Spring 2014

Compound city: social, economic, and environmental impact in the production of generative urban space

Nathan Jones

COMPOUND CITY:

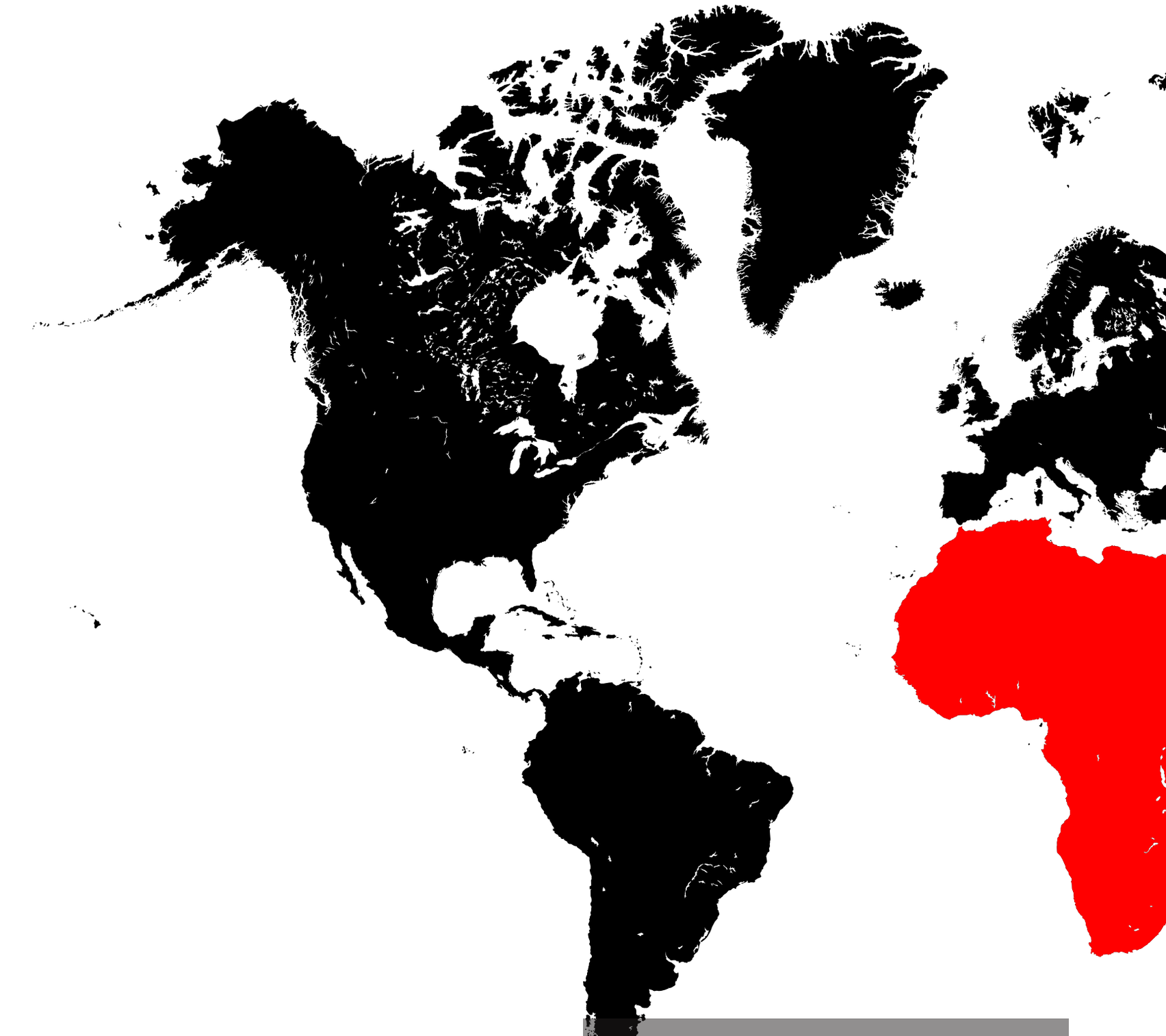
SOCIAL, ECONOMIC, AND ENVIRONMENTAL IMPACT IN THE PRODUCTION OF GENERATIVE URBAN SPACE

Nathan A. Jones
Syracuse University
Bachelor of Architecture Thesis

Advisors
Bess Krietemeyer
Joseph Godlewski

INTRODUCTION
KEY TERMS

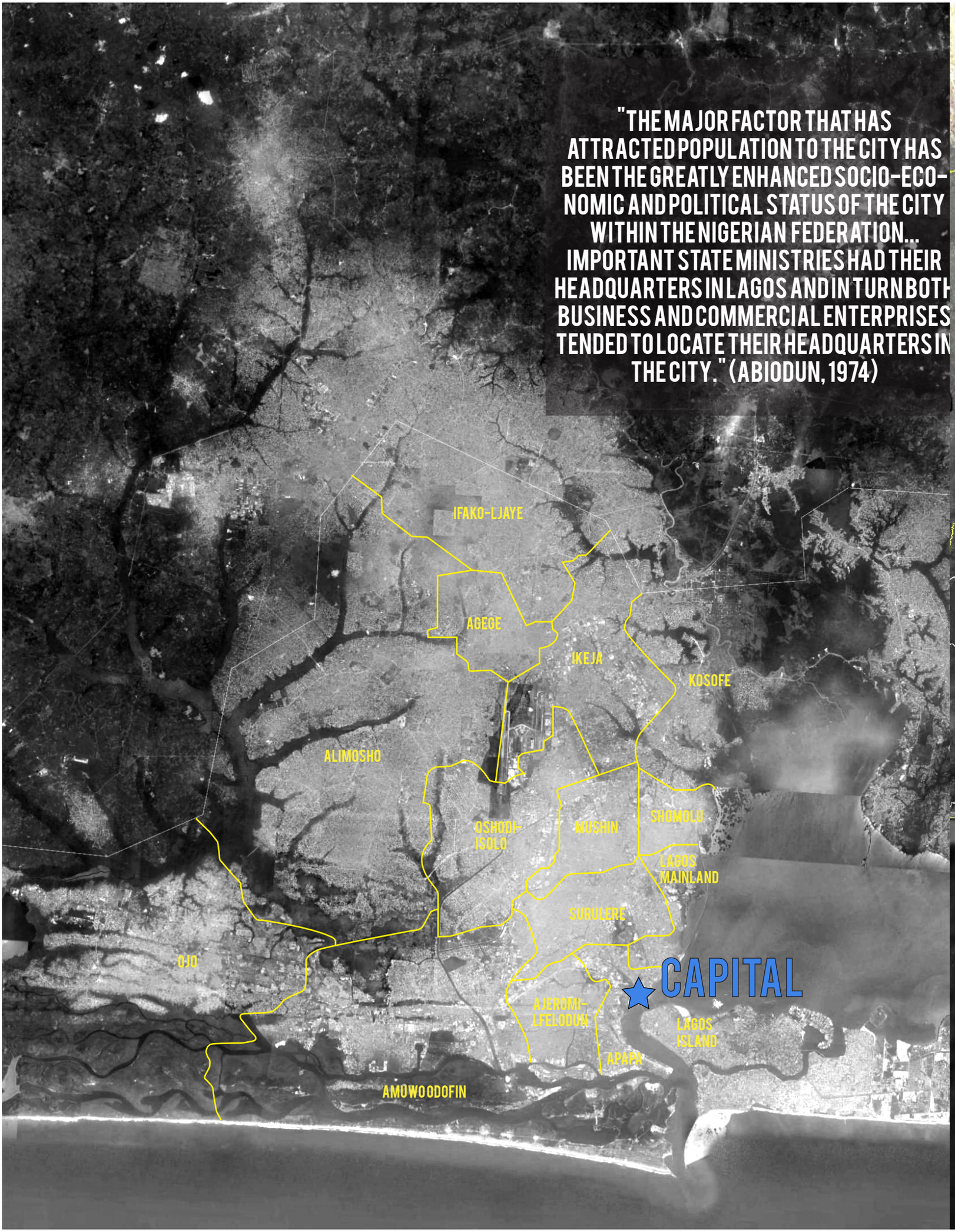
"Compound City" will focus on the implementation of an open source, social infrastructure, as a methodology in addressing the on-going urban crisis in Lagos. Dealing primarily with urban informality, Lagos will serve as a theoretical testbed, providing a natural precedent in which to test these ideas. How can open source technologies - softwares & hardwares - subvert or embrace existing infrastructures/processes as a means of alleviating inadequate living conditions? Identifying the coincidental pressures in Lagos will help establish project parameters, driving the development of design criteria to be addressed by the new, open source, platform.

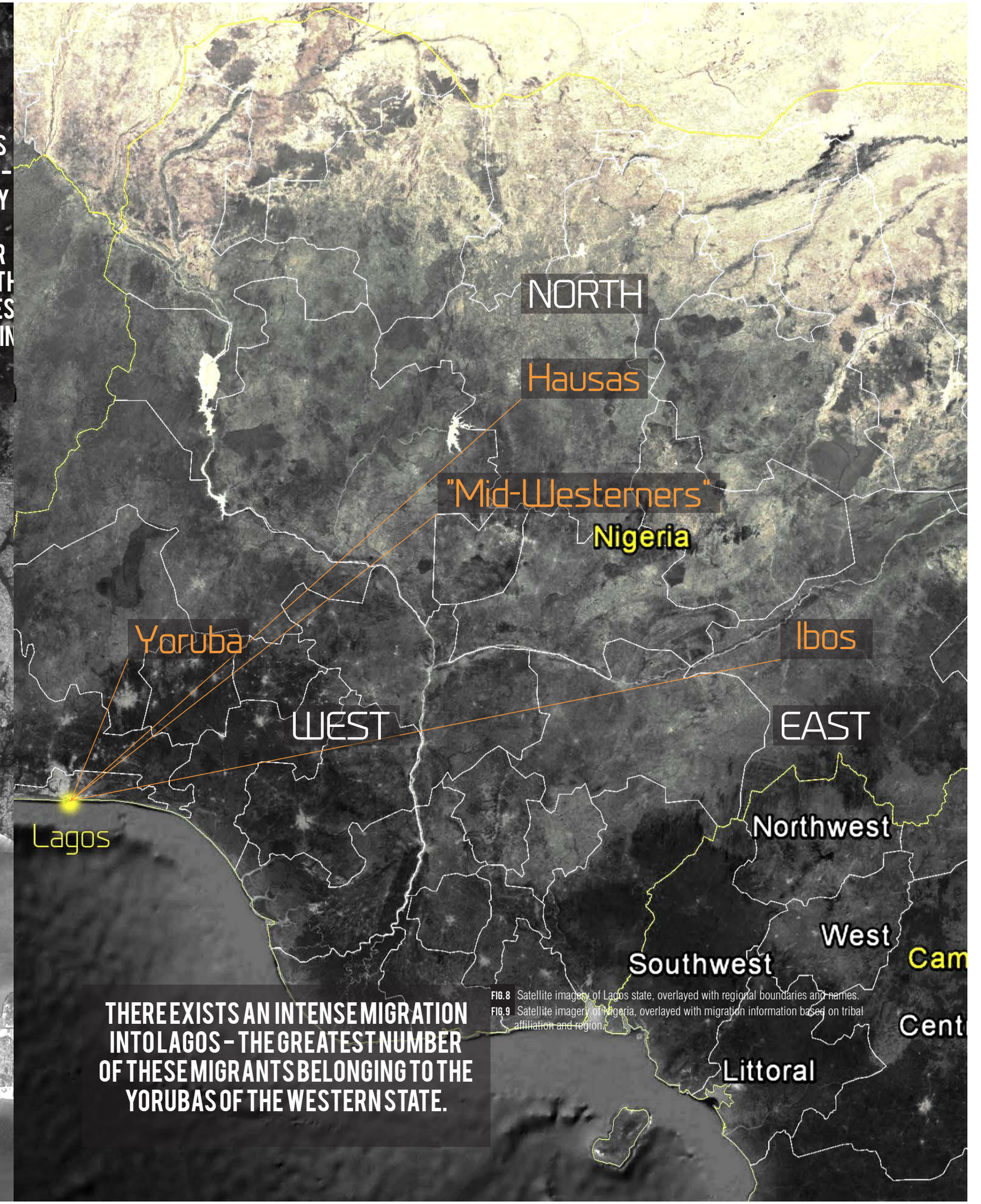


"...SCHOLARS OFTEN THINK ABOUT SIMILARITY AND DIFFERENCE WHEN STUDYING WEALTHIER AND POORER COUNTRIES, SUCH COMPARISONS TEND TO REMAIN WITHIN A NARROW COMPARATIVE GEOGRAPHIC SCOPE BETWEEN CONTEXTS IN THE USA AND EUROPE AS THE CENTRE OF DISCUSSIONS." (IKIODA, 2013)

FIG.1 Global Map: Africa highlighted.
FIG.2 Global Map: Africa, with Nigeria highlighted.

