludes that those without dependents leave first, followed by older men and then families"[12]. For Findley[13] (1994), the determining factors of urban migration to Sahel cities or domestic destination were the limited assets and the government policies. In Ethiopia, for Ezra and Kiros[14] (2001), the out-migration of a household member to the city in addition to typical labour migration was critical to survival during a drought. For Caldwell et al.[15] (1986), migration in response to drought was found in only 2% of the households in India and Bangladesh, during both 1983 and 1994-1995. "Increased migration was not a response to drought, partially because substantial labour migration had previously taken place." Migration following a drought is therefore interpreted as a way to minimise the risk and send remittances.

On the other hand, it is possible to find out characteristics of distress migration by studying different cases. The frequent Bangladeshi disasters allowed to find out that temporary displacement is the most common, but only at local level. For Perch-Nielsen[16] (2004), people moved by about two miles away from their original houses, as it was perceived critical to keep the bounds with family and land in order to gain rights on it again after recovery.

Moreover, in studies regarding 1972 Nicaraguan and 1976 Guatemalan earthquakes, it was shown that not only did the majority of affected people return to their homes, but a population retention rate of 90% was found in both damaged and undamaged areas, indicating that the migration rate in disaster-effected communities may be similar to overall migration rates and hence not driven by the natural hazard, as reported by Belcher and Bates[17] (1983). Surveys in Guatemala and the Dominican Republic highlighted that the people's intention of staying in their villages didn't depend on the harms and damages, but rather on the kind of work they were used to do: those involved into coffee plantations felt that their field would undergo a negative trend, and so decided to leave (Belcher and Bates).

The incapability of governments to face the crisis and provide stable services may make definitive the decision to migrate.

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[12] Shipton, Parker *African famines and food security* Annual review of Anthropology, 1990

[13] Findley, Sally *Does drought increase migration? A study of migration from rural Mali during the 1983-1985 droughts* International migration review, 1994

[14] Ezra, Markowitz & Kiros *Rural out-migration in the drought prone areas of Ethiopia: a multilevel analysis* International migration review, 2001

[15] Caldwell, John Charles & Reddy , P.H. & Caldwell, Pat *Periodic high risk as a cause of fertiliy decline in a changing…etc.* Economic development and cultural change, 1986

[16] Perch-Nielsen, Sabin *Understanding the climate effects on human migration: the contribution of mathematical…* Department of environmental studies, Zurich, 2004

[17] Belcher, J. C., and Bates, F. L. *Aftermath of natural disasters: coping through residential mobility* Demography, 7 (2): 118-128, 1983

However, the distribution of services and aids is itself a complicate issue, that calls back the central role of urban contexts and humanitarian geopolitics. Shipton[9] (1990) found a swelling of population around market towns in Kenya and Somalia after the hazards, due to both growing dependence on aids and markets. Paul[18] (1998, 2003) observed that people reached by aids at their place are less likely to migrate, but only if the distribution is acted smoothly and without irregularities, provided to a disperse population and not in large camps, which can generate unexpected risks and costs for migrants: the risk of having their properties at home stolen, of reduced privacy, food insecurity, dirty water, diseases...

Disasters also happen to be induced by inconsiderate demographic policies, such as the Ethiopian mass resettlement that occurred in the 80s because of socio-economic misgoverning. However, the Ethiopian case also provides an example of popular reaction both to drought and to the hegemonic aids and resettlement system. In *Environmental refugees: myth or reality?*, 2001, Richard Black argues, by quoting Pottier and D. and P. Turton, that "migration is not an 'end-result' which can be labelled simply as a 'problem', but often forms part of the solution to famine for those concerned[19]. [...] the Mursi of Ethiopia responded to the 1970s drought through a strategy of 'spontaneous resettlement' in which they systematically avoided distributed relief at institutional feeding points- which might have turned large number of Mursi into permanent refugees in their own country."

Black doesn't discuss the shape of environmental refugees to deny their reality, rather to protest against their transformation into a stereotypical concept, apt to be politically mobilised.

How politics affect climate induced migration

To be easily understandable, a concept needs a visually clear metaphor. In the case of environmental refugees, the metaphor is called by Giovanni Bettini and Elina Anderson *Sand waves and human tides*, the title of an article of their published in 2014 on the Journal of Environment & Development. The expansion of the desert, this wide surface of nothing but sand or land, therefore linked to the absence of life, the absence of choice, is something that can undeniably justify migration. Yet Black states that "the concept of desertification itself has come under fire in the last years, particularly as availability of satellite images of the region has improved. Thus, work by Dregne and Tucker (1988) and Tucker et al. (1991)[20] has shown a highly elastic response of vegetation cover to growing season rainfall, with the 'desert margin' in the Sahel fluctuating from year to year as a result."

Gregory White again states at the start of the 2nd chapter of *Security and borders* that he "takes seriously the natural scientific evidence that climate change has accelerated in the twentieth century because of anthropogenic contributions", still he reports the scientific debate on the regional specifications of climate change: "it is the middle zone[21] that especially concerns de Wit and Stankiewitcz [...] The expected change in precipitation by the end of the twenty-first century [...] points out the need for special concern about southern Africa as well as Madagascar, and about the drying associated to the subtropics north of the Tropic of Capricorn (23° N) and south the Tropic of Cancer (23° S) [...] Sahelian and sub-Saharan Africa

[18] Paul, K.B. *Relief assistance to 1998 flood victims: a comparison of performance between governments and NGOs,* The geographic journal, 2003

[19] Pottier, Johann *Migration as a hunger-coping strategy: paying attention to gender and historical change* International Development Studies Occasional Paper n° 9, Denmark, 1993

[20] Tucker, C.J. & Dregne, H.E. & Newcomb, W.W. *Expansion and contraction of the Sahara desert from 1980 to 1990* Scienze, 253:299-301, 1991

[21] De Wit and Stankiewitcz divide Africa into three hydrological zones: less than 400, between 400 and 1,000 and greater than 1,000 mm of rain per year.

above the southern tier, on the other hand, are not predicted to be as brutally affected by climate change as conventional assertions suggest." More forward, he types: "is Africa truly as vulnerable as is often suggested? Mortimore [...] argues that people in the Sahel are typically cast as poor and incompetent, lacking sufficient local knowledge, and too rooted in their place. This is all contrary to the fact that people have adapted for millenia, are mobile, and exhibit crucial innovation. [...] in east Africa, pastoralists are quite adept at evaluating information presented to them. Such information often corroborates local wisdom -garnered from examining the intestines of slaughtered animals, bird flight patterns, clouds, livestock behaviour, and so on [...] (As noted earlier, for centuries Andean farmers have adjusted their potato planting according to the relative haziness of the Pleaides at the southern winter solstice. Researchers have ascertained that high cirrus clouds associate with El niño create the haziness). This is time-honored knowledge, but Luseno et al.[22] discern that pastoralist are willing to incorporate forecasting from external sources, albeit with limitations".

On the other hand, according to the Raleigh's et aliorum World Bank report, "micro-credit lending for sustainable development and improvements of livelihoods, encouraging food security in poorer countries with semi-arid climates (Petty and Savage, 2007)[23], improved planning of coastal communities, fair trade programs, cash-based targeting, education programs (as in Mexico) (Coady, 2004)[24]" can help.

