

cluster vs grid planning

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length: 20 min
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introduction

"comparative assessment of the development and operations costs of displaced persons settlements using grid and cluster based designs"

economic study into grid vs cluster planning

financial argument – which is cost effective?

social implications

commissioned by USAID/OFDA

introduction phase one

phase one initiated over summer, involving Shelter Centre EWB volunteer team

phase one aims:

1. agree definitions of grid or cluster planning
2. undertake a literature review
3. undertake interviews with humanitarian workers
4. build an analytic framework and basis for comparisons

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definitions grid planning

1. agree definitions of grid and cluster planning

proposed definition:

"infrastructure and services set out in a grid of access roads with accommodation in the gaps between the roads"



definitions grid planning

grid planning:
infrastructure
and services
set out in a grid
of roads with
housing in the
gaps between
the roads

why it is used?

- status quo
- simple, easy to mark out and implement
- good access
- consistency between camps for logisticians and aid workers

drawbacks

- difficult to adapt to changes in topography
- possibly unfamiliar to displaced population

definitions cluster planning

1. agree definitions of grid and cluster planning

proposed definition:

"cluster planning sets out infrastructure and services like branches of a tree with communal facilities often placed in the central area and major thoroughfares radiating from it"

- also termed "loop and culs-de-sac" planning
- rarely used in transitional settlement



definitions cluster planning

cluster
planning:
set out with
organic
structure, like
branches of a
tree

why is it used?

- encourages communally shared activities
- supports social hierarchy
- responsive to topography, contour led

drawbacks

- difficult to mark out
- little past experience

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research lit. review

2. undertake a literature review

operational literature

reliefweb.int used to give context to planning data of individual camps

town planning literature

contact made with Oxford Brookes University (UK) and University of East Anglia (UK) urban town planning departments

studies by Canada Mortgage and Housing Association

we would welcome any other sources of information

research interviews

3. undertake
interviews with
humanitarian
workers

any volunteers?

would anyone here be prepared to undertake interviews on experiences in the field related to grid or cluster planning?

research analytical framework

4. build an analytic framework and basis for comparisons

methodology

- a. 5 camps identified in Sierra Leone
- b. access degree of compliance to UNHCR and Sphere standards
- c. redesign camps in cluster form with same standards compliance
- d. identify and compare key parameters between camps

research analytical framework

4. build an analytic framework and basis for comparisons

a. 5 camps identified in Sierra Leone

name	pop.
Taiama	6780
Gerihun	6663
Jembe	6762
Jimmi Bagbo	6354
Bandajuma	5014



Sierra Leone refugee situation, 15 April 2003

research analytical framework

4. build an
analytic
framework and
basis for
comparisons

**b. assess degree of compliance to UNHCR and
Sphere standards**

information collated

- GIS data – MapInfo
- limited costing data
- reliefweb.int – camp histories

standards accessed

- area per person
- firebreak provision
- water supply provision
- sanitation provision

research analytical framework

4. build an analytic framework and basis for comparisons

b. assess degree of compliance to UNHCR and Sphere standards

camp	area per person (m ²)		persons per water point		persons per latrine	
Sphere	45 min		250 max		20 max	
Bandajuma	79.8	✓	278	✗	44	✗
Gerihun	78.0	✓	196	✓	45	✗
Jembe	34.0	✗	93	✓	64	✗
JimmiBagbo	70.9	✓	635	✗	159	✗
Taiama	74.6	✓	115	✓	133	✗

research analytical framework

4. build an analytic framework and basis for comparisons

b. assess degree of compliance to UNHCR and Sphere standards

- 4 of 5 camps met standards on area and firebreak provision
- 3 of 5 camps met standards on water infrastructure provision
- 2 of 5 camps met standards on sanitation provision