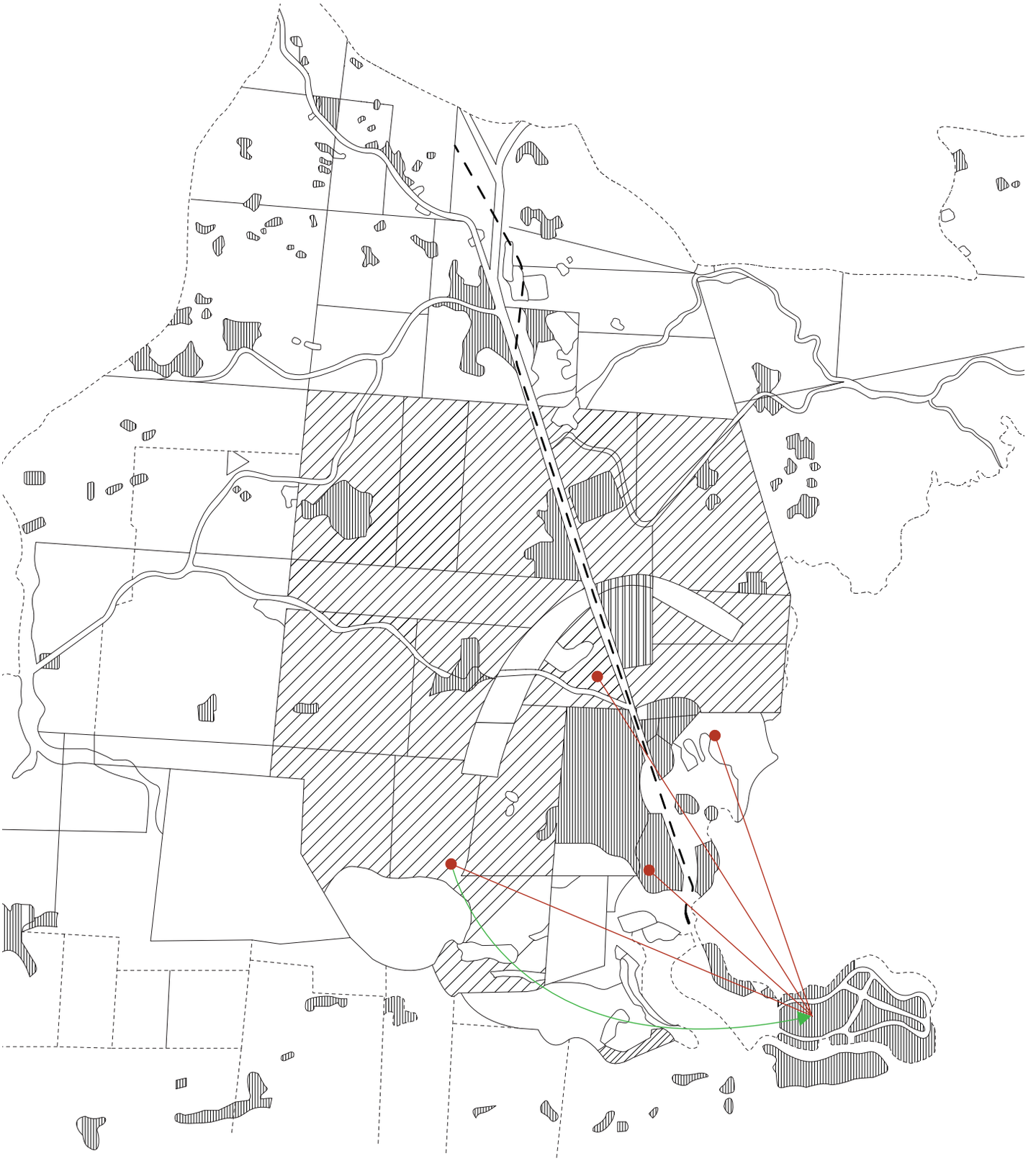
HOW WILL ARCHITECTS ESTABLISH THE TOOLS, INFRASTRUCTURES, AND INSTITUTIONS FOR NEW GLOBAL ECOLOGIES?


"THE MAJOR FACTOR THAT HAS ATTRACTED POPULATION TO THE CITY HAS BEEN THE GREATLY ENHANCED SOCIO-ECONOMIC AND POLITICAL STATUS OF THE CITY WITHIN THE NIGERIAN FEDERATION... IMPORTANT STATE MINISTRIES HAD THEIR HEADQUARTERS IN LAGOS AND IN TURN BOTH BUSINESS AND COMMERCIAL ENTERPRISES TENDED TO LOCATE THEIR HEADQUARTERS IN THE CITY." (ABIODUN, 1974)
IFAKO-IJAYE
AGEGE
IKEJA
KOSOFE
ALIMOSHO
OSHODI-ISOLO
MUSHIN
SHOMOLU
LAGOS MAINLAND
SURULERE
OJO
CAPITAL
AJEROMI-IFELODUN
LAGOS ISLAND
APAPA
AMUWO ODOFIN

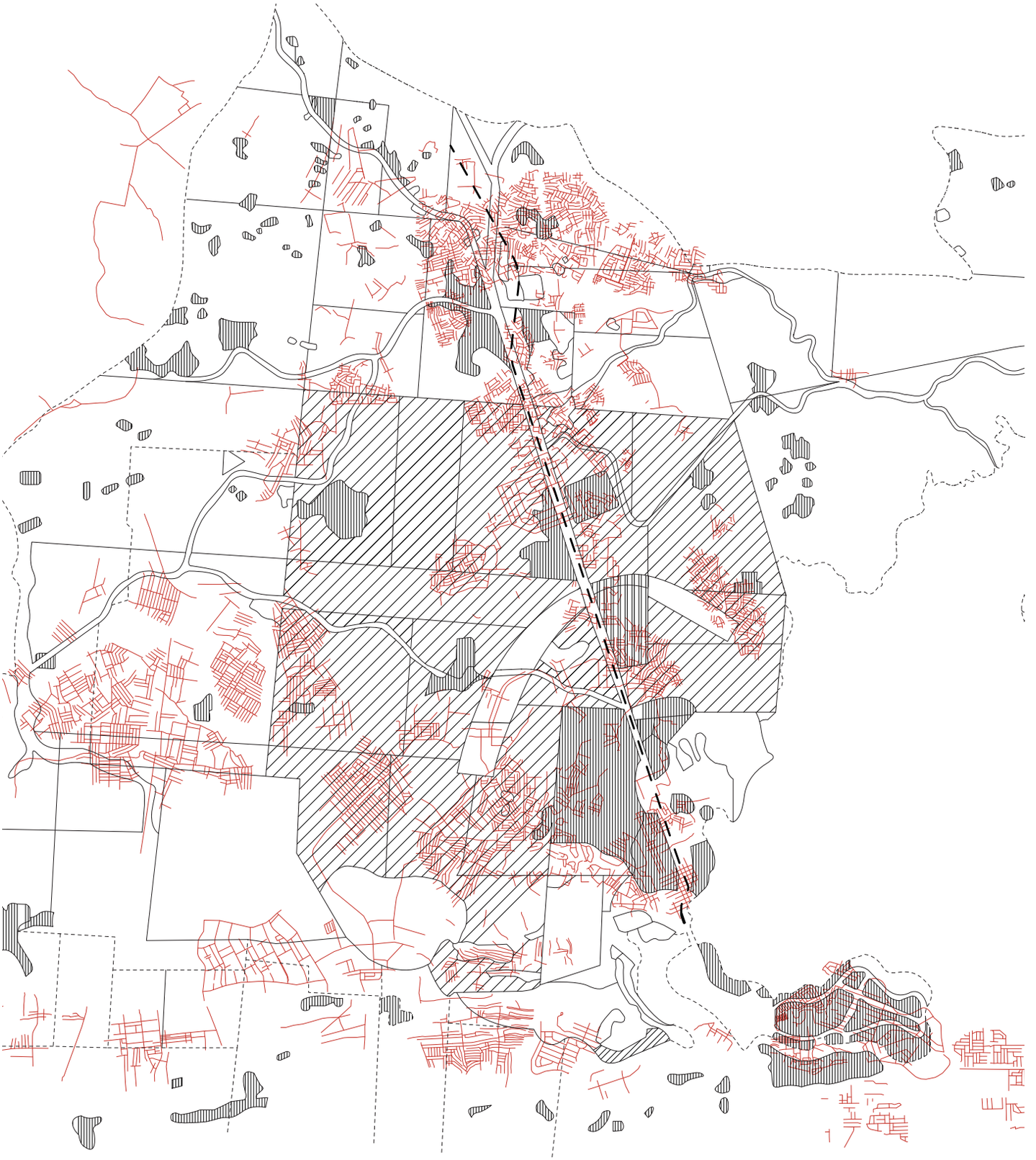


THERE EXISTS AN INTENSE MIGRATION INTO LAGOS – THE GREATEST NUMBER OF THESE MIGRANTS BELONGING TO THE YORUBAS OF THE WESTERN STATE.

FIG.8 Satellite imagery of Lagos state, overlayed with regional boundaries and names.
FIG.9 Satellite imagery of Nigeria, overlayed with migration information based on tribal affiliation and region.



"THE TEMPORARY HOUSING PROVIDED IN SURULERE BECAME PERMANENT AS IT BECAME IMPOSSIBLE FOR MANY OF THE DISPLACE POPULATION TO REACQUIRE AND REDEVELOP THEIR PLOTS IN THE CENTRAL CITY..."
(ABIODUN, 1974)



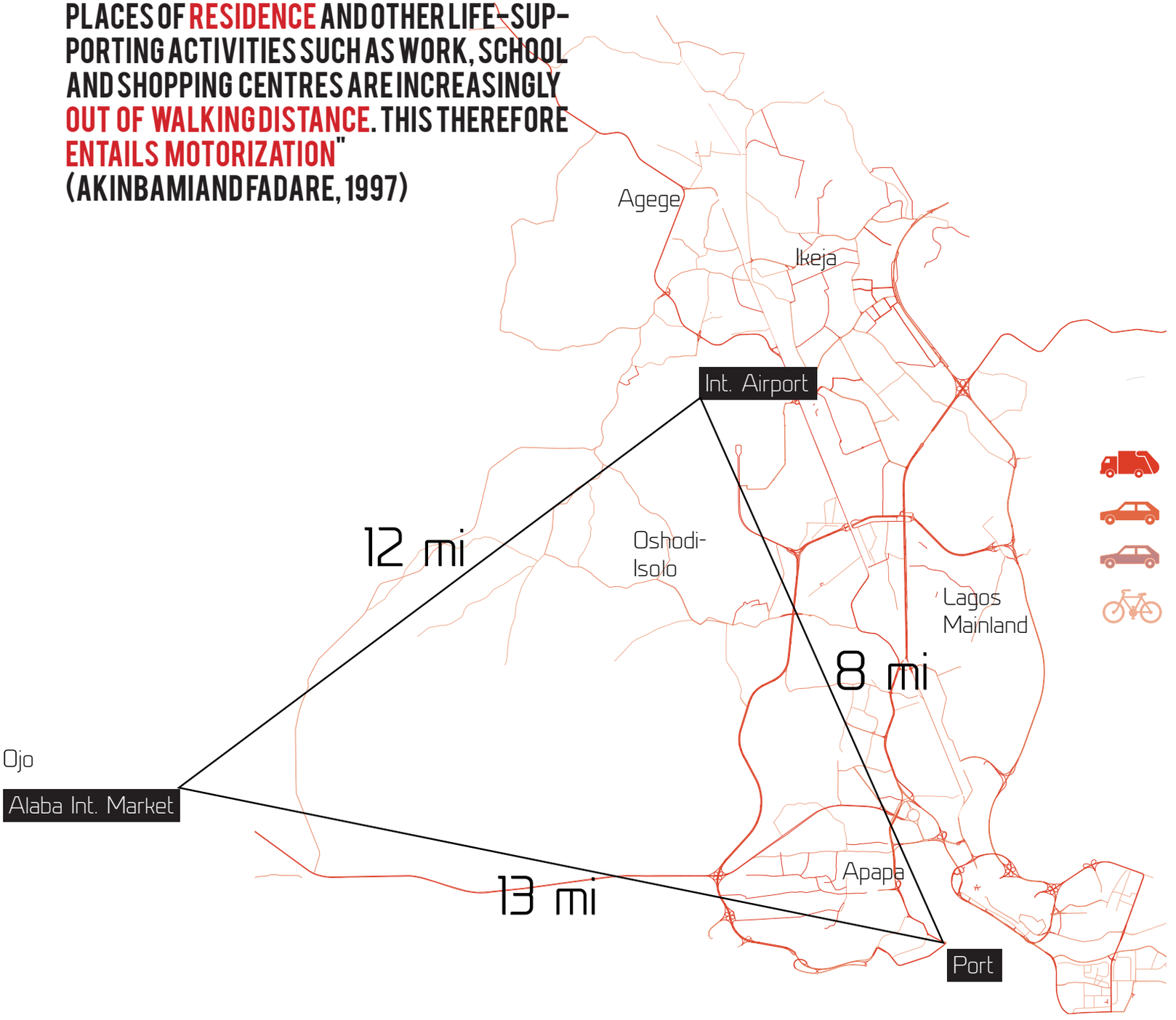
THE LAYERING OF POPULATION DISPLACEMENT, LOW WAGES, AND INCREASING MIGRATION, COINCIDENTALLY GENERATED INFORMAL SETTLEMENT AND EXPANSION.

FIG.10 Left: showing government planned development schemes circa 1974. Arrows indicate pattern of resident displacement to mainland periphery, and intented re-settlement.

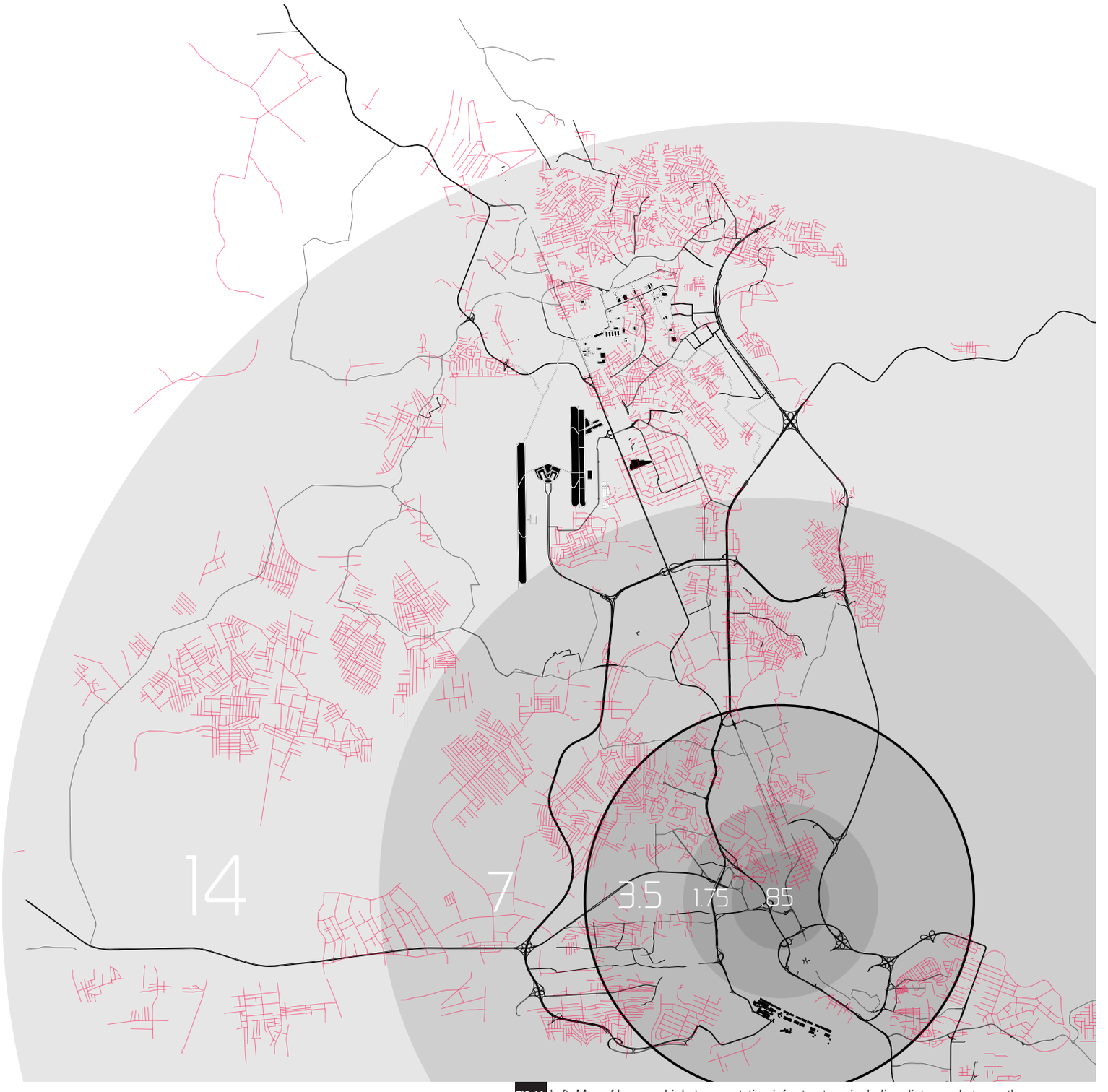
FIG.11 Right: same government schemas (1974). Red indicates all currently documented areas of settlements; the intention to reveal the contrast between what was planned, and what actually developed.