The Botswana Drought Relief Program (1982-1985) is a good example of a well-working adaptation effort, directed towards the replacement of lost income and the preservation of productive assets, successful in preventing famine deaths thanks to an effective early warning system ensuring a prompt release of resources. Still, crop insurance and cash based aid to disaster victims are not widespread.

However, rural migrants are more often invisible to administrators, and policies rarely understand and support circular migration from rural areas, as noted again by De Brujin and Van Djick, 2003. This has a lot to do with climate change, as its consequences are mainly experienced in rural areas. This mistreatment operated by governments is clear in India, where the system of public services in some regions allows the access to all the benefits only to those who reside exactly where they originally registered in -which also happens for the China's Hukou system and Vietnam's KT system.

Governments' blocks can even exacerbate ecologically frail conditions, as it happened in Dar Masalit in Sudan when the Chadian refugees weren't allowed to leave relief camps, prolonging an especially hard famine. In general, with Suhrke's words "Environmental degradation [...] is more likely to generate exploitation rather than acute conflict"[25].

Raleigh, Jordan and Salehyan look quite sceptical about a climate induced mass migration scenario, nor conflicts raising from populations' upheavals are expected. On the contrary, the authors insist on how social inequality can highly be exacerbated by climate change manifestations.

And regarding the responsibilities of wealthier countries, Black is very concerned about the "environmental refugees" propaganda. Whose agenda is to diffuse that stereotyped, flat climate induced migrant that we

[22] Luseno, Willie et alii *Assessing the value of climate forecast information for pastoralists: evidence from southern Ethiopia and northern Kenya* World development, 2003

[23] Petty, C. & Savage, K. *Livelihoods in crisis: a longitudinal study in Pader, Uganda* Inception paper, London, HPG working paper, 2007

[24] Coady, D. *Targeting outcomes redux*, World Bank research observer, 2004

[25] Suhrke, A. *Pressure points: environmental degradation, migration and conflict* Cambridge, American academy of art and science, 1993

are trying to make a round-character? For Kibreab, "the answer lies in the agenda of policy-makers in the north, who wish to further restrict asylum laws and procedures: 'thus the term was invented at least in part to depoliticise the causes of displacement, so enabling states to derogate their obligation to provide asylum.' [...] However, this sits somewhat uneasily with the fact that much of the literature on 'environmental refugees' has in practice argued for an *extension* of asylum law and/or humanitarian assistance, [...] rather than endorsing a differentiation between 'political' and 'environmental' causes as a matter of policy."[26] The World Foundation on Environment and Development, the Norwegian Refugee Council, the IOM and the US-based Refugee Policy Groups all concluded that new instruments are needed to protect the ones excluded by the Geneva Convention definition of "refugee". However, "the focus here would be much more on large-scale forced migrations inside the developing world where [...] UNCHR, for example, has much more room to manoeuvre in influencing which populations should receive protection and assistance", and in this sense "Kibreab is correct"[27].

Climate change and agriculture

It's possible to take a closer look upon this horizon by approaching the relation between climate change and agriculture, that was only mentioned before.

From northern Nigeria and Ghana to the south

Going back to Sahelian, almost desertic regions, I will now consider Nigerian and Ghanaian northern countryside, where agriculture is facing changes in both dry season and rains.

Cristina Cattaneo and Emanuele Massetti dealt with this issue in a 2015 article for the FEEM, Fondazione ENI Enrico Mattei. In the preface, they claim to be interested in long-term climate trend, rather than daily weather or extraordinary events. In farming households, they find a hill-shaped relation between temperature in the dry season and the propensity to migrate, and the same happens for the precipitations in the rain season. "Climate has instead no significant impact on the propensity to migrate in non-farm households."[27]

These assumptions need to be questioned and contextualised to be better understood. All the data for the analysis are drawn from the Nigeria General Household Survey, conducted between 2010 and 2011, and the Ghana Living Standard Survey, conducted between 2005 and 2006.

Nearly 48.5 and 44.1 percent of Ghanaian and Nigerian household respectively report a farm or a plot operated by one of them or are engaged in breeding animals. The percentages increase to 73.9 and 72.6 when considering northern areas. Here, they usually produce goods at a subsistence level and barely have access to irrigation, improved seeds or fertilizers: less than 1 and 4 percent of the households have access to irrigation devices, 0.2 and 1.5 owns a tractor. In general, southern regions are wealthier, if we consider that the asset index that controls for the welfare of the households displays 1.03 units more in southern Nigeria than in northern and 0.78 for Ghana.

Migration is a widespread phenomenon: 43 and 23 percent of households report at least one family member living away[28]. "In Nigeria it is documented that a considerable part of the moves are represented

[26] Black, Richard *Environmental refugees: myth or reality?*, UNCHR Working Paper n° 34,2001

[27] Cattaneo, Cristina & Massetti, Emanuele *Migration and climate change in rural Africa* Fondazione ENI Enrico Mattei, n° 29 2015

[28] 1 member: 27.5 and 15.8; 2 members: 9.1 and 5.6; 3: 2.9 and 0.9; >4: 3.8 and 1.0

by rural-urban migration (Black et al., 2006). In Europe and North America they represent the largest group of foreigners amongst Africans [...] In Ghana internal migration is primarily from north to south, with in-migrants representing a large share of the population in the Greater Accra, Volta and Western Regions. This internal flows are fuelled by infertile soils and underdeveloped local services in the North (Black et al., 2006)." The totality of migrants sends remittances back to home.

In general, we shouldn't expect that farming households are more linked to migration than non-farming, as we have respectively a 48.3% vs 38.8% in Ghana reporting members away, while in Nigeria, on the contrary, we have a 23.1% vs 23.5%.

To discuss the relation between climate and migration, it is necessary to give little information about the climate: as tropical countries, both Ghana and Nigeria have two major seasons, the dry and the wet one. Average temperatures don't vary significantly in the two periods: 27.6°C and 26.1°C for Ghana and 27.2°C and 26.0°C for Nigeria. On the contrary, the precipitation rates are much more variable: not only we have 53.9 mm/month vs 145 mm/month in Ghana and 48.1 mm/month vs 220.2 mm/month in Nigeria, but in this latter rates that may also reach 400 mm/month, a quantity typical of monsoon-affected areas.

The authors individuate a mathematic model to investigate how the propensity to migrate of a household (y^*) is affected by both climate (C) and the same household's (X) characteristics:

$$y^*_j=\gamma C_i+\beta X_i+u_i$$

What is observed is that the environmental factors are significant only for farming households, for whom the temperatures in the dry season are significant at 10% and the precipitations in the wet season are significant at 5%. However, this significance is increasing when considering the families growing only crop, but disappearing in the case of the ones only breeding animals. The characteristics of the soil are a little significant, and only when considering the Exchangeable Sodium Percentage, the Electrical Conductivity, the organic Carbon and the Cation Exchange Capacity (the total nutrient fixing capacity of a soil).

In relation to the household specifications, welfare index is significant at 1%, indicating that a certain initial capital is required for migration, while the poorest families may not find the sources to make a member of them move: they may be "trapped". It is also true that households located in districts with mild temperatures or precipitation have a positive chance to become migrant families (i.e. with at least one member migrated), while the reverse occurs to those living into regions with extreme temperatures or precipitations. Henry Sabin[29], who similarly studied how the north-south rainfall gradation in Burkina Faso impacted on migration (in that case also a mainly internal migration), stated: "Men and women from better watered areas are more likely to engage in a long-term migration to a foreign country than those living in drier regions."