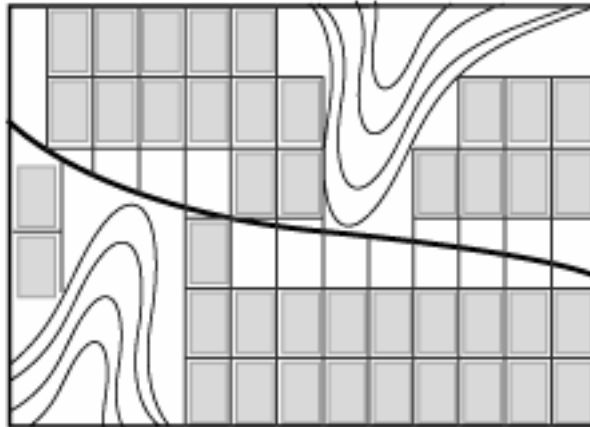
the work reinforces the consistency between original and redesigned camps

research analytical framework

4. build an analytic framework and basis for comparisons

c. redesign camps in cluster form with same standards compliance

MapInfo used to manipulate blocks and roads



grid plan



cluster plan

research analytical framework

4. build an analytic framework and basis for comparisons

d. **identify** and compare key parameters between camps

key elements of camp	variable between grid & cluster?
water and sanitation infrastructure	x
market places and commercial facilities	x
medical facilities	x
feeding centres	x
surface water drainage	x
road and paths infrastructure	✓

research analytical framework

4. build an analytic framework and basis for comparisons

d. identify and **compare** key parameters between camps

camp	total road length (km)		% saving
	grid plan	cluster plan	
Bandajuma	6.3	3.4	46%
Gerihun	8.9	3.8	57%
Jembe	9.2	4.3	53%
Jimmi Bagbo	13.3	5.5	59%
Taiama	6.5	3.9	40%
average	8.8	4.2	51%

this assumes that all roads are same but in reality...

research analytical framework

4. build an
analytic
framework and
basis for
comparisons

assumption

A: roads required for vehicular access

B: secondary roads and pathways, vehicular access not required

camp	total road length (km)				% saving	
	grid plan		cluster plan			
	A	B	A	B	A	B
Bandajuma	2.2	4.1	2.2	1.5	0	63%
Gerihun	0.8	8	0.8	3	0	63%
Jembe	1.3	7.9	1.3	3	0	62%
Jimmi Bagbo	1.1	12.1	1.1	4.4	0	64%
Taiama	1.8	4.7	1.8	2.1	0	55%
average	1.4	7.4	1.4	2.8	0	62%

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phase one conclusions

1. reduction of road infrastructure

cost dividend

social dividend

2. areas identified for further work

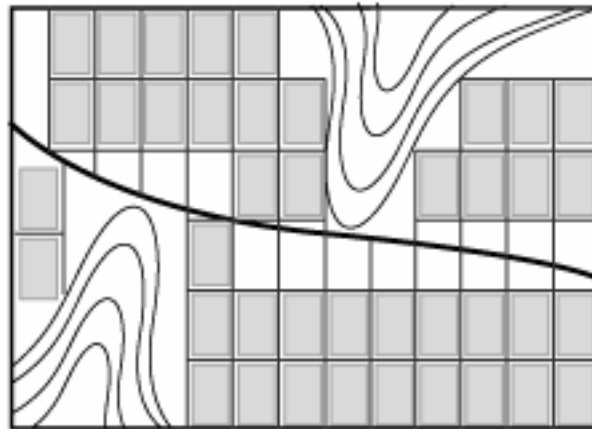
flexibility - binary nature of grid

topographical limitations

phase one conclusions

1. reduction of road infrastructure – cost dividend

road type B reduced by up to 60%, cutting out redundancy inherent in grid structure



grid plan



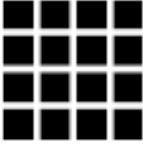
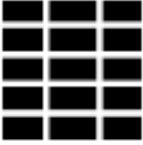