7 Abiodun, Josephine Olu. "Urban Growth and Problems in Metropolitan Lagos" Urban Study 11 (1974): 341-347. Print. Online. Accessed 11.4.2013. doi: 10.1080/00420987420080601.

"NIGERIAN CITIES ARE BECOMING MORE AND MORE CHARACTERIZED BY URBAN SPRAWL TO THE EXTENT THAT **DISTANCES BETWEEN** PLACES OF **RESIDENCE** AND OTHER LIFE-SUPPORTING ACTIVITIES SUCH AS WORK, SCHOOL AND SHOPPING CENTRES ARE INCREASINGLY **OUT OF WALKING DISTANCE**. THIS THEREFORE **ENTAILS MOTORIZATION**"
(AKINBAMI AND FADARE, 1997)



"AS THE URBAN AREAS SPRAWL AT THEIR PERIPHERIES AND THE CORE AREAS BREAK DOWN WITH THE BURDEN FROM INCREASING DEMAND FOR SOCIAL SERVICES BY THE POPULATION, THEY CONSEQUENTLY BECOME HOMES OF THE POOR, AND THE SITES AND SOURCES OF ENVIRONMENTAL POLLUTION." (BRAIMOH AND ONISHI)



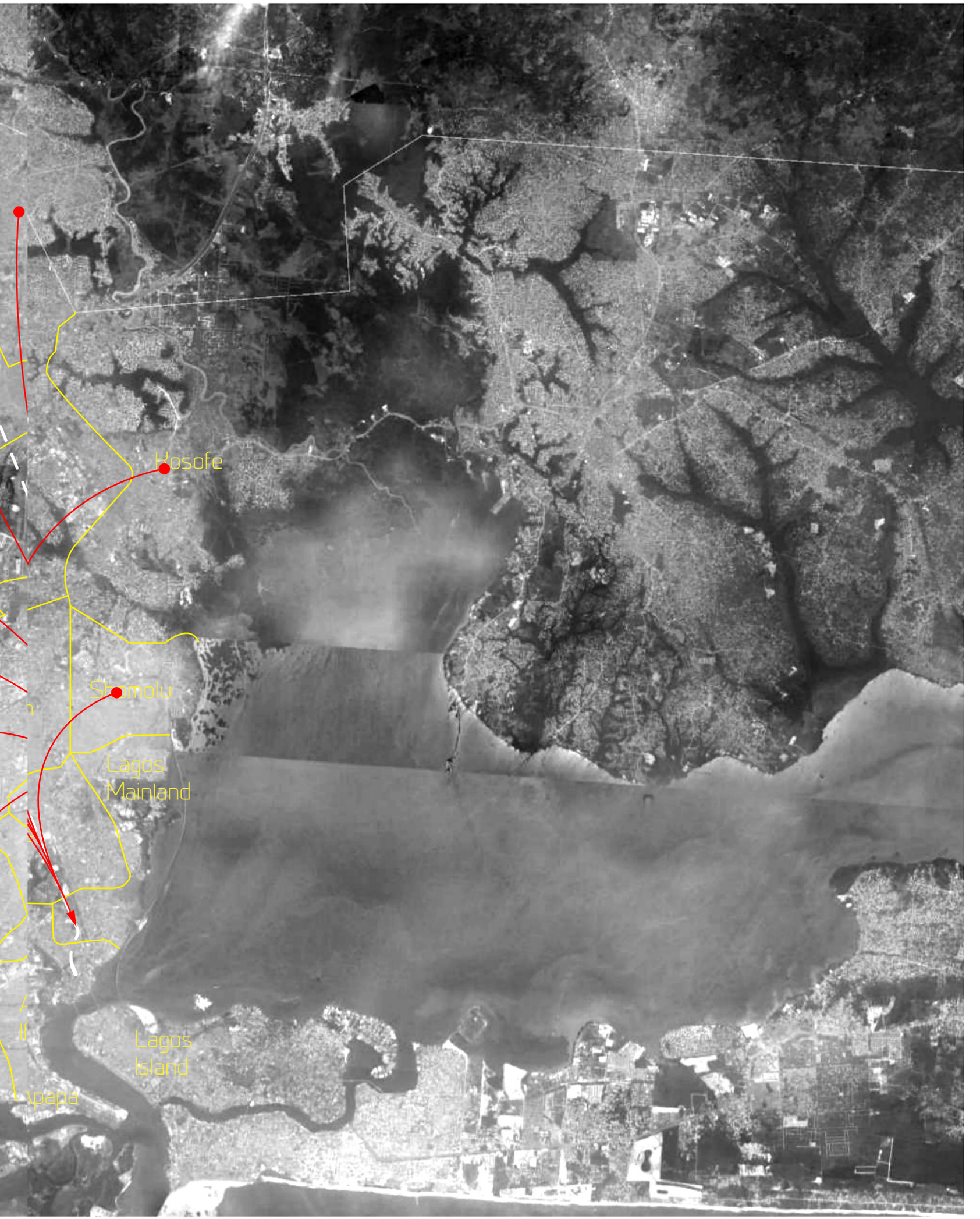
A LARGE PERCENT – AROUND 40% – LIVE BETWEEN 10 – 12 MILES DISTANCE FROM THE CITY CENTER, FORCING MANY TO OWN VEHICLES OR COMMUTE BY BUS.

FIG. 14 Left: Map of Lagos vehicle transportation infrastructure, including distances between the port, Alaba Int. Market, and the airport.

FIG. 15 Right: Map of Lagos vehicle transportation infrastructure in contrast to documented areas of settlement; measured is distance in miles from city center.

[10] Akinbami, J.F.K. and Fadare, S.O.. "Strategies for sustainable urban and transport development in Nigeria" Transport Policy 4.4 (1997): 237-245. Print. Accessed 11.4.2013. PII: S0967-070X(97)00022-X.


"LAGOS...HAVE BECOME VICTIMS OF TRAFFIC CONGESTIONS...TRAFFIC VOLUMES UP TO 100,000 VEHICLES/DAY ARE STILL RECORDED FOR SOME MAIN ROUTES...TRAFFIC CONGESTION HAS ASSOCIATED WITH IT SOME SOCIO-ECONOMIC CONSEQUENCES SUCH AS LOSS OF MANHOURS, AND HEALTH PROBLEMS WHICH CANNOT BE EASILY QUANTIFIED... THERE IS A CONSIDERABLE EMISSION OF POLLUTANTS SUCH AS CARBON DIOXIDE (CO2) CARBON MONOXIDE (CO), SULPHUR DIOXIDE (SO2) AND THE NITROGEN OXIDE FAMILY (NOX) FROM VEHICLES IN MAJOR URBAN CENTRES...60% OF TOTAL GASOLINE AND DIESEL CONSUMPTION IN NIGERIA TAKES PLACE IN LAGOS..." (AKINBAMI AND FADARE, 1997)
Ifako-Ijaye
Agege
Alimosho
Oshodi-
Isolo
Ojo
Amuwo Odofin


Ikosofe
Lagos
Mainland
Lagos
Island

"INADEQUATE HOUSING LEADING TO THE EMERGENCE OF SLUMS, SPATIAL INEQUITY IN ACCESS TO LAND AND INFRASTRUCTURE, HAPHAZARD LAND DEVELOPMENT, INFRASTRUCTURE DECAY, INCESSANT FLOODING, WIDESPREAD POVERTY AND UNEMPLOYMENT ARE SOME OF THE SYMPTOMS OF UNSUSTAINABLE EXPANSION OF THE CITY REQUIRING THE INTERVENTION OF LAND USE PLANNERS AND MANAGERS." (BRAIMOH AND ONISHI)

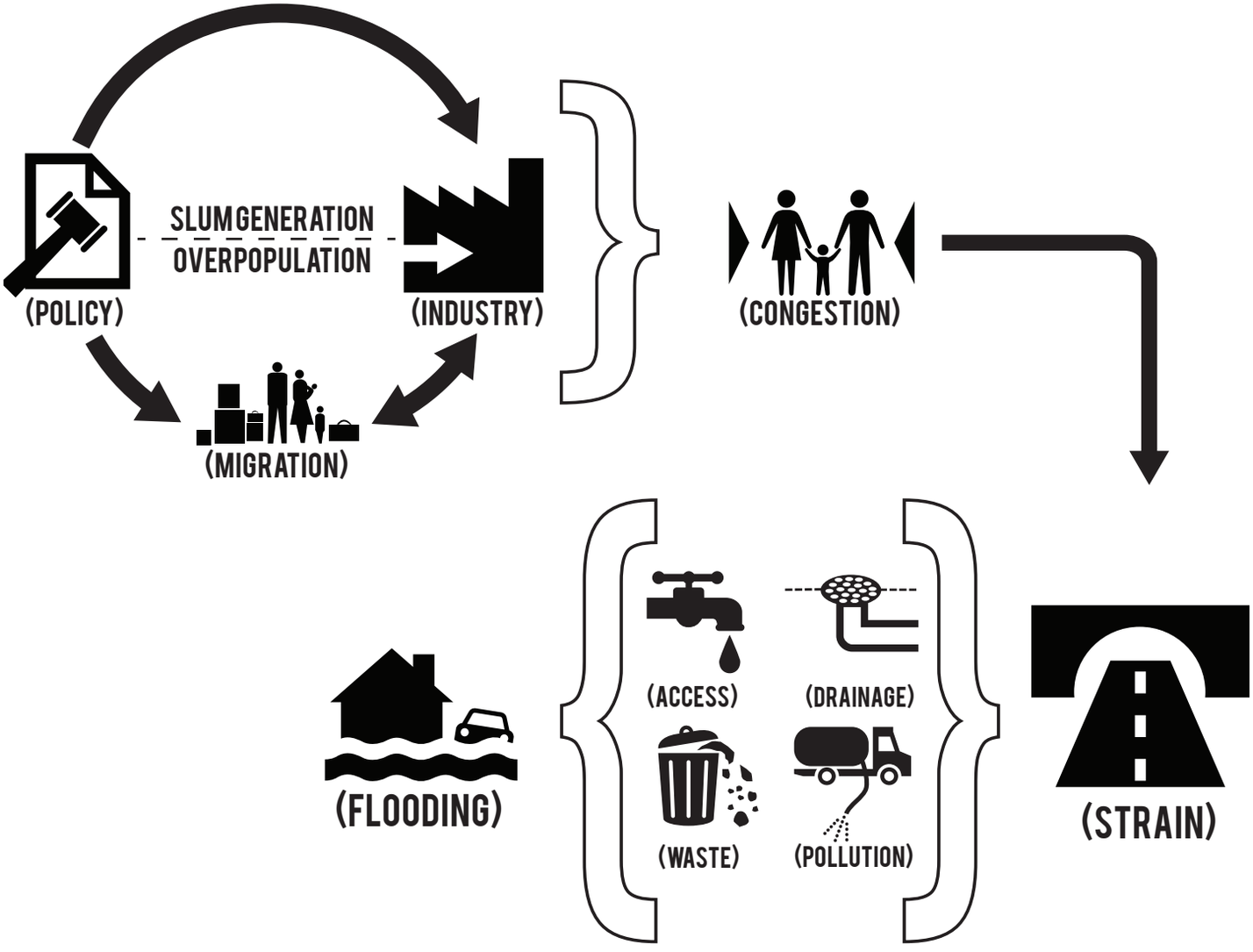
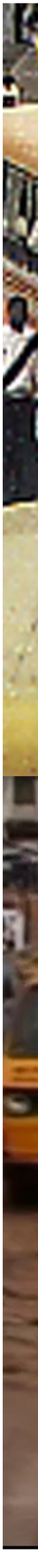
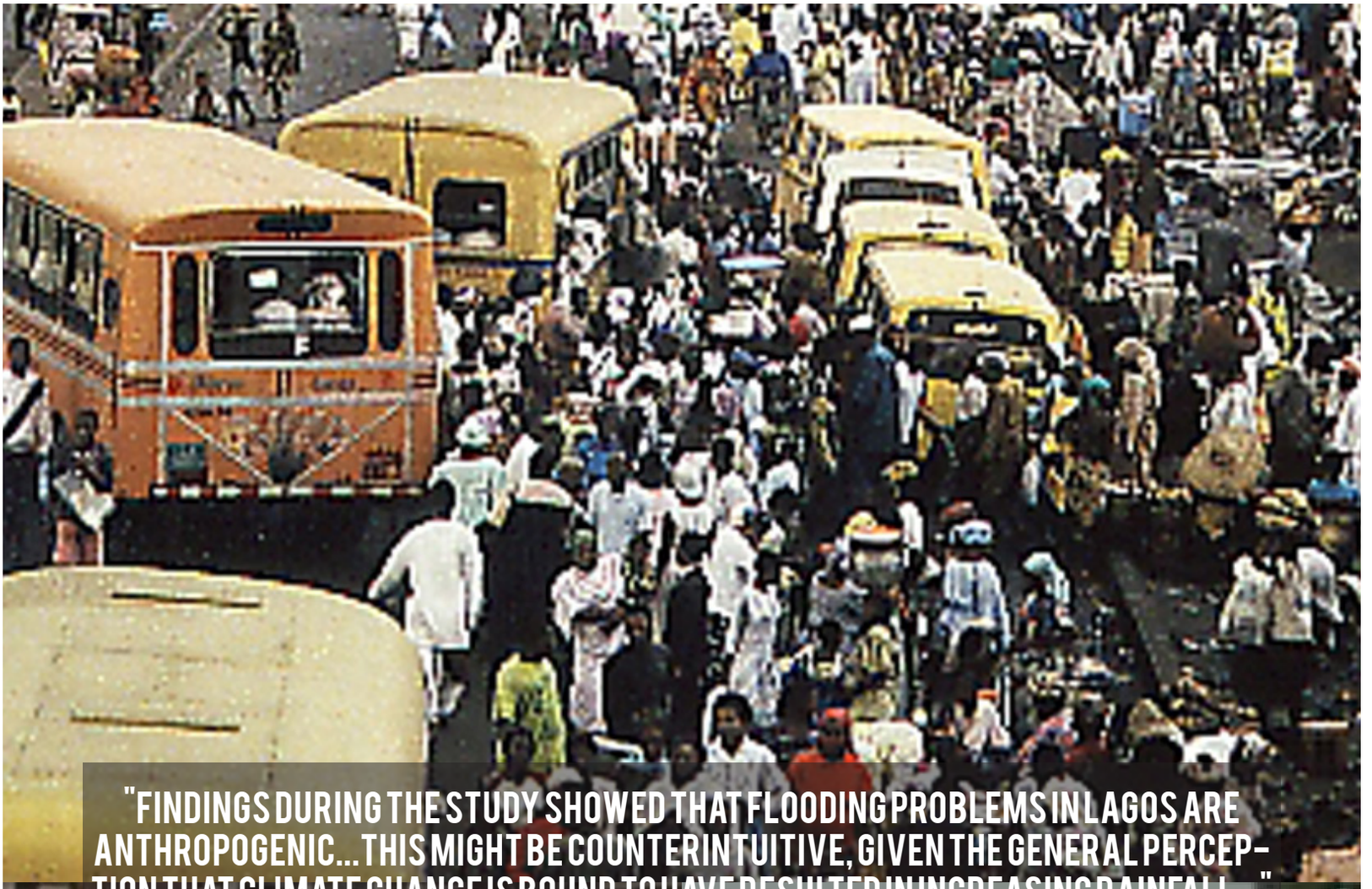