The number of dependents, the gender and the age of the family head are insignificant factors.

A secondary or tertiary education grade of the household's head is significant only for non farming households, as well as coming from an urban context is significantly related to migration only for these latter.

[29] Sabin, Henry et al. *Modeling inter-provincial migration in Burkina Faso, West Africa: the role of socio-demographic and environmental factors,* Applied geography 23, 2003

Furthermore, the information the families provided about the destination of the emigrants allows to study the impact of climate on international migration: it appears that, in this case, nor the precipitations in the wet season nor the temperatures in the dry one are relevant any more.

These results show that climate and migration are linked, but only in some determinate ways and always depending on other social aspects regarding the same agent. When questioning long-term climate change rather than weather oscillations, "climate change may [even] reduce migration in Ghana and in Nigeria". The model of the equation is applied to the forecast climate characteristics of 2031-2061 and 2071-2100 periods, no more at the level of the single household but a district or regional level. To do so, the authors refer to the Representative Concentration Pathways proposed by IPCC's Fifth Assessment Report, models that quantify four different possible concentrations of Green House Gases into the atmosphere in the next century, according to the intensity of ecological policies engaged by governments. They use 4.5 and 8.5 RCPs, which respectively mean that there will be 4.5 W/m^2 and 8.5 W/m^2 more of radiation than before the industrial revolution and they are expected to increase temperatures by 1.1°C to 2.6°C and 2.6°C to 4.8°C with respect to the 1986-2005 period. The first one assumes a high but not extreme effort to reduce gas emission, while the second one is the most pessimistic vision. "While Ghana always has a reduction of the probability to migrate, in Nigeria different climate models, or for the same models different RCP scenarios, generate different estimates [...]", but only the 4.5 RCP suggests a possible increase in migration from northern regions.

From Cambodia to Thailand

According to a survey conducted by Maryann Bylander for Knomad, the *Global knowledge partnership on migration and development* belonging to the World Bank group, a direct correspondence between climate and migration was found by the 2009 CSES (Cambodia Socio-Economic Surveys), in the case of Cambodian households trying to diversify their incomes by sending one or more members to Thailand.

Among a total number of 11,807 Cambodian households reporting environmental shocks, the majority claimed to have at least one relative migrated to Thailand, in all the cases of those reporting drought or flood, both in 2008 or in the last five years, and the same happens for those reporting different kinds of rainfall insecurity.[30] In the case of losses of the crop, the majority of those reporting emigrants is outstanding.

The climate insecurity of the area is underlined[31] by GVC, Gruppo Civile Volontari, an association born by young bolognaise university students supporting Devonian missions to Africa and taking part to the 70's political struggles for African liberation, established as NGO in 1971, present since 1972 in Brazil and Congo and now working in 25 countries. In Cambodia, their aim is to contrast poverty and climate change, with particular regard to the migrants affected by it.

[30] Bylander, Maryann *Cambodian migration to Thailand: the role of environmental shocks and stress,* KNOMAD working paper 7, 2016

[31] Romanelli, Margherita *Cambiamento climatico, acqua, migrazione* GVC lecture held at "Buonasera clima!" on the 24th May 2017

A research[32] about migration from Banteay Meanchy, Siem Reap and Battambang provinces on the Cambodian border with Thailand was conducted by Hing Vutha, Sry Bopharath and Roth Vathana, with Massimo Chiaregato's (2050), Stefania Pirani's (GVC) and Margherita Romanelli's (GVC) support.

The research, funded by the Cambodian Development Resource Institute as a part of the three-year project MIGRASAFE, coordinated by GVC in cooperation with the Cambodia Women's Crisis Centre and Phare Ponleau Selpak, pursued the general aim to gain information in order to "develop community networks to share and disseminate information about safe migration and the risks of irregular migration, and to support civil society organisation networks to monitor the role of brokers and intermediaries in the recruitment process".

It consisted in distributing a questionnaire regarding their pre- and post-migration life to 500 households basically drawn by lots among all those reporting at least one migrant to Thailand. The data collection took place between the 22nd October and the 1st October 2015.

It was observed that the household's members' average salaries are quite variable, depending on the kind of profession: farming is the least remunerative with 48 to 60 US$, and also taxi/tuk tuk drivers gain 57 US$, while the others even exceed a hundred US dollars up to the 205 US$ of the soldiers. The majority of the expenses in the families regard subsistence such as food, health... with a 63% reporting to spend money for education.

When coming to migration, 1.187 million out of the 15.578 million of Cambodian citizens were migrant in 2016, and the destination of the 68% of them was Thailand. Gender distribution doesn't show significant difference, being 56.23% male and 43.77% female.

For the MIGRASAFE's survey, migration was defined as any period spent with a residence place away from home. Labelling migrants as daily, seasonal, frequent, 6 months to 2 years, more than 2 years, the respective percentages were 0.19, 5.38, 4.08, 39.11, 51.25, on a total number of 1079 studied households. The 60% declared that the motivation for departure to Thailand was the lack of job in Cambodia, and the 27% the higher Thai salaries. 10% travelled to try repaying debts. With respect to the jobs in Thailand, the 43% of migrants were occupied as construction workers, the 16% as agricultural, the 13% as luggage loaders and the 10% were in factories, followed by 4 to 1% of shop assistants, agro-industry workers, food sellers, cleaners, domestic workers, taxi drivers, fish boat workers. The average salary is over 200 US$, with some statistically significant gender gap in both senses, but only among the construction workers (respectively, 247 for male and 215 US$ for female) and the food sellers (in this case, 285 for male and 239 US$ for female). An apparently direct correlation between education and the gained salary was found for these migrants, being the average salaries for no schooling, primary, low secondary, high secondary and post-secondary school people respectively 197, 236, 260, 261, 315 US$.

The 90% of them sends remittances home. The 92% reports using them in consumption/expenditure, the 61% in health, the 30% in children education. Pre- and post-migration households' incomes and food security show clear improvements.

[32] H. Hing Vutha, B. Sry Bopharath and V. Roth, M. Chiaregato, S. Pirani, M. Romanelli, CDRI and GVC *Migration and remittances: mapping the sending channels and the management of remittances in Cambodia, the case of three provinces* in the frame of the project MIGRA-SAFE: Safe Labour Migration for Vulnerable Cambodian Migrant Workers cofounded by the European Commission, Phnom Phen 2016

But is it right, then, to speak about "environmental refugees"? Again, this Cambodian case helped us to reflect on complexity: while it is true that drought, floods and El niño's increasing oscillations pose grave difficulties to the peasants' subsistence, the general perception of these same peasants focuses on work opportunities distribution, the quality of salaries and the pay of debts. Of course, these economic considerations may also derive from a sense of insecurity due to climate instability and to Cambodian vulnerability, which suggests the strategy of a cross-border diversification of the incomes.

Adaptation and its meaning

The cases analysed in the previous sections focused on contexts where climate change stands among the causes of migration in a wide sense. We could already say that, from the Nigerian, Ghanaian and Cambodian households that try to diversify the family income by sending someone away, to the Tuvaluans moving to other islands building networks of mutual aid or looking for the opportunities of global market in the Pacific, migration can be interpreted as a form of adaptation, a response consciously elaborated to change and maybe improve the geometries life is managed through.