cluster plan

phase one conclusions

1. reduction of road infrastructure – social dividend

12% more buildable area, culs-de-sac vs grid

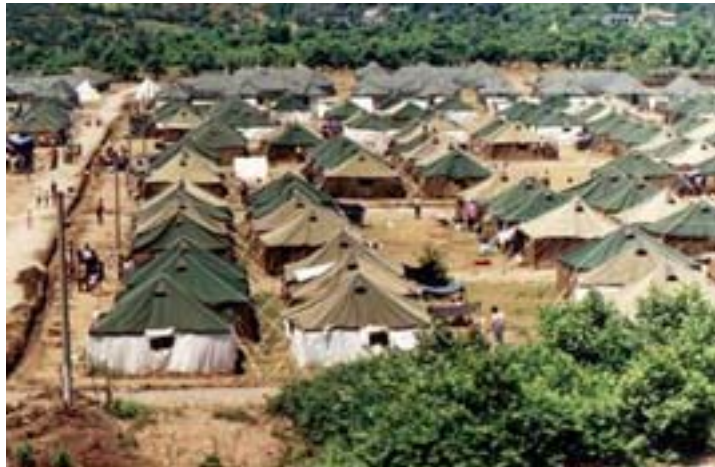
Figure 1: Comparison of area used for streets, among five typical patterns

					
	Square grid (Miletus, Houston, Portland, etc.)	Oblong grid (most cities with a grid)	Oblong grid 2 (some cities or in certain areas)	Loops (Subdivisions - 1950 to now)	Culs-de-sac (Radburn - 1932 to now)
Percentage of area for streets	36.0%	35.0%	31.4%	27.4%	23.7%
Percentage of buildable area	64.0%	65.0%	68.6%	72.6%	76.3%

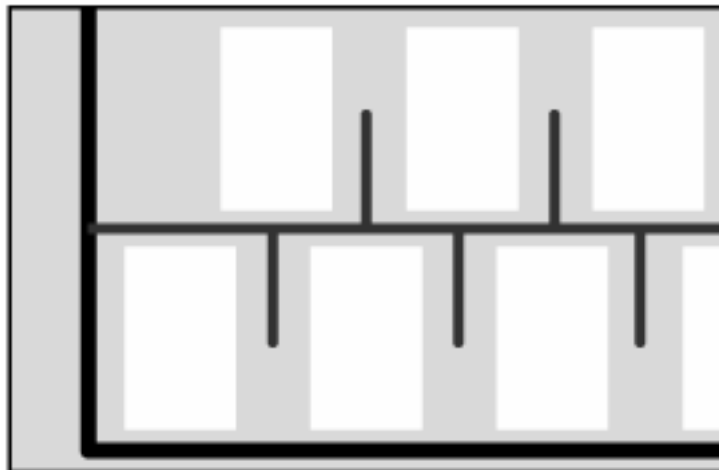
source: study by Canada Mortgage and Housing
Association