FIG. 18 Above: Flowchart mapping the various coincidental forces generating conditions of congestion, and thus strain.

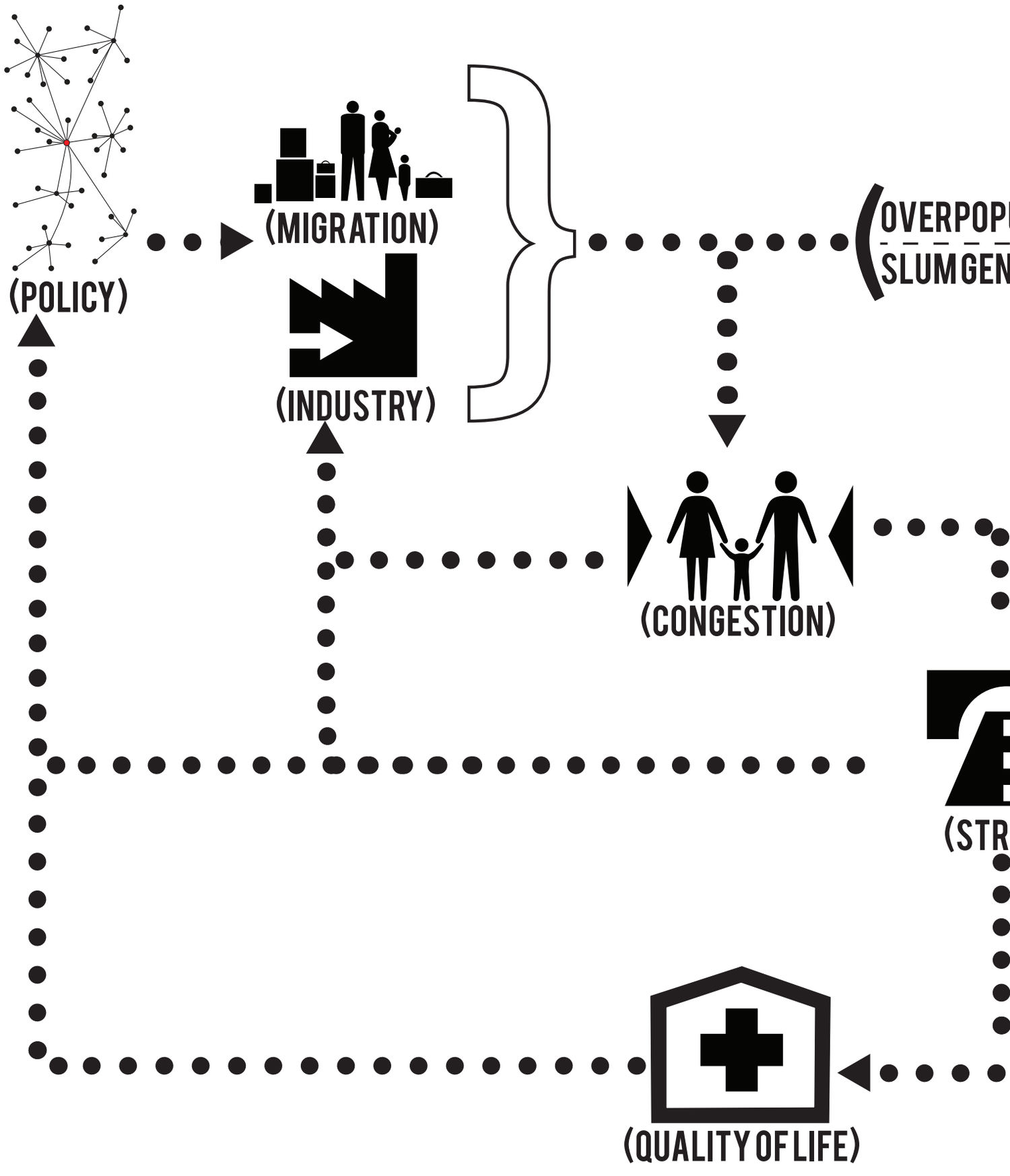
FIG. 19–20 Right: Images acting in sequence (from top to bottom right): vehicular and pedestrian congestion on main roads, poorly constructed and maintained off roads, flooding as a result of improper drainage and waste pile up.

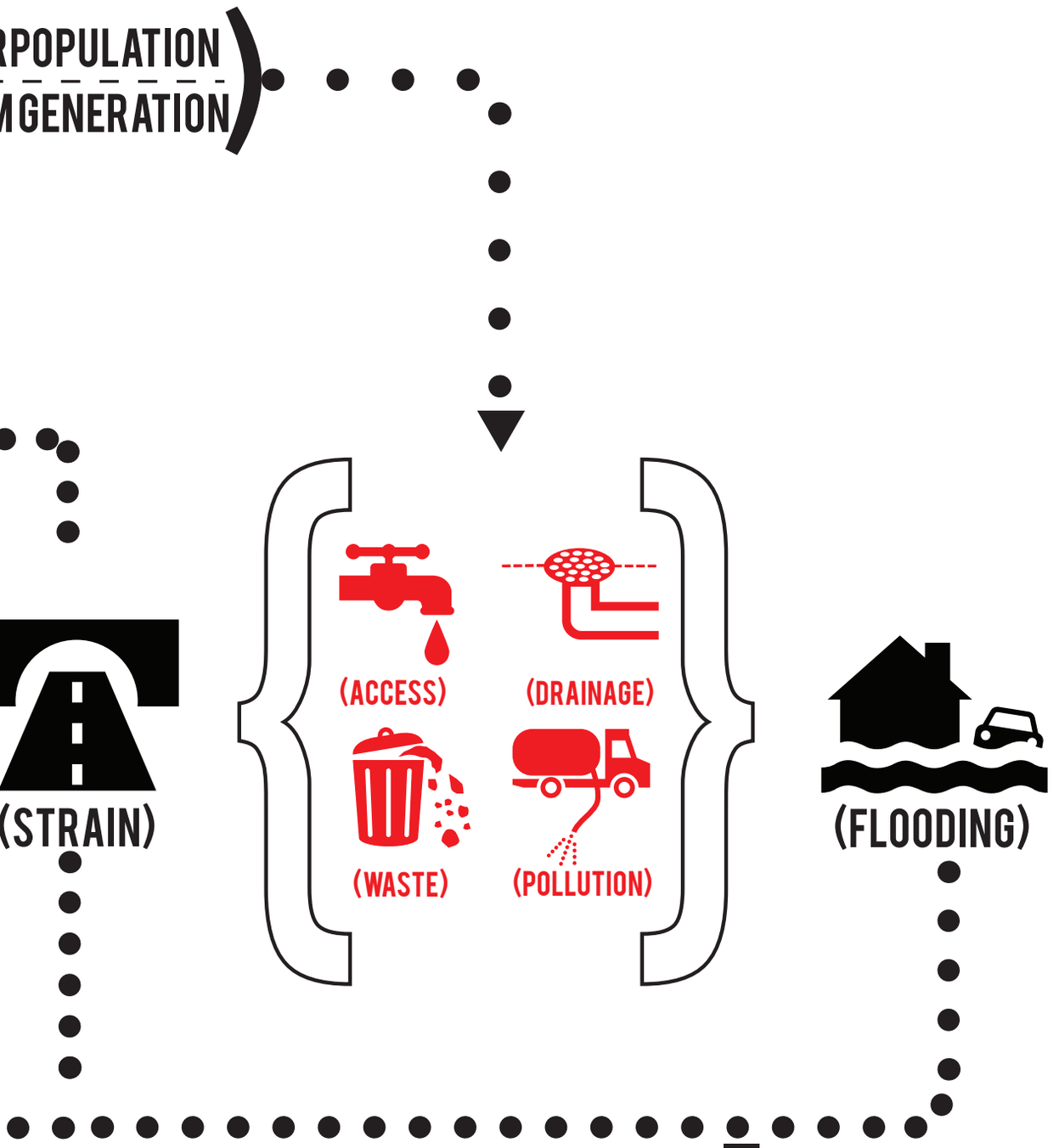
SIMPLY PUT: OVERPOPULATION DUE TO MIGRATION, LAND USE POLICY, MOTORIZATION, AND LIMITED RESOURCES HAVE PUSHED LAGOS' INFRASTRUCTURES TO THEIR LIMITS.





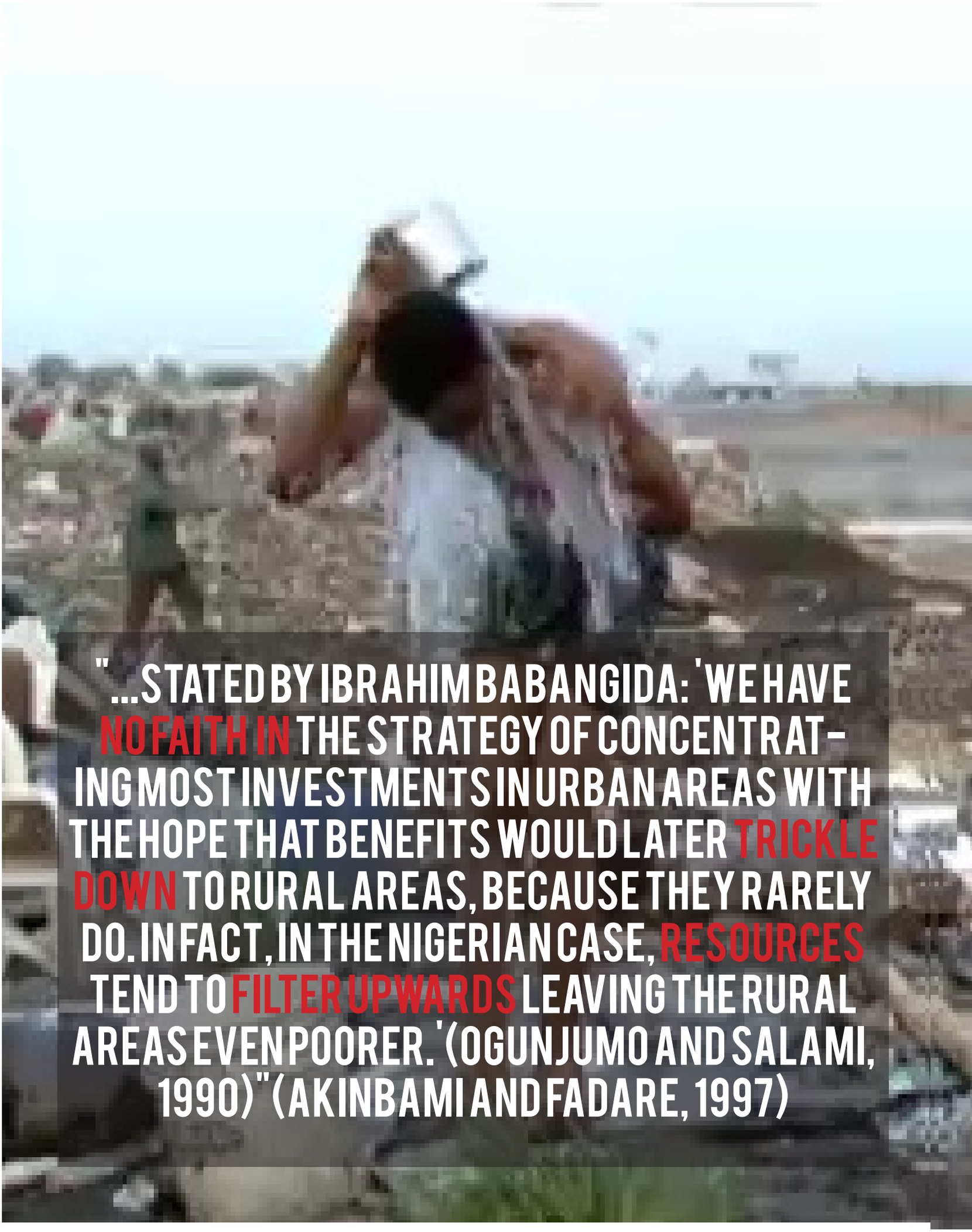
"FINDINGS DURING THE STUDY SHOWED THAT FLOODING PROBLEMS IN LAGOS ARE ANTHROPOGENIC... THIS MIGHT BE COUNTERINTUITIVE, GIVEN THE GENERAL PERCEPTION THAT CLIMATE CHANGE IS BOUND TO HAVE RESULTED IN INCREASING RAINFALL..."
(ADEYOLE AND RUSTUM)


(POLICY)
(MIGRATION)
(INDUSTRY)
OVERPOPU
SLUM GEN
(CONGESTION)
(STR
(QUALITY OF LIFE)



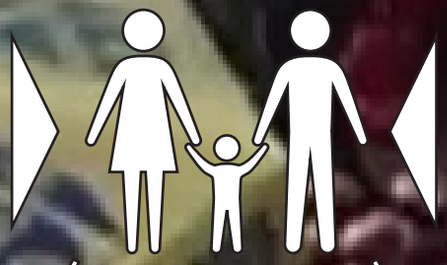
VARIOUS CONDITIONS PLAGUING LAGOS ARE INTERCONNECTED, ACTING OUT A CONTINUOUS CYCLE. WHICH CONDITIONS CAN ARCHITECTURE EXPLICITLY ADDRESS IN ORDER TO REMEDY THE DETERIORATION OF LAGOS?