It mustn't be taken for granted that migration will occur as soon as a problem, as heavy as one might think, occurs. Nor migration itself should be considered something with a fixed substratum and a changing outside, as what we have called migration up to now has been every time something radically different for the people experiencing it. Our general assertions upon it rather tried to cancel bias than adding positive elements.

Anyway, if adaptation is the set of all actions intended to increase the resilience, many forms of adaptation at the place of origin are possible and often realised instead of migrating, as the "incorporation of the risk by the communities" Raleigh, Jordan and Salehyan were addressing to testifies.

In this section, I will interrogate two cases of adaptation to climate change that will exhort us to rethink the meaning of adaptation itself.

COSPE in Swaziland

COSPE is an NGO born in Florence in 1983 from the Florentine and Bolognaise committees for peace, and in 1984, together with some lectures held in Bologna about the eco-development in collaboration with the Universities of Bologna and Florence, already operated in Cabo Verde, Senegal, Sahrawi, Algeria and Zambia. Nowadays its main activities, claimed on the website, regard women's rights, water and food, environment and interculturality, rights and social justice, throughout 30 countries. Their declared mission is to promote dialogue between persons and peoples, equal and sustainable development and human rights, in order to obtain peace and justice between peoples.

They visited Swaziland from the 11th to the 25th of March 2016. 2014-15 farming year was characterised by a less frequent precipitation rate, while 2015-16 was properly struck by a drought as a consequence of El niño's oscillations. Their intervention consisted into a participatory assessment of the main risks for the different communities in the Lubombo region and into elaborating collective strategies against them, with the aim to develop a planned anticipatory adaptation to climate change. They operated singularly with the villages both in the Lowveld and the Plateau and were directed by Massimiliano Sanfilippo's consultancy.

These procedures were executed by following the "Climate Vulnerability and Capacity Analysis" (Chambers, 2009), produced by the association "Care", and with the support of the Swaziland meteorological service,

which modified the methodology as required by the local characteristics, prepared a technical formation for the COSPE staff, took after the first meetings with the communities and overviewed the entire process.

The principles of this methodology, concretised in multiple assemblies held among the villagers and with the collaboration of COSPE, gave as result two histograms about the self-perception of the vulnerability of the communities of Lowveld and Plateau and one scheme per community about and the possible strategies to deal with the main risks.

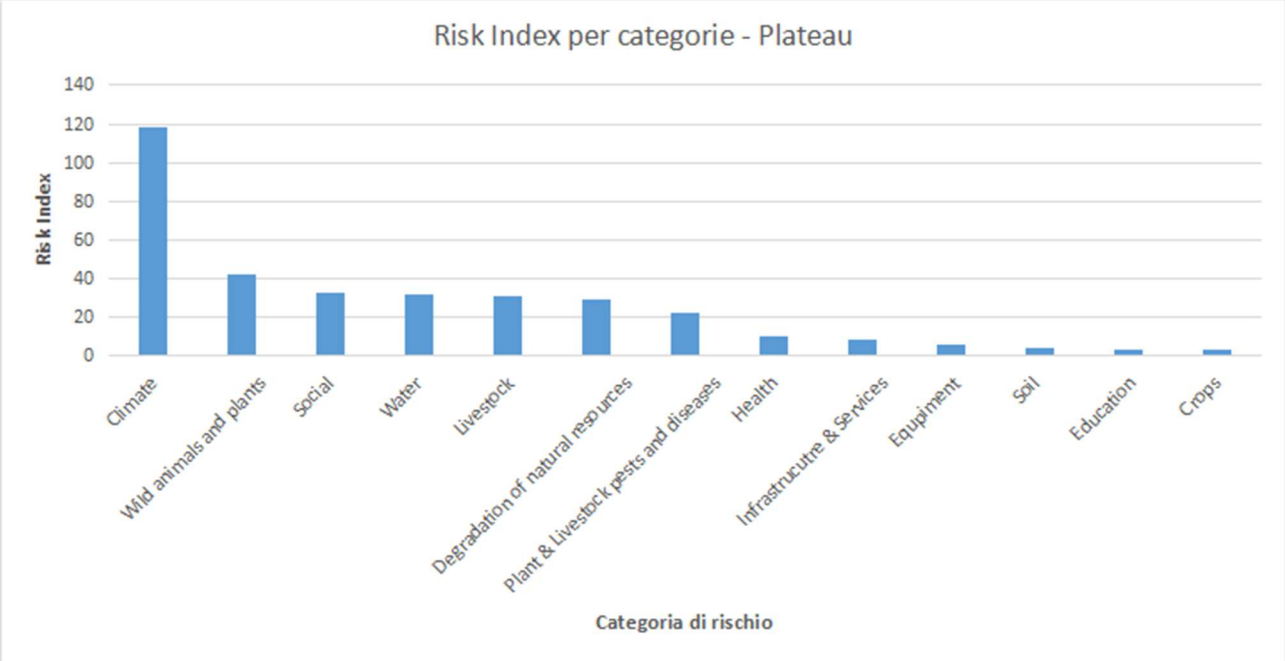
About the histograms, the Sanfilippo reports as follows: "During the mission, the systematisation and the elaboration of data collected during the field activity were processed, by following the following steps:

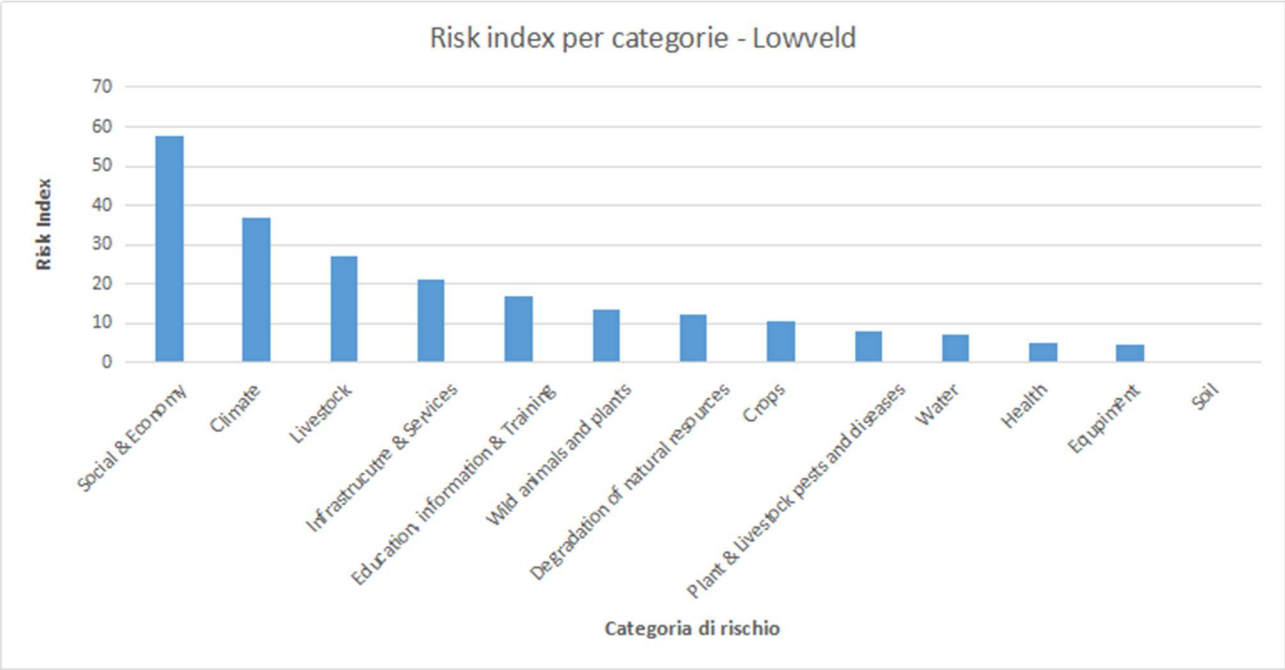
a. digitalization of data obtained in the communities utilizing the adaptation matrixes approach

b. computation of the risk index utilizing the equation

*Risk Index (RI)= (Hazard*Vulnerability)/Capacity*

c. the identified risks were codified and gathered into 13 categories"





As observable in the first picture attached[33], the Plateau community, through several mathematical averages operated by COSPE, perceived the climate factor as the far most relevant threat, while in the Lowveld, it was perceived as the second one, following by a certain distance the "social and economy" factors. Here, "climate" refers to the natural events such as drought, hail, strong wind, extreme rain... etc., "social and economy" to social risks such as alcoholism, teenage pregnancy, thefts, employment, micro-enterprise ...etc. as it is described in the report of the consultancy provided by the association.

"These (results) suggest that in the Plateau there is a bigger exposition to climatic risk than in the Lowveld. However, this hypothesis contrasts the objective fact that Lowveld is drier and more frequently undergoing drought than Plateau. [...]

It is worthy to underline that the average Risk Index values reported in pictures 1 and 2 also depend onto the number of identified risks. For a greater number of risks identified for a certain category, we will have a greater Risk Index value for that category. By comparing the number of risk factors identified in the Plateau and the Lowveld communities, one gets aware that there exists a statistically relevant difference between the two zones (in this case also the Student's t-test was used, $p<0.05$) and that the Plateau communities identified on average almost 3.5 risk factors more than Lowveld"

The higher number of problems identified in the Plateau is thought to be explained by the previous presence of long-lasting COSPE projects in all the area, while only a part of Lowveld was involved into this kind of project. This supposition is supported by a research conducted by the University of Florida (Bayly, 2016) on four villages in the Lubombo region, the two of which involved in the project look like having developed a better analysis and adaptive response than the other two. Moreover, the more diversified Lowveld economy, with a higher number of men gaining a salary by working in sugar cane monoculture, and the larger presence in the same area of drought-tolerant crops (namely sorghum and sweet potato), may justify the highest risk associated to the climate factors in the Plateau.

[33] The pictures and the following quotes come from Sanfilippo, Massimiliano *Report participatory adaptation, phase 2* COSPE 2015, which was very kindly provided to me for the academic purposes of this essay

COSPE reports then the detailed list of the "challenges" and the respective "proposed local solutions" identified by a selection of five Lowveld (Lomahasha, Matstetsa, Mdumezulu, Mpolonjeni, Mafucula) and two Plateau (Shewula, Maphungwane) communities. The characteristics and the limits of the approach appear clearly from these lists.

All, except for two, individuate drought as a challenge, and only Mpolonjeni village adds hailstorms as a climatic challenge. The reported complications and solutions for the drought vary. Lomahasha village suggest that they should "grow crops sustainable for the soil" and/or "source some seeds from neighbours and ask for support of seeds from the NGOs, SNAU and the MoA", Mafucula that they should "grow drought tolerant crops which are also suitable for the soil", "adapt to the present times which means the community to be flexible for change or adopt new techniques to improve their livelihood", "well manage the available wetlands", Mpolonjeni suggests "water harvesting from roofs and earth dams, growing drought tolerant crops", Shewula "to promote drought tolerant crops and agro-ecological approach", while for the "drying up of wetlands" they suggest "protection (fencing and not constructing homesteads near wetlands)", "local authority to ensure that no fields and homesteads are developed near the wetlands" and "community mobilisation about the importance of water availability". Mdumezulu doesn't find any solution to the problem, just like Mpolonjeni for the hailstorms. Lomahasha reports that the drought caused lack of food and seeds and that the increased poverty promoted teenage pregnancy.

Apart from these climate factors, the villages claim to face many other problems: five lament livestock invading fields, one laments birds doing that, others a bad condition of the grazing areas or livestock theft.

There's a spread lack of drinking water, markets and pre-schools (Mafucula) and schools (especially of high-schools for Maphungwane). There's substance abuse in Shewula and lack of community hall and recreation centres in Matsetsa, where inadequate "Neighbourhood Care Points" and "Children and Old age elderly art" are lamented as well. The three challenges are all without solutions indicated.

Mafucula writes that they should practice crop rotation and diversification to end monocroping. In Matsetsa infrastructures such as roads or gullies are a problem without a supposed solution.

The consultant's comment is that, although in the majority of cases the adaptive strategies are coherent with the challenge and therefore the cooperation was useful to promote a planned participatory adaptation, three main issues emerged: 1) those strategies don't make a precise referring to the local climate scenario presented by COSPE, they are quite generic instead 2) there was a confusion between risks and problems, being the first ones "phenomena that have a certain probability to happen in the future and that may bring negative consequences", and the second ones "already current phenomena" 3) the designated strategies often required the help of an organisation external to the community, such as NGOs, the government...etc. while the scope of participatory adaptation is to stimulate autonomous and self-realisable measures.

However, the report ends confident that these problems will be solved in the next COSPE's planned participatory adaptations, and underlines the importance of organising a final encounter to select two or three of the proposed solutions and to detail the ways in which they could be realised, with a proposed example as follows:

Risk	Adaptation	Responsibles for	Action required	Timing	Indicator

	measure	the impementation			
Drought	Grow drought tolerant crops	Farmers	Provide relevant information and seeds of suitable crops	Next rain season	At least 25% of agricultural land planted with drought resistent crops

"Le abitudini dell'acqua" in western Africa

From what has been observed, the reader could think that adaptation is a "specific set of measures" that can be brought or induced thanks to organisation(s) coming from wealthy countries, even if the material elements through which it can be achieved lay into the underdeveloped community.

But adaptation has also a wider sense, more situated into historical flowing and more polymorph in its transfers and generations of meanings. In the same moment history proceeds, with both its injustice and improvements, people always adapt.

An example of this kind is offered by the Kasena community in Paga, as reported by Gaetano Mangiameli. He obtained his PhD in Anthropology at the University of Bologna Department of Historical, Anthropological and Geographical Disciplines. He made field research among the Kasena at Paga, in north-eastern Ghana between 2003 and 2009. In 2010 he published as a result an essay entitled "Le abitudini dell'acqua- Antropologia, ambiente e complessità in Africa occidentale"[34], whose main topic is how, in the Kasena context, humans and non-humans incessantly follow on a spiral without a priority of the first ones on the latter ones or vice versa, and both, without a previously given distinction and rather by scraping each other's image, contribute to writing the environment.

This narration ineludibly overlaps the climate change discourse and finds into adaptation a strong reason of existence. Starting as ethnography, it describes the Kasena way of living. This people, cross-border settled between Ghana and Burkina Faso into a region called Kassoŋo, all speaks Kasem but doesn't have a unitary political organisation, with decentred power hotspots translated in English as chiefdom.