FIG. 21 "Existing" flowchart: impact of social, economic, and political forces acting upon each other; generating new and continuous conditions.



"...STATED BY IBRAHIM BABANGIDA: 'WE HAVE NO FAITH IN THE STRATEGY OF CONCENTRATING MOST INVESTMENTS IN URBAN AREAS WITH THE HOPE THAT BENEFITS WOULD LATER TRICKLE DOWN TO RURAL AREAS, BECAUSE THEY RARELY DO. IN FACT, IN THE NIGERIAN CASE, RESOURCES TEND TO FILTER UPWARDS LEAVING THE RURAL AREAS EVEN POORER.' (OGUNJUMO AND SALAMI, 1990)" (AKINBAMI AND FADARE, 1997)

PHENOMENON

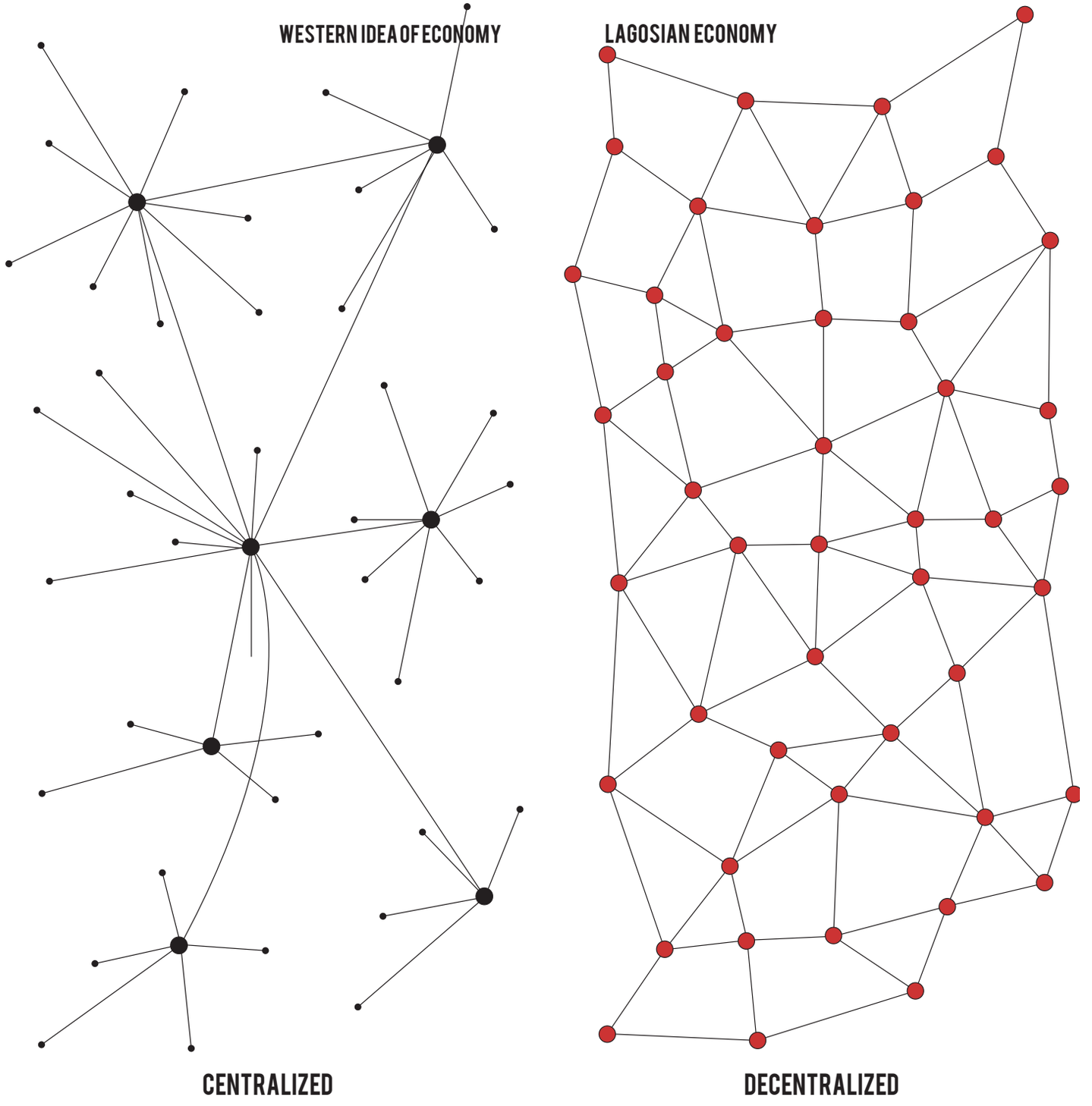


(PROXIMITY)

(MARKETPLACE)

"MARKETPLACES IN LAGOS MAY ALTHOUGH APPEAR DISORGANISED AND SEEMINGLY CHAOTIC, BUT THEY STILL POTENTIALLY REVEAL IMPORTANT INTERCONNECTIONS THAT CAN INFORM AND ILLUMINATE THEORIES ON RETAILING AND CONSUMPTION IN NEW AND EXCITING WAYS." (IKIODA, 2013)

"FORMAL" VS "INFORMAL"



UNDERSTANDING LAGOS' ORGANIZATIONS – IN PART – AS A COMPLEX SERIES OF SOCIAL INFRASTRUCTURES.

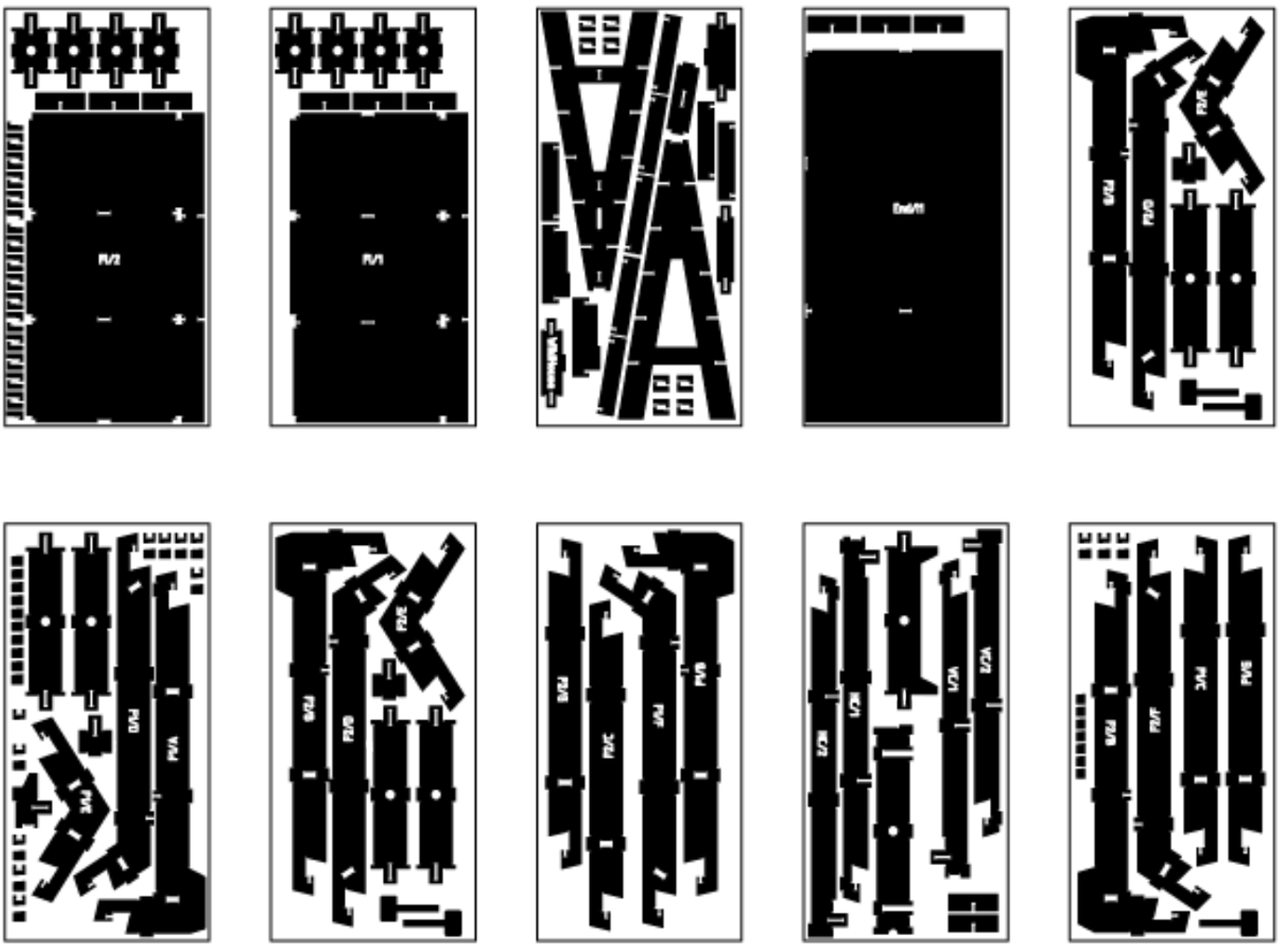
FIG.23 Left: Diagram illustrating the occurance of informal markets and economies as a direct result of congestion, or proximity.

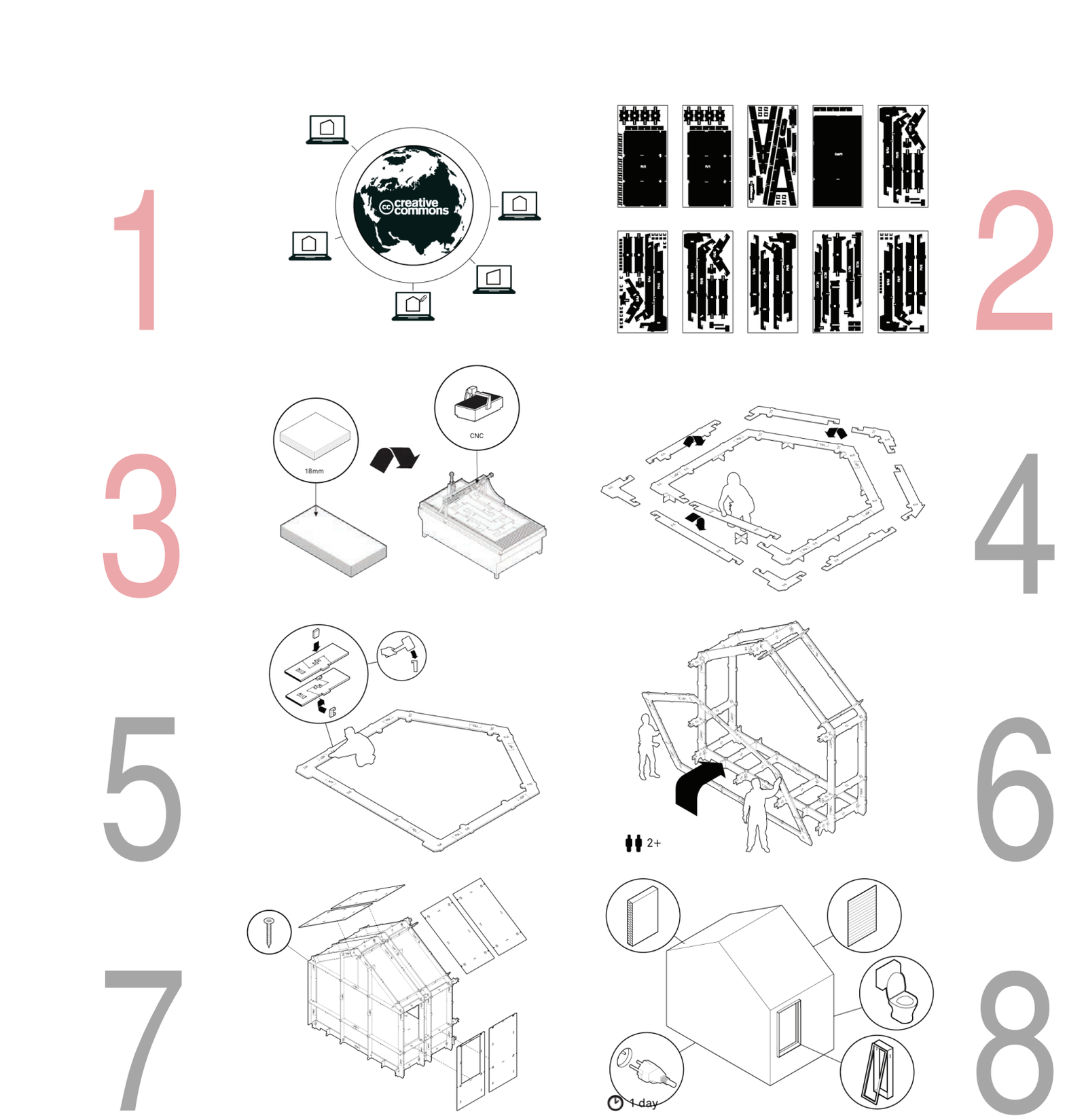
FIG.24 Above: Diagrams illustrating the dynamics of centralized, and decentralized systems of organization.

"CAN YOU DO IT ON YOUR OWN?"
"WE CAN, BUT WE ALSO NEED THE GOVERNMENT. THERE ARE A LOT OF THINGS WE CANNOT DO IT ON OUR OWN. WE CANNOT BUILD THE ROADS ON OUR OWN. WE CANNOT GENERATE ELECTRICITY ON OUR OWN. THE TELEPHONE SYSTEM AND NEW NETWORKS ARE MONOPOLIZED BY GOVERNMENT." *WELCOME TO LAGOS*

WHAT IS NEEDED IS A REGULATIVE FOUNDATION THAT PROVIDES COMMUNITIES WITH A STABLE PLATFORM FOR GROWTH.

"WIKIHOUSE IS AN OPEN SOURCE CONSTRUCTION SET. THE AIM IS TO ALLOW ANYONE TO DESIGN, DOWNLOAD, AND PRINT CNC-MILLED HOUSES AND COMPONENTS, WHICH CAN BE ASSEMBLED WITH MINIMAL FORMAL SKILL OR TRAINING."





WIKIHOUSE IS CAPABLE OF PROVIDING THE DESIGN, DISTRIBUTION, AND ASSURED QUALITY OF LOW COST HOMES. THIS IS ACHIEVED BY TAKING ADVANTAGE OF FREELY AVAILABLE SOFTWARES AND TECHNOLOGIES.

FIG.37 Left: Image illustrating parts layout for any given WikiHouse model - these sheets typically come in .svg format, and are ready for immediate mill use.

FIG.38 Above: Diagram illustrating the 8 steps to building a WikiHouse. Accessed 9.14.2013: http://www.wikihouse.cc/.

1

DESIGN

DESIGN FOR CLIMATE, CULTURE, ECONOMY, ENVIRONMENT, AND SAFETY.

2

RECYCLE

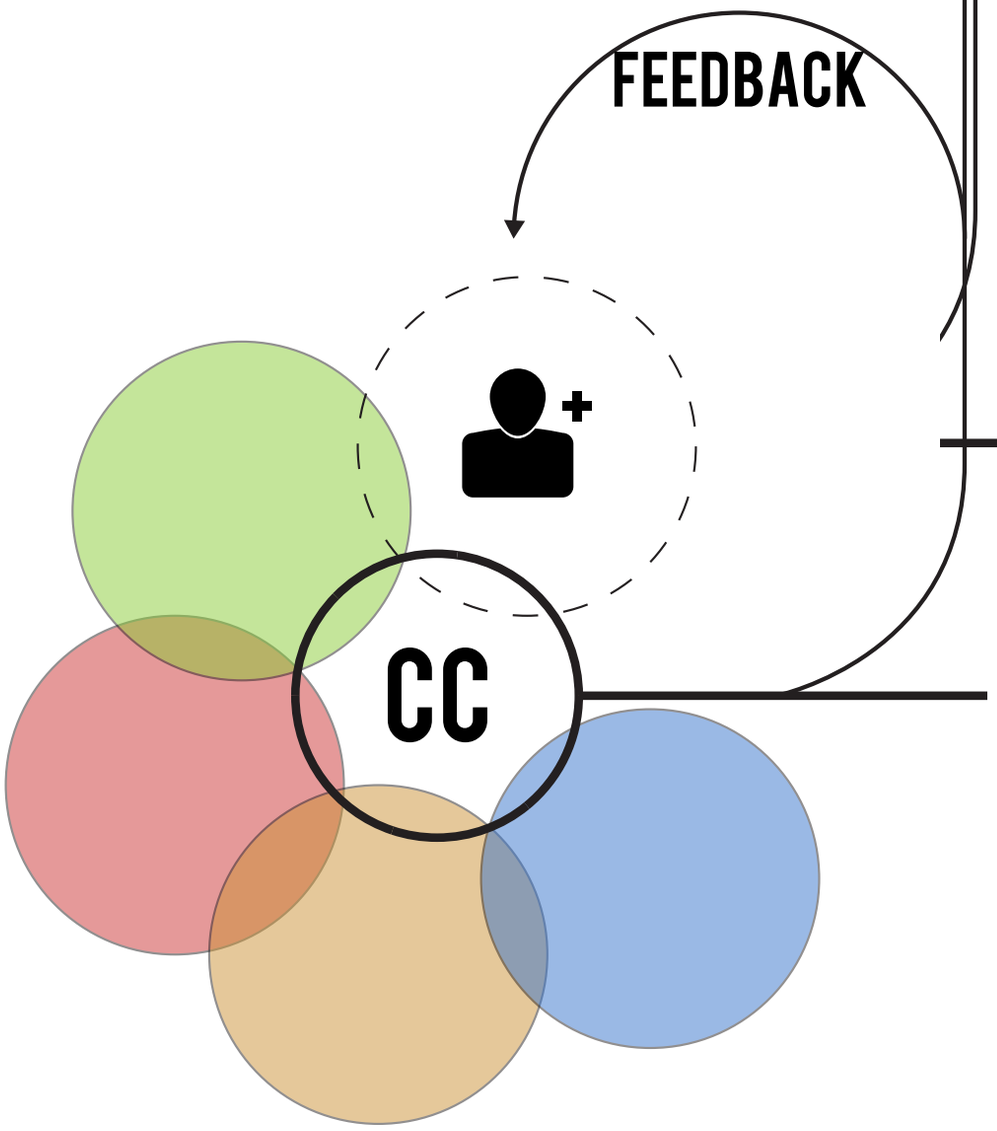
DESIGN CHEAP, LOW CARBON, RECYCLABLE, BIODEGRADABLE, SOLUTIONS.

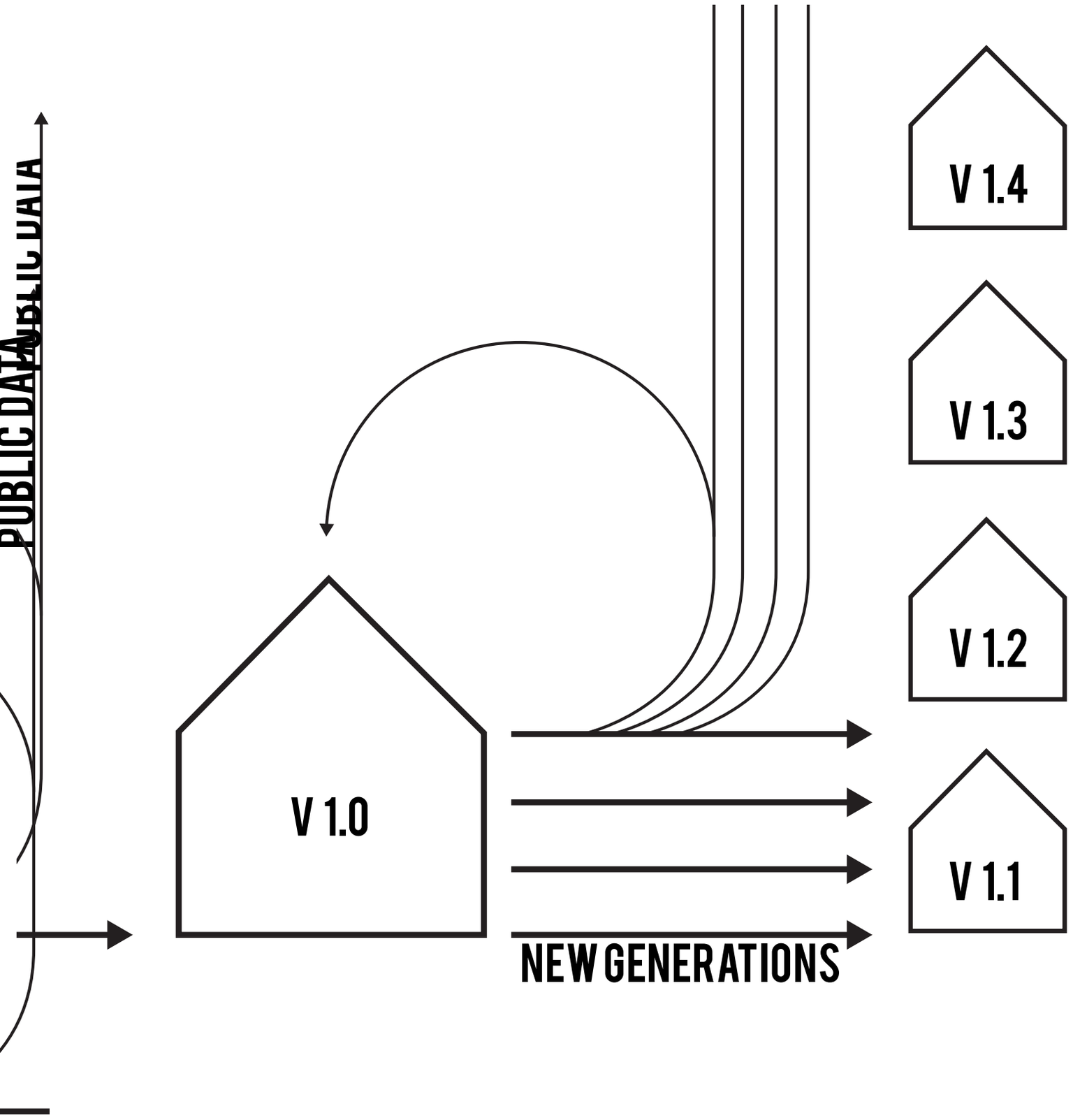
3

BUILD

DESIGN TO DISMANTLE, DESIGN FOR MISTAKES.

PUBLIC DATA

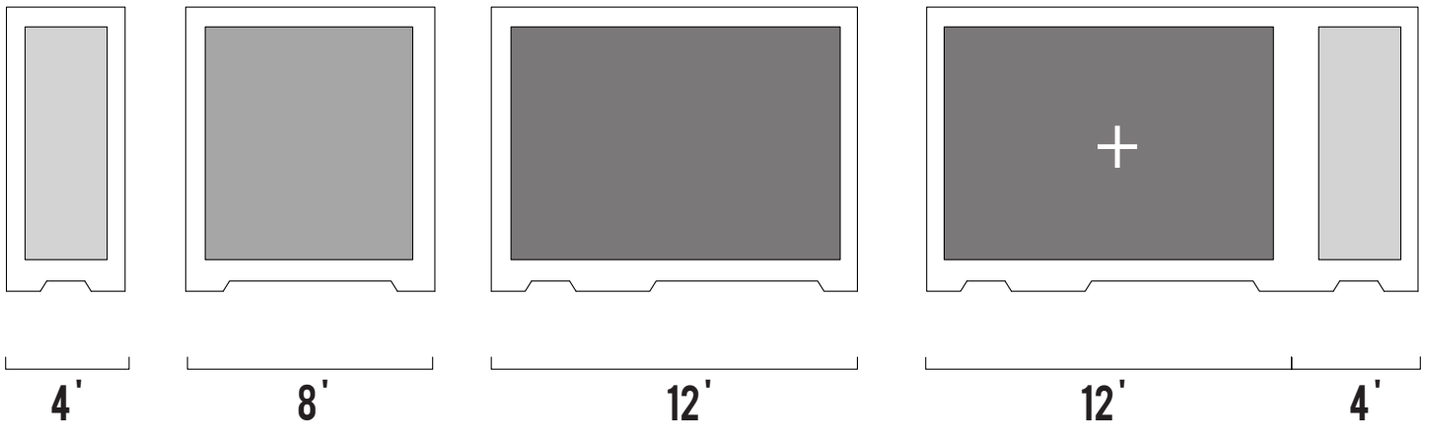




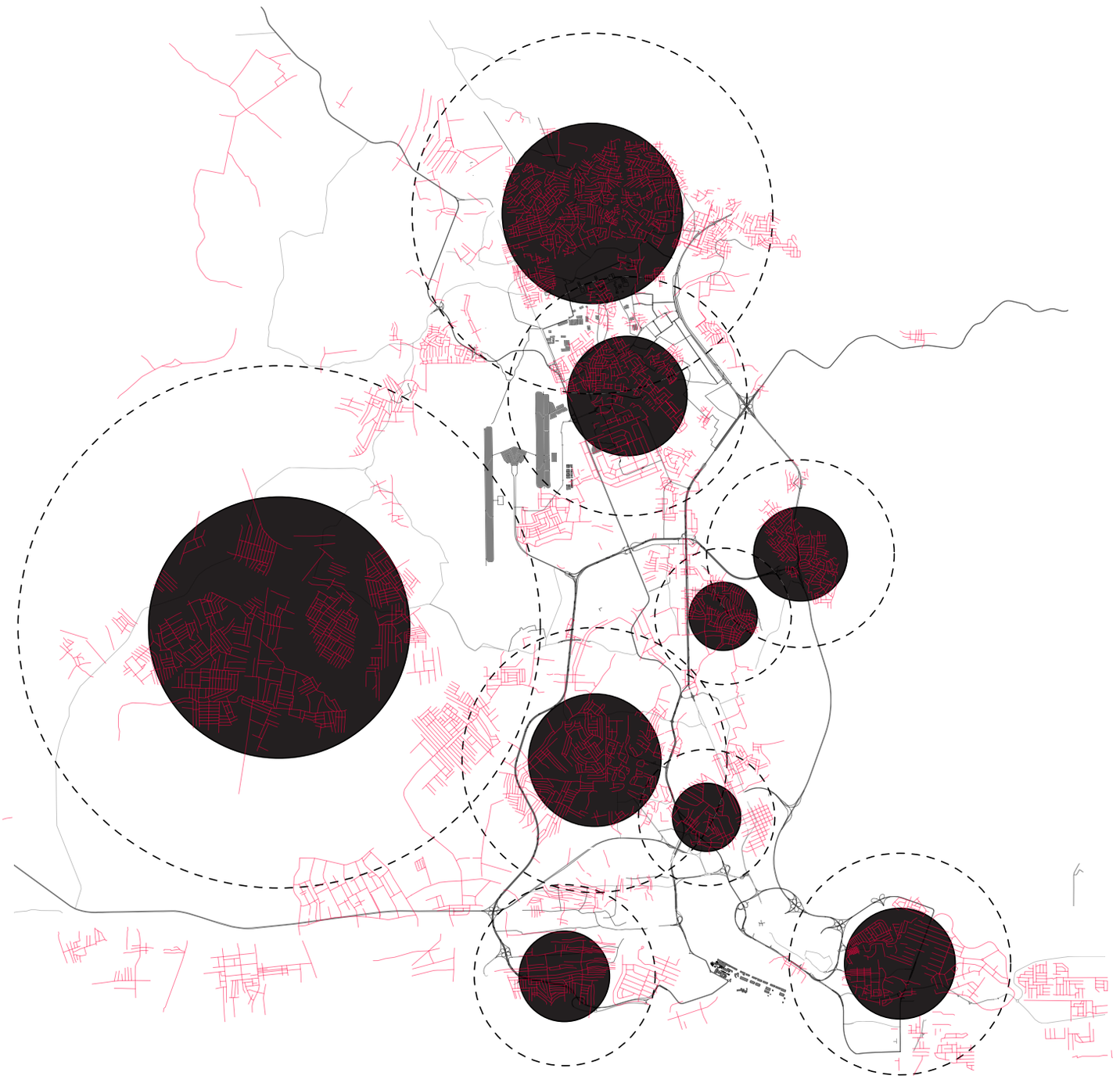
WHAT IS OPEN SOURCE? IT IS NEITHER A DIGITAL, SOCIAL, OR PHYSICAL CONCEPT– BUT A CONFLATION OF ALL THREE.