The title of the essay becomes clearer in many passages, like when the narration deals with the houses or *sam* (singular: *soŋo*) of the Kasena: "The settlings are far from the river shores in order to avoid contacts with the *simulium* midge, the vector of *Oncocherca vulvulus* that causes *Oncocercosis* or river blindness. Moreover, the risk of floods during the rainy season, such as the dramatic one occurred in September 2007, makes the soil depressions as much as undesirable for human houses' exigencies, also because humidity damages both native cereals and livestock. It follows a double water's connotation as source of life and death, with a relationship of attraction/repulsion: water is necessary for both human beings and livestock, but its excessive closeness is on the contrary dangerous. As a consequence, a rugged soil is the fitting settlement for the s*am*, which allows the houses not to be eroded by the flowing of rainwater. [...] The *soŋo* orientation depends on water as well: its perimeter usually leaves uncovered only a brief western segment, the entrance, while the rooms [...] constitute a wall projected to the East, therefore opposed to the prevailing direction of water-bringing winds [...]"[35]

[34] Which may be translated The habits of water- Anthropology, environment and complexity in western Africa

[35] Mangiameli, Gaetano *Le abitudini dell'acqua* Biblioteca di studi antropologici ed etnografici, 2010, my translation from Italian pagg. 61-62

So, the habits of water "reveal the capability of non-humans to act as subjects. [...] if the habits are in general inserted into a flux that links them on one side to what they generate and on the other one to what generates them, then the habits of water adapt to the earth's profile, but also contribute to modifying it."[36]

In this context, men aren't the only ones who know the habits of water, being instead the greater experts the crocodiles. According to Paga's founding myth , the crocodiles helped Panlogo, a political leader fleeing from his brothers, to cross a lake, remembering an ancient alliance with Panlogo's lineage. Panlogo and the crocodiles agree to a new deal, that the humans won't ever eat crocodile's meat nor annoy them, and the crocodiles won't ever attack the humans. The deal, renewed by the Panlogo's descendent Nave, is still valid -that's why Paga's crocodiles are quite and tourists can encounter them and ride them. Although this pacific coexistence was developed through centuries of a human-crocodile shared culture, whose archaeology is reconstructed by Mangiameli, the highpoint here is that not only do not the crocodiles attack the innocent Kasenas, they are even supposed to contain the *juru*, the Kasena mortal soul, in the literary sense that for every Kasena there exists a correspondent crocodile, whose biography is supposed to be symmetrical.

This is an example of the monistic human-non-human spiral. With such a role assigned in the system, the crocodiles represent a moral and scientific authority: "They serve as bridges in the visibility-invisibility dialectic [...]: during the dry season, when water retreats from many sacred lakes [...] they are supposed to hide in the little holes at the margins of the dry lakes. [...] as able to fast for more than six months, [...] they will be there at the return of the rain, the Kasena peasants waited for for so long, indicating with their presence the possibility to face those environmental adverse conditions that cyclically come back." [37]

But the habits of water, together with the ones of the people, are changing. The author tells that, before his return to Italy in 2005, he was convoked by an aged and respected man of Paga, Cholonia, who exposed his concerns on the indifference towards Taŋwampia, a sacred wood near his house that was getting drier and drier. According to Cholonia, the decadence of the site indicated a larger lack of interest in the *chullu* (translated with "culture" by the Kasena) by the young people, occurring together with an increasing scarcity of water and agricultural productivity: "The old man's speech threw a bridge between [...]apparently distinct and distant poles: the health-status of a little commune of trees was the starting point for a reflection on [...] climate, economic and cultural change."[38]

An apparent measure of adaptation in front of this change is realised in apparently strange ways. When the dry season is too dry, the lakes' gods may ask, through the intricate and ambiguous process of divination, to be dug in order to let some water emerge again to the surface. What's weird of this process is that the chief or *pɛ* can't order to start the digging for more than three times in his rule. That's because the chiefs order this operation for both political and religious aims, in the first case as a power dispositive, by checking if the other sections of the community will respond to the call to dig, and in the second case as a way to have the existential assurance that gods interact with his dominant lineage. A limit of three times was therefore put in order to prevent abuses from the power against the sacred/natural.

However, all the Kasena thought is framed by the monistic ecology. As humans and non-humans aren't separated and the latter ones are conceived as conscious actors, the cultural transfers and meanings I was referring to at the beginning tend to expand the respect and protection to every being.

[36] Ibidem, pag. 17
[37] Ibidem, pag.116
[38] Ibidem, pag. 163

Two important religious hotspots are the *taŋwana* and the *We teni*, being the first ones the sacred untouchable "earth's skin", often woods, in which non-humans must be let grow, interact and maybe die without human interfering, and the second ones the "God's trees", old sacred and respected plants that grow isolated. These two institutions mustn't be thought in a rigid way, both in forms and temporary evolution. Mangiameli points out that biodiversity (and, we could suppose, climate change mitigation neither) isn't an intended aim, as the *taŋwana* often host species that already grow abundantly and resist adverse climatic conditions, while the *We teni* are, in the majority of cases, baobabs.

The ecologic mind is rather settled in the dignity accorded to the potentialities of all plants and animals, also and most of the times of the non sacred ones. An example is offered by the nims, an Indian tree species brought to Africa by the English. Contemptuously named the "white man's trees", they become as special and as untouchable as the "indigenous" plants when they grow into a *taŋwam.* They might also become *We teni* if they get to survive spontaneously for a long time, while the same baobabs might be cut down if they are young.

In general, the Kasena don't cut trees unless they need it. Once, they even got to cut down some young *taŋwam* trees. Cholonia had persuaded Mangiameli to plant some as a support for the bad conditions of Taŋwampia, but then the building of a road judged as useful imposed to eliminate all the trees in that site and nobody opposed to it, with the great surprise for the Italian anthropologist studying this environment-friendly population.

On the other hand, the trees usually planted and eradicated are those for agriculture, which are fenced in order to let them grow until they make fruits.

Mangiameli reassumes: "We can define protected trees those who haven't been protected, and unprotected those who have"[39].

In this conceiving humans and non-humans as differentiated expressions of a unique *dwi*, the seed of generation, and therefore committing their existence and life to the existence of the others, the Kasena Mangiameli describes incarnate the batesonian "flexible complex organism-in-its-environment"[40]. That's why this kind of adaptation to the environment and to the history is deeper, longer-lasting, conscious and constant and most of the times coincident with mitigation, and it's much more a life-style rather than the "set of measures" adopted in the European societies, characterised by the separation between nature and culture and, with a beautiful Mangiameli's expression, failing in identifying the minimal unity of survival.

Adaptation to climate and the widespread of humanity

Not only adaptation to climate seems to be an important aspect of contemporary post-industrial societies, but it also have accompanied the genus *Homo* since its appearance and, according to Rick Potts, constituted its distinctive element. This paleoanthropologist hypothesises that human evolution wasn't properly a matter of survival of the fittest, rather a survival of the most adaptable.

There is much evidence that world climate has been changing for long in earth's history. One could consider the record of oxygen isotopes through time. Both being present in the fossil skeletons of foraminifera that used to live at the bottom of the oceans, one can measure ^{18}O and ^{16}O. The first one is heavier and more

[39] Mangiameli, Gaetano *Le abitudini dell'acqua* Biblioteca di studi antropologici ed etnografici, 2010, my translation from Italian, p. 188

[40] Bateson, Gregory *Steps to an ecology of mind* 1972

abundant in cold water, and by knowing the relation between temperature and their distribution in percentage one can reconstruct temperature variability of Tertiary and Quaternary Eras. This process allows to identify the Marine Isotopes Stages (MIS), hot and cold alternate periods in the earth's history. The obtained results should correspond to Milanković' cycles, the average effect of great earth's movements determined by its orbital eccentricity, the axial tilt and the precession, giving birth to glaciations each about 100,000 years in the Quaternary Era.