FIG.39 Top left: General design guidelines/criteria for designing a proper WikiHouse; for clarity they can be organized into three groups.

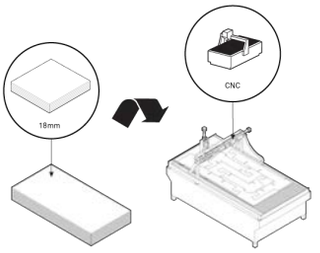
FIG.40 Flowchart: illustrates how WikiHouse operates both as a open source community, as well as a practice of design build, feeding back into an iterative design process shared accross the Creative Commons.



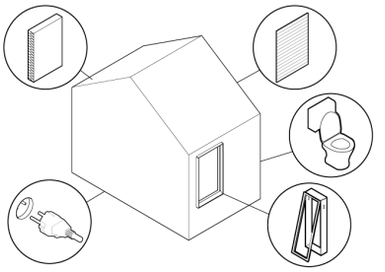
LATERAL EXPANSION ONLY INCREASES SPRAWL, EXACERBATING INFRASTRUCTURAL PRESSURES



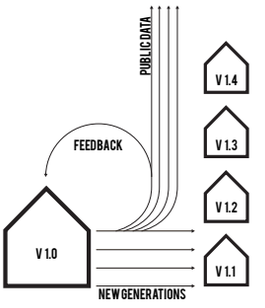
DOES



LOCALLY RESOURCED

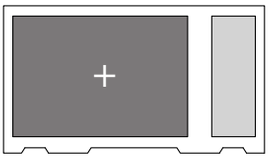


"ALL-IN-ONE" PROVISION



DESIGN FEEDBACK

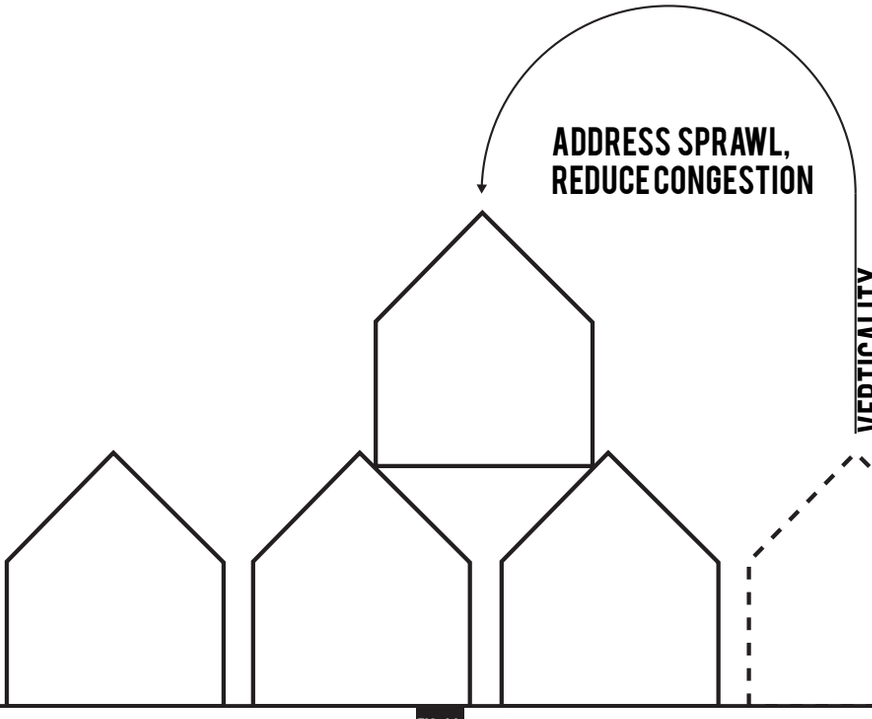
NO SKILL CONSTRUCTION



EXPANDABLE

RECONFIGURABLE

DOESN'T

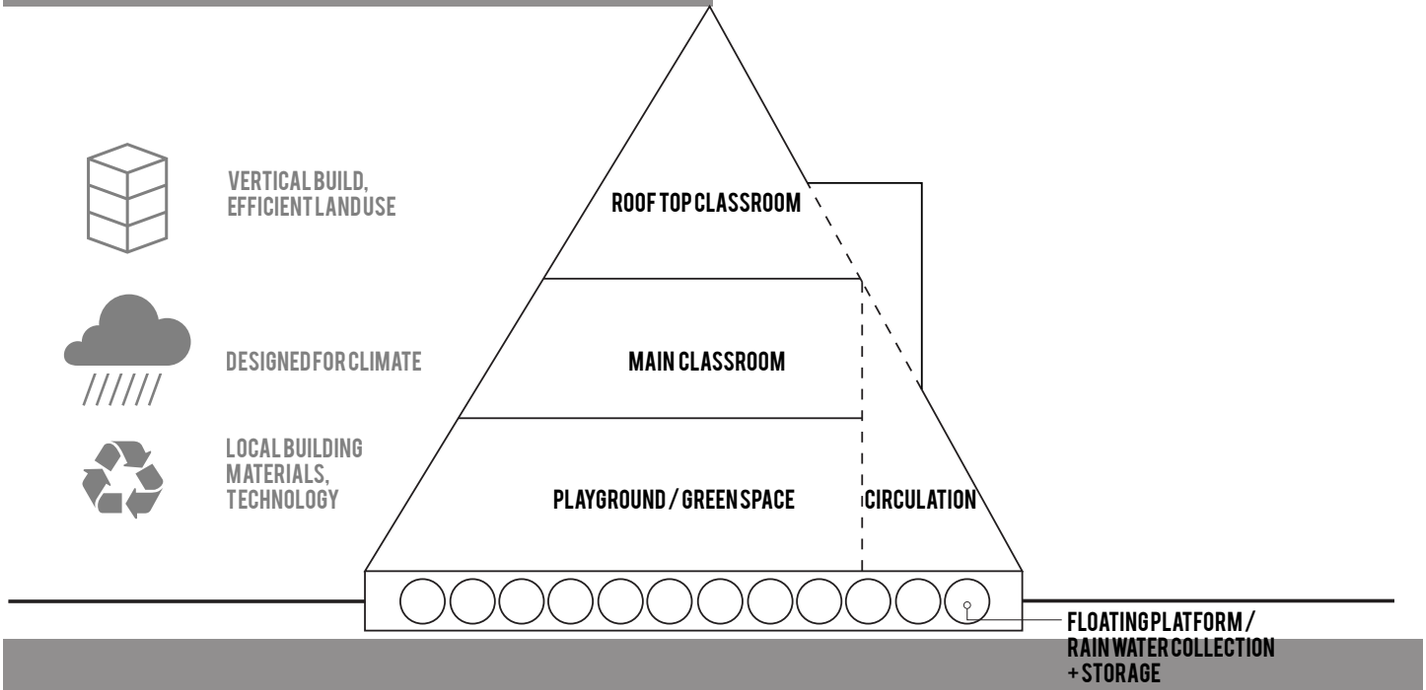


WHILE WIKIHOUSE PROVIDES A FLEXIBLE "ALL-IN-ONE" SOLUTION, IT DOES NOT ADDRESS VERTICALITY.

FIG. 44 Left: Diagram and map illustrate how WikiHouse - due to current lack of vertical construction- would only exacerbate the already growing urban informality.
FIG. 45 Above: Diagram illustrating what WikiHouse does currently, and what is doesn't; mainly, the inability to build vertically.

MAKOKO FLOATING SCHOOL
NLE | LAGOS, NIGERIA

"Makoko Floating School is a prototype floating structure, built for the historic water community of Makoko, located on the lagoon heart of Nigeria's largest city, Lagos. As a pilot project, it has taken an innovative approach to address the community's social and physical needs in view of the impact of climate change and a rapidly urbanizing African context. Its main aim is to generate a sustainable, ecological, alternative building system and urban water culture for the teeming population of Africa's coastal regions."
-http://www.nleworks.com/case/makoko-floating-school/



CAN FORMAL INSTITUTION INTERFACE WITH INFORMAL COMMUNITIES?

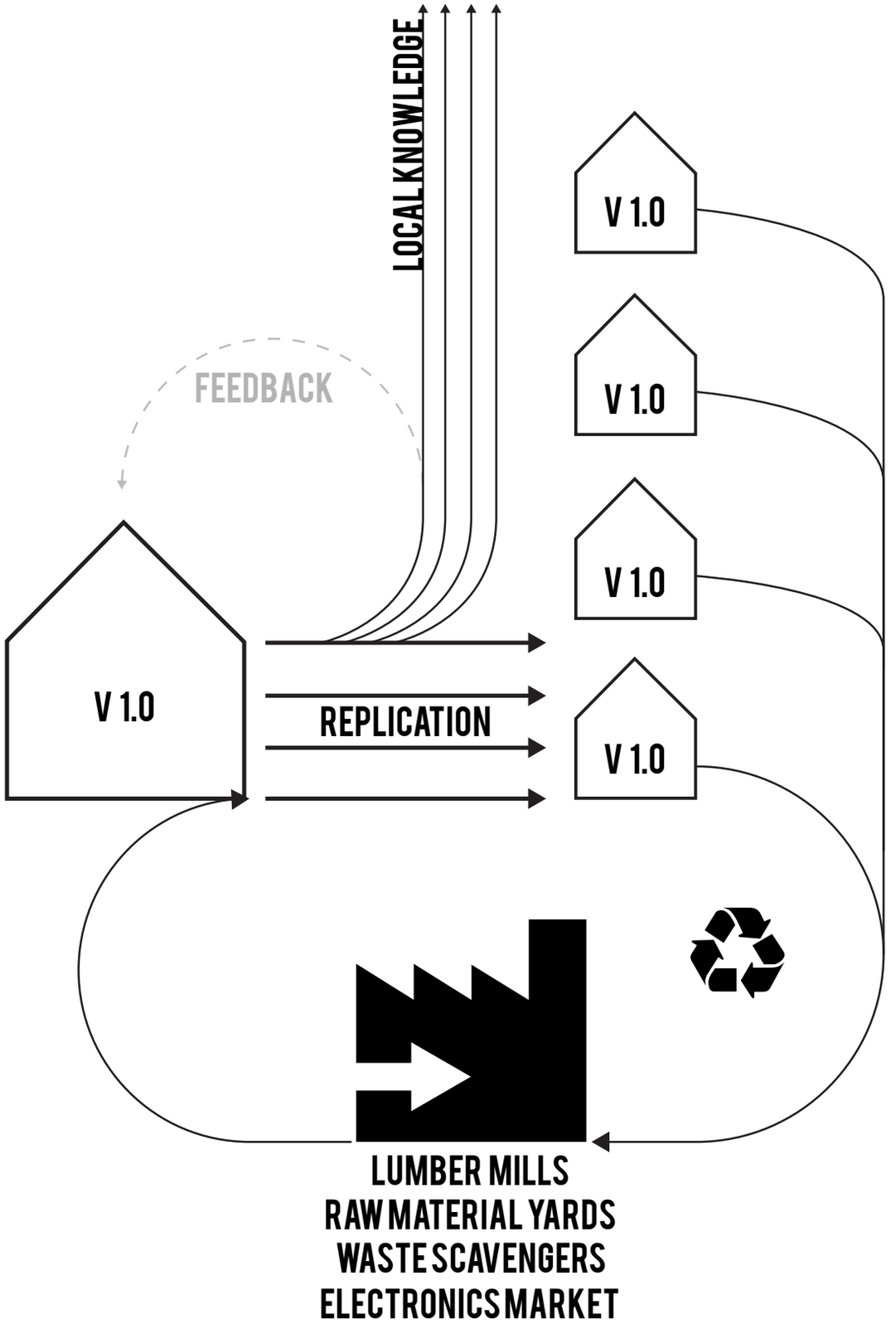


FIG. 46 Left: Diagrams illustrate the project's response to local constraints and technologies, harnessing both to provide a low cost and realistic solution for the community.

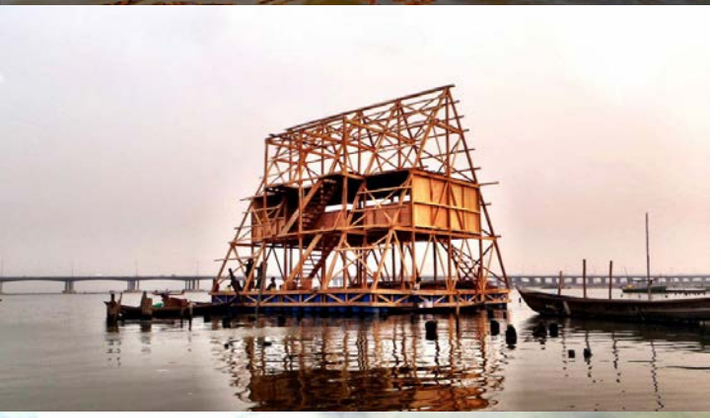
FIG. 47 Above: Similar to previous "feedback" diagram, this shows how the floating school project utilized local materials and technologies to produce the school locally. Missing is the open source capability to "learn" from build experience and build upon its platform.