According to the Smithsonian Institute, "there are two main trends: an overall decrease in temperature and a larger degree of climate fluctuation over time. The amount of variability in environmental conditions was greater in the later stages of human evolution than in the earlier stages."[41]

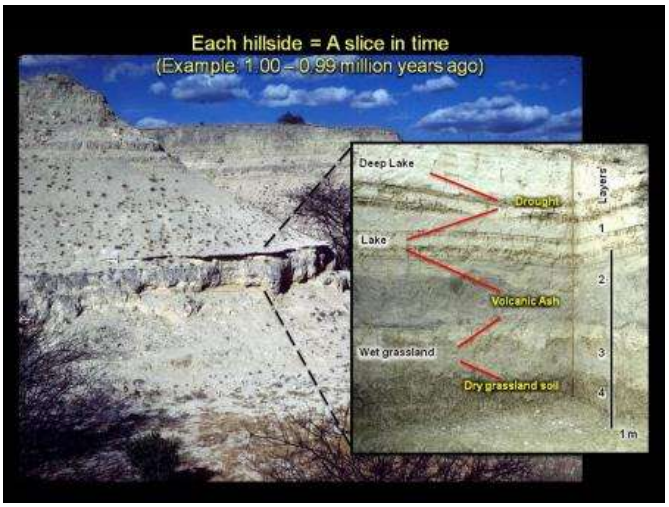
To endure this variability, "the ability to adjust" was fundamental. While many organisms have quite specific preferences about the habitat, it looks like men evolved differently: they survived because they were sketch-men, to use an Italo Svevo's expression. An evidence that an adaptive process occurred rather than a specializing one is the failing of the "savannah hypothesis", according to which "certain adaptations, such as upright walking or tool-making, were associated with drier habitat and the spread of grasslands"[41]. But if these characteristics had been developed as a response to the Savannah context, we would expect to encounter them in that environment and not in diverse types of habitat. However, only *Orrorin tugenensis* was only found in wooded habitats, while *Sahelanthropus tchadensis* and *Ardipithecus Ramidus* were supposed to live in both wooded and grassland areas, respectively in the modern Tchad and Ethiopia. "*Australopithecus anamensis* has been found at Kanapoi and Allia Bay, Kenya, in association with another kind of mosaic- an open savannah with low trees and shrubs, but with both grasslands and gallery forests nearby."[41] The reconstruction of the environments was made by Dr. Jonathan Wynn at Kanapoi, with a research on paleosols and pedogenic carbonates, while at Allia Bay Dr. Margaret Schoeninger and her colleagues indicated that most of the vegetation consisted of woody plants known as C_3 vegetation.

The climate-environment-mobility relations were also linked to the encephalization and the toolmaking. While during the first four million years of human evolution the brain size increased very slowly, it started to grow "dramatically" over the past 800'000 years, coinciding with the strongest climate fluctuations, allowing to produce "versatile solutions". On the other hand, the first stone tools date to around 2.6 million years ago. "Although simple toolmaking may have developed originally in one type on environment, the carrying of stone tools over considerable distances -and becoming reliant on stone technology- may have arisen due to the benefits of altering the diet as environment changes. The oldest known stone technology -called Olodowan toolmaking- involved carrying rock over several kilometres and is found associated with a variety of ancient habitats. [...] Technological innovations began to appear in the Middle Stone Age in Africa, with some early examples dating prior to 280'000 years ago. [...] other tools were used to make clothing which would have been important for hominines in cold environments."[41]

The hominines' persistence through environmental change is well testified by the Kenyan Olorgesailie site. Traces of an ancient lake, volcanic activity and drought were found, as well as high quantity of stone artefacts, peculiar animals. All the findings "span most of the past 1.2 million years" and early humans lived here until 490,000 years ago. Finally, in 2003 the first human fossil, probably belonging to *erectus*, was found. It was "from a layer above (younger than) a volcanic layer dated about 974,000 years old, and is

[41] *Climate effects on human evolution* Smithsonian National Institute of Natural History, online available at http://humanorigins.si.edu/research/climate-and-human-evolution/climate-effects-human-evolution

estimated to be about 900,000 years old"[42]. But, in years of excavation, that was the only human fossil's specimen. Dr. Rick Potts' team thought that it could depend on the territory morphology and the location of the first findings, situated on the ridge of a volcanic hill that connected the lake lowlands to the surrounding highlands. This is where, after a few months, another human fossil was found, featuring marks of carnivorous teeth bites. The situation might help to interpret the life of these people, who were supposed to use the lake and wetlands for foraging and the highlands as a refuge from the predators that gathered near the water's edge to prey at night.



In the picture, the hillside represents about 10,000 years and the different layers show the changes occurred to the lake and the environment.

"In places nearer the equator, like Olorgesailie, grasses have one pathway of photosynthesis that involves 4 carbon atoms, while woody plants (trees and bushes) have a different pathway that involves 3 carbon atoms. This sets up the distinction between C_4 plants (grasses) and C_3 plants (trees and bushes). By testing the carbon isotopes in the upper Member 1 paleosol, we learned that most (75 to 100%) of the vegetation 990,000 years ago consisted of C_4 plants. This means a landscape that was covered almost entirely with grass, and with some trees. This information makes sense of the fossil animals whose bones were unearthed from the same soil, almost all of which were from grass-eating species whose teeth had become worn down bythe tough silica particles (phytoliths) found in grass.

In later times at Olorgesailie, C_4 grasslands continued to be prominent in the region. Yet the range of habitats between 800,000 and 500,000 years ago included wooded grasslands, where tree cover was greater, and grassy woodlands in which trees were even more prevalent. In addition, measurement of oxygen isotope values can indicate changes in the amount of moisture over time. These values indicate a moister climate or cooler temperatures compared with today throughout most of the Olorgesailie sequence of sediments over the past 1 million years."[42]

Men weren't the only ones who had to adapt: many large mammals who used to live in the zone got extinct, replaced by modern relatives, smaller and more adaptable in diet or habitat. For example *Equus grevyi*, a grazing and browsing zebra, took the place of *Equus oldowaynensis*, that had larger teeth specialised for eating grass and whose last known appearance was between 780,000 and 600,000 years ago.

Another *Homo* species that evolved in a period of great oscillations was *neanderthalensis*, who lived in Europe between 200,000 and 40,000 years ago. Their extinction is particularly debated: "The Neanderthals were able to adjust their behaviour to fit the circumstances. During cold, glacial periods they focused on hunting reindeer,[...] cold-adapted animals. During warmer, interglacial periods, they hunted red deer. During extreme cold periods, they shifted their range southwards toward warmer environments. Neanderthals and modern humans had different ways of dealing with environmental fluctuation and the survival challenges it posed. [...] Neanderthals did not make tools that were as specialized as those of modern humans [...]. The Neanderthals usually did not exchange materials over so wide a distance as *Homo*

[42] *Olorgesailie, Kenya* Smithsonian National Institute of Natural History, online available at http://humanorigins.si.edu/research/olorgesailie-kenya

sapiens. They occasionally produced symbolic artifacts."[41] What is known is that *neanderthalensis* and *sapiens* had been co-living and mixing for long, after they met about 100,000 years ago in Palestine, where *neanderthalensis* taught *sapiens* burying techniques. It is thought that from 1 to 4% of contemporary humans' genetic heritage is neandertalian.