"STRUCTURAL SOLUTIONS ARE THEREFORE UNSUSTAINABLE IN THE LONG TERM BECAUSE THEY CAN DAMAGE THE ENVIRONMENT, THEY ARE COSTLY AND, MOST IMPORTANTLY, THEY ARE TIME CONSUMING." (ADEYOLE AND RUSTUM)

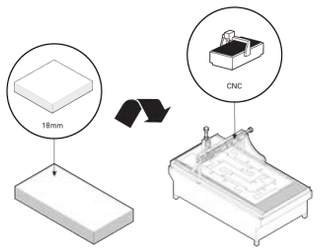
What is fantastic about the floating school, is that it provides a blueprint for what works in Makoko; a project that addresses a multitude of constraints in a coherent solution. It suggests the possibility in how alternate building systems might also address the vast sprawl that now characterizes Lagos; maintaining quick construction, low cost, and with minimal effect on the environment.

The slight drawback is the concentrated effort needed on the part of NLE to produce just one of these structures. What would happen if these blueprints were freely accessable by the community? How might that alter the community's ability, and need, to provide for itself?



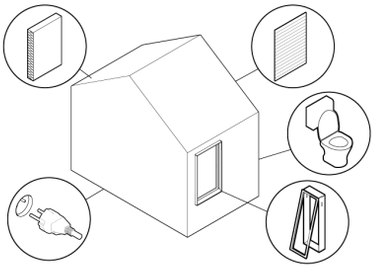



DOES

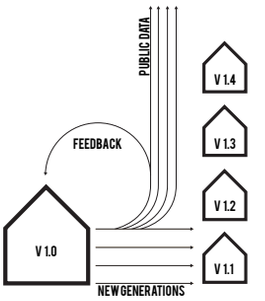


LOCALLY RESOURCED

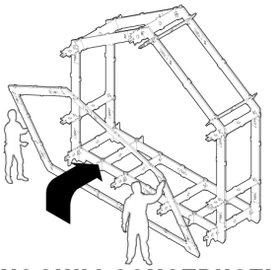
DOESN'T



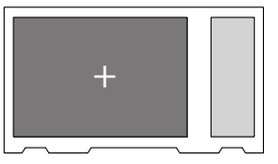
"ALL-IN-ONE" PROVISION



DESIGN FEEDBACK



NO SKILL CONSTRUCTION



EXPANDABLE

RECONFIGURABLE

WHILE THE FLOATING SCHOOL MAKES USE OF VERTICAL CONSTRUCTION, IT STILL LACKS THE FLEXIBILITY OF WIKIHOUSE.

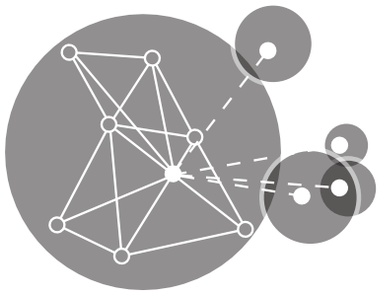
FIG. 48–53 Image sequence: erection of floating school over the course of just a couple of days. Documentation by NLE, found here: http://www.nleworks.com/case/makoko-floating-school/.

FIG. 54 Diagram: what the floating school in Makoko DOES do is utilize verticle build for efficient use and organization of space. Such a build would be ideal in areas suffering from extreme density and congestion; what the project lacks however is the flexibility that WikiHouse could provide.


Untitled Map
Write a description for your map.
(STRAIN)
(ACCESS)
(DRAINAGE)
(WASTE)
(POLLUTION)
(FLOODING)
PUBLIC DATA
RECLA
FEEDBACK
V 1.0
NEW GENERATIONS
THE SITE FOR THE PROJECT WILL BE LOCATED IN THE SUBURB REGION OF EBUTE METTA, OPERATING WITHIN EXISTING URBAN BLOCKS AS A FOUNDATION FOR INFORMAL DEVELOPMENT.
ARCHITECTURALLY THE PLATFORM WILL OPERATE AS A HYBRID, MERGING THE MOST ADVANTAGEOS QUALITIES OF THE WIKIHOUSE PLATFORM, AND THE MAKOKO FLOATING SCHOOL PROJECT WHILE ADDRESSING FOUR MAJOR CRITERIA.
Google earth

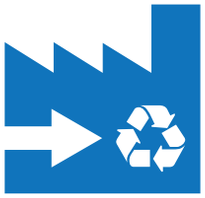
A NEW FRAMEWORK

ECLAIM SPACE FROM SPRAWL



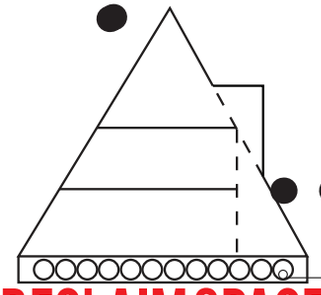
(OPEN SOURCE)

(MIGRATION)



(LOCAL)

(OVERPOP
SLUM GEN



(RECLAIM SPACE)

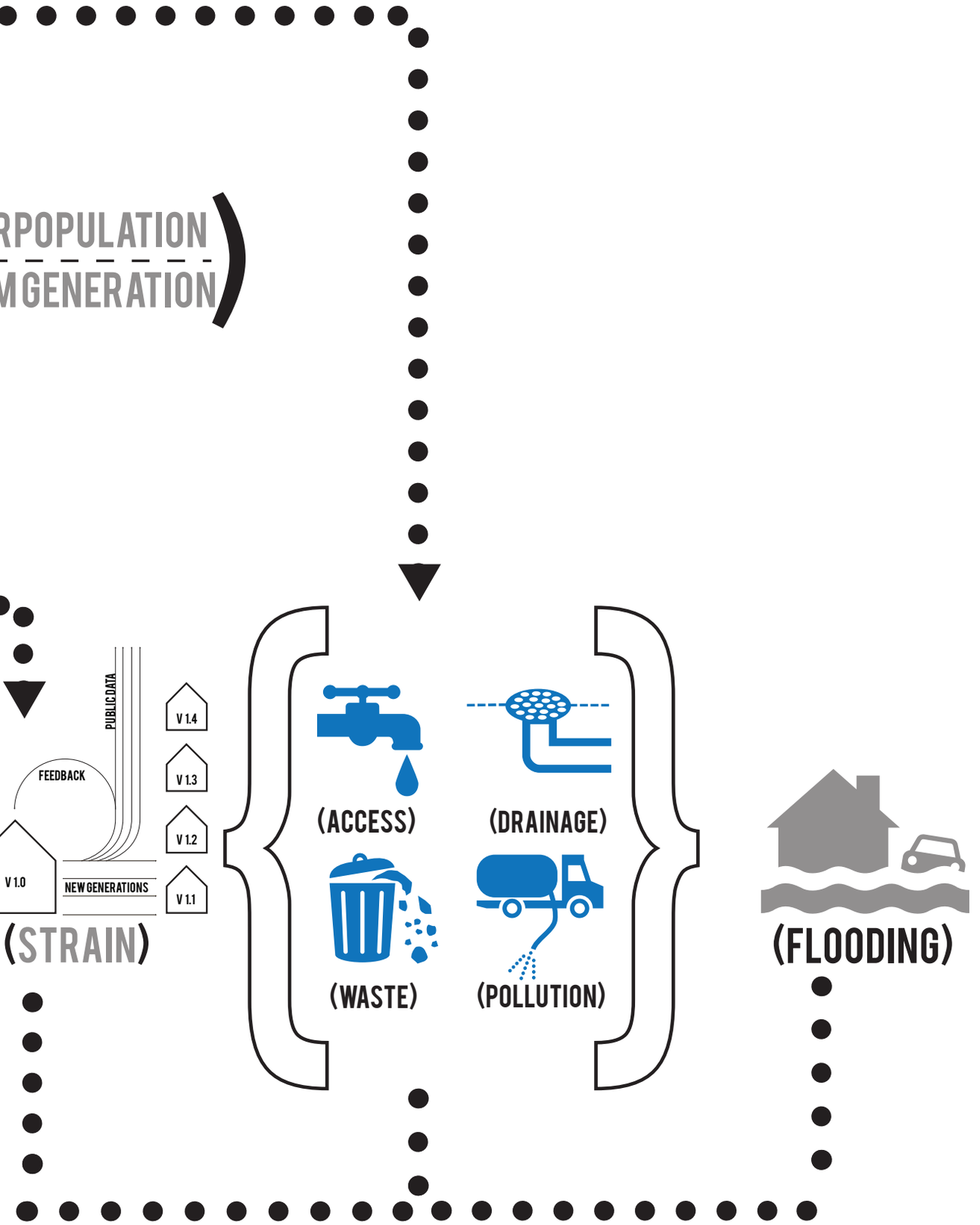
FEEDBA

V 1.0

(STR

IMPROVED
REDUCED
CHANGED

(QUALITY OF LIFE)



HYPOTHETICAL FLOW CHART HIGHLIGHTING WHERE AND HOW AN OPEN SOURCE PLATFORM COULD INFLUENCE THE EXISTING DYANMICS OF LAGOS.

FIG.55 A hypothetical flowchart illustrating what "People as Infrastructure" would need to address in order to properly integrate with the complex ecology of Lagos.

BIBLIOGRAPHY

BOOKS

Holden, Kimberly J.. “SHoP: Out of Practice” The Monacelli Press (2012): 431. Print.

Kelly, Kevin. “Out of Control: The New Biology of Machines, Social Systems, & the Economic World” New York: Basic Books (1995): 528.

Mohsen Mostafavi. “In The Life Of Cities” Zurich: Lars Muller Publishers (2012): 369. Print.

Rushkoff, Douglass. “Present Shock: When Everything Happens NOW” New York: Penguin (2013): loc 4641. Kindle.

Schuldenfrei, Eric and Yiu, Marisa. “Instant Culture: Architecture and Urbanism as a Collective Process” MCCM Creations (2011): 465. Print.

Shepard, Mark. “Sentient City: Ubiquitous Computing, Architecture, and the Future of Urban Space” Cambridge: MIT press (2011): 200. Print.

Smil, Vaclav. “Energy in Nature and Society: General Energetics of Complex Systems” Cambridge: MIT Press (2008): 388. Print.

Smil, Vaclav. “Harvesting the Biosphere: What We Have Taken from Nature” Cambridge: MIT Press (2013): 252. Print.

Vlach, John Michael. “Affecting Architecture of the Yoruba”
UCLA James S. Coleman African Studies Center (1976): 48-53+99. Print.

Denyer, Susan. “African Traditional Architecture: An Historical and Geographical Perspective”
New York: Africana Pub Co. (1978): 210. Print

Gardi, Rene. “Indigenous African Architecture:
New York, Van Nostrand Reinhold (1974): 248. Print.

Virilio, Paul. “Open Sky (Radical Thinkers)” New York: Verso (2008): 144.

DATA

http://www.openstreetmap.org/#map=13/6.4693/3.3673

http://www.geocommons.com/

http://www.geohive.com/cntry/nigeria.aspx

http://www.nigerianstat.gov.ng/

http://www.gapminder.org/

http://kff.org/globaldata/

http://www.who.int/research/en/

http://stats.oecd.org/Index.aspx

http://data.un.org/

https://www.cia.gov/library/publications/the-world-factbook/

STUDIES

Abiodun, Josephine Olu. “Urban Growth and Problems in Metropolitan Lagos” Urban Study 11 (1974): 341-347. Print. Online. Accessed 11.4.2013. doi: 10.1080/00420987420080601.

Adeloye, Adebayo J. and Rustum, Rabee. “Lagos (Nigeria) flooding and influence of urban planning.” Urban Design and Planning 164 (2011): 175-187. Online 6.21.2011. Accessed 11.4.2013. doi: 10.1680/udap.1000014.

Akinbami, J.F.K. and Fadare, S.O.. “Strategies for sustainable urban and transport development in Nigeria” Transport Policy 4.4 (1997): 237-245. Print. Accessed 11.4.2013. PII: S0967-070X(97)00022-X.

Braimoh, Ademola K. and Onishi, Takashi. “Spatial determinants of urban land use change in Lagos, Nigeria” Land Use Policy 24 (2007): 502-515. Online. Accessed 11.4.2013. doi: 10.1016/j.landusepol.2006.09.001.

Fourchard, Laurent. “Lagos, Koolhaas and Partisan Politics in Nigeria” International Journal of Urban and Regional Research 35.1 (2011): 40-56. Online. doi: 10.1111/j.1468-2427.2010.00938.x.

Godlewski, Joseph. “Alien and Distant: Rem Koolhaas on Film in Lagos, Nigeria” TDSR 21.11 (2010):7-19. Online. Accessed 11.4.2013.

Ikioda, Faith Ossy. “Urban Markets in Lagos, Nigeria” Geography Compass 7.7 (2013): 517-526. Online. Accessed 11.4.2013. doi: 10.1111/gec3.12057.

LeBas, Adrienne. “Violence and Urban Order in Nairobi, Kenya and Lagos, Nigeria” St Comp Int Dev 48 (2013): 240-262. Online. Accessed 11.4.2013. doi: 10.1007/s12116-013-9134-y.

Simone, A.M. “People as Infrastructure: Intersecting Fragments in Johannesburg” Public Culture 16.3 (2004): 407-429. Online. Accessed 11.19.2013.

FILM

Koolhaas: Lagos Wide and Close Interactive Journey Into An Exploding City. DVD. Directed by Bregtje V, D Haak. 2006. Submarine, 2006.

Welcome To Lagos. Broadcast, BBC Two. Directed by Gavin Searle. 15 April 2010 - 29 April 2010. BBC, 2010.

ONLINE

Accessed 11.22.2013: http://www.nleworks.com/case/makoko-floating-school/.

Accessed 9.14.2013: www.wikihouse.cc.

Accessed 11.23.2013: http://natgeotv.com/ca/dont-tell-my-mother/galleries/lagos

GIS

http://downloads.cloudmade.com/africa/western_africa/nigeria/lagos#downloads_breadcrumbs

http://lagosstreetmap.blogspot.com/2011/11/lagos-online-enterprise-gis-portal-is.html

http://www.lagosstate.gov.ng/pagelinks.php?p=6