Both the role of *neanderthalensis* and the widespread of s*apiens* out of Africa extensively overlap the climate induced migration discourse, as a new mathematical simulation effectuated by Axel Timmermann and Tobias Friedrich, from the International Pacific Research Center, Univeristy of Hawaii, draws an "early exit scenario" due to increasing rains in the middle east, and the authors try to justify some discrepancies of their simulation with the fossil findings by recalling the interactions between the two species.

In a letter to *Nature*, published on the 6th October 2016, they hypothesise that the migrant waves of *sapiens* out of Africa, only possible during periods of rains occurred in northern Africa, the Levant and the Arabian peninsula that created "vegetated pluvial corridors", happened around 106-94, 89-73, 59-47 and 45-29 ka. They use a mathematical Human Dispersal Model forced by time-varying temperature, net primary production, desert fraction and sea level boundaries conditions, and adopt as a parameter the LOVECLIM earth climate model, accounting for glacial temperature and hydroclimate variability "in good agreement with some palaeoclimate proxy data".

"Every ~21 thousand years decreased precession and corresponding higher boreal summer insolation intensified rainfall in northern Africa, the Arabian Peninsula and the Levant, thus generating habitable savannah-type corridors for *H. sapiens* and a possible exchange pathway between African and Eurasian populations, which in turn impacted the subsequent global dispersal of *H. sapiens* across Asia, Europe, Australia and into the Americas."[43]

There are some contrasts with previous knowledge, such as the simulated dry conditions of the period 71-60 ka following the modelled 89-73 ka migration, which clashes the Oppenheimer's suggestions[44] of a very active migration corridor during the same period.

However, the early arrival of *sapiens* to Asia "is consistent with previous findings", while "the simulated low-density arrival [...] in Europe around 90-80 ka and the subsequent population increase from 60-50 ka challenges fossil and archaeological evidence placing the European arrival of *H. sapiens* before or around 45 ka", but the "small populations of *H. sapiens* [...] may have been assimilated by the prevalent Neanderthal population and [...] only the subsequent wave from the Levant [...] led to a *H. sapiens*-dominated population regime."[35]

On the contrary, a late exit scenario simulated by assuming a potential late MIS5a/MIS4 exodus "explains qualitatively the reconstructed arrival times in India, Europe, Australia and North America", but "does not explain the early MIS5 presence of *H. sapiens* in the Levant, the Arabian Peninsula and in southern China."

Another important achievement of the research is to highlight the importance of orbital-scale global climate swings (such as that caused by precession) in Late Pleistocene human distribution and migration, "whereas millennial-scale abrupt climate changes, associated with Dansgaard-Oeschger events[45], had a more limited regional effect"[35] on the Mediterranean populations, as repeating the early exit scenario simulation without the influence of D-O events shows.

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[43] Timmermann, Axel & Friederich, Tobias *Late Pleistocene climate drivers of early human migration* Nature, vol. 538, 6 October 2016

[44] Oppenheimer, S *Out of Africa, the peopling of continents and islands: tracing uniparental gene trees across the map* Phil. Trans. R. Soc. Lond. B367, 770-784 (2012)

[45] The D-O events are rapid glacial events occurred 25 times during the last glacial period

Yet *sapiens*, as the Smithsonian Institute recalls, isn't the only *Homo* species that experimented migration and climate diversity. There's evidence of e*rectus* at Dmanisi, Georgia, 1.85 to 1.78 ma, in a site characterised by grasslands surrounded by mountain with forests, and with access to lava as a raw material; in China, at Yuanmou, 1.7 ma men were living near a lake with a mixture of grasslands, bushlands and forests, while at Nihewan Basin, 1.66 ma, they might have experienced a much more arid region, with a seasonal hot-cold transition; in the same period, hominines in Java encountered grassland, rivers, marine coastal environments and monsoonal rains.

Conclusions

The idea of refugees as without-choice people is abominable.

Choice is unalienable for men, and any human movement comes from conscious or unconscious (it doesn't matter) reflections, processes, complications that, in the end, lead to the movement. Even if the only choice was to stay and die or go and survive, still it would be a choice. However, this isn't often the case in the complexity of a world socially, economically, historically and environmentally connected. A person seeking refuge is never depersonalised to the point of being "desperate", "miserable", "with nothing to lose", "ready to everything just to survive". Nor every migrant is seeking refuge. Still, this doesn't mean that he or she doesn't have a strong reason to move.

So we could say that there is no climate-change-refugee in the sense that nobody is moving only because of climate change, as well as we could say that it's very difficult to find someone who is migrating only because of economic reasons, or political oppression, or personal insecurity. These factors often work together, and climate change isn't really a secondary reason, even if its manifestations are often still unrecognised. Drought, extreme temperatures, floods, salinization of coastal lands are making more difficult agriculture and the average lives of many. Of course this could look not evident both to the European reader, as if climate change wasn't affecting European agriculture as well, nor to the "climate change induced migrant", if their household takes part to a longer migratory history in order to diversify the income. Many surveys suggest that this is happening, even if from Africa to Africa, from Pacific island to Pacific island, from south-Asia to south-Asia, from south-America to south-America and therefore doesn't look as dramatic as if it was directed to Europe, or USA, or Australia, or New Zealand, or to Japan, just to name some.

Moreover, it is very curious that it's not the gravity of a sudden event to cause migration, as the high post-disaster retention rate often shows. In other words, migration, and especially climate induced migration, isn't a crisis, an emergency, at least in the sense of a sudden, unexpected crisis. Rather, it is a crisis in its etymological sense of a determining event, something that doesn't leave things as they used to be. And it is even more curious that this behaviour is shared with the ancient migration of the quitting Africa s*apiens*, if the geologically rapid Dansgaard-Oeschger events weren't as critical as the systemic orbital-scale events.

Once again, if I should find a constant in the migration cases that I considered, they would be the great inequalities, that are causing both great pollutions (because of the economic competition between the "developed" and some "developing" countries such as China and India) and migrations, as they make every day more evident and unbearable that somebody is wealthier than somebody else or that very different kinds of life are possible.

Men, biocultural beings since their appearance, choose to adapt, whether by migrating or by staying and changing their habits. But habits always change, culture is never fixed as some Tuvaluans reminded. Even in societies that someone would call "traditional" just because they chase another way of living, such as the Borana, the respect for tradition doesn't bypass the importance for "modern" education, and among the Kasena also the "white men's trees" can become "God's trees". Yet, the Borana would migrate to a safer place if war didn't limit their options.

So what about the abused expression "let's help Africans at their place"? Should we teach the Kasena the respect for the environment? A beneficial, mutual exchange of sources, knowledge and feelings could help both. Gregory White peremptorily states: "Adaptation *must* be pursued in the context of development

projects. [...] given that African societies contribute only 2.5 percent of the world's CO_2 emissions, mitigation effort within the continent are not especially pertinent." Furthermore, a one-direction "responsible and technical colonialism", as someone dared call indiscriminately all the "humanitarian" help that wealthier countries provided, provide and will provide to the low-income ones, could just worsen the situation.

And if migration and transformation are so strictly linked to human history that always accompanied it, how should they be governed? The only way to properly govern migration is to give everybody an equally healthy environment to live in and the same political opportunities to move freely.

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