phase one conclusions

1. reduction of road infrastructure – social dividend



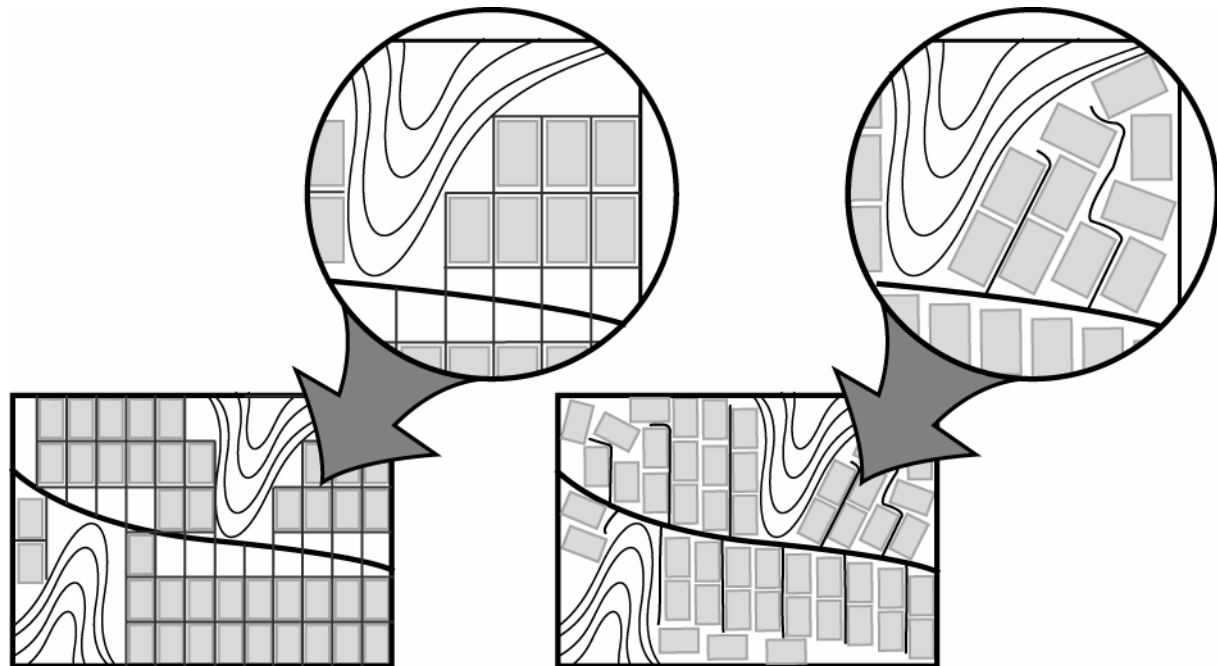
- road space can become usable area
- Labinot Fushe camp, Albania 1999



phase one conclusions

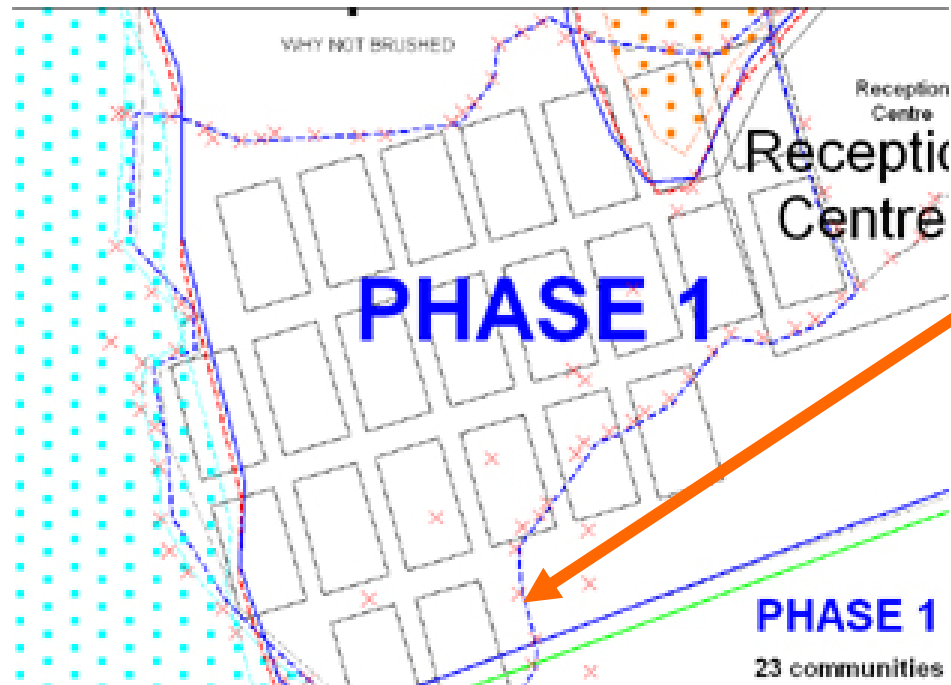
2. areas identified for further work – flexibility

- grid plan is binary in nature – block is either used or not
- cluster plan can adapt to move around obstacles
- blocks need to be flexible in shape



phase one conclusions

2. areas identified for further work – flexibility



'left over'
space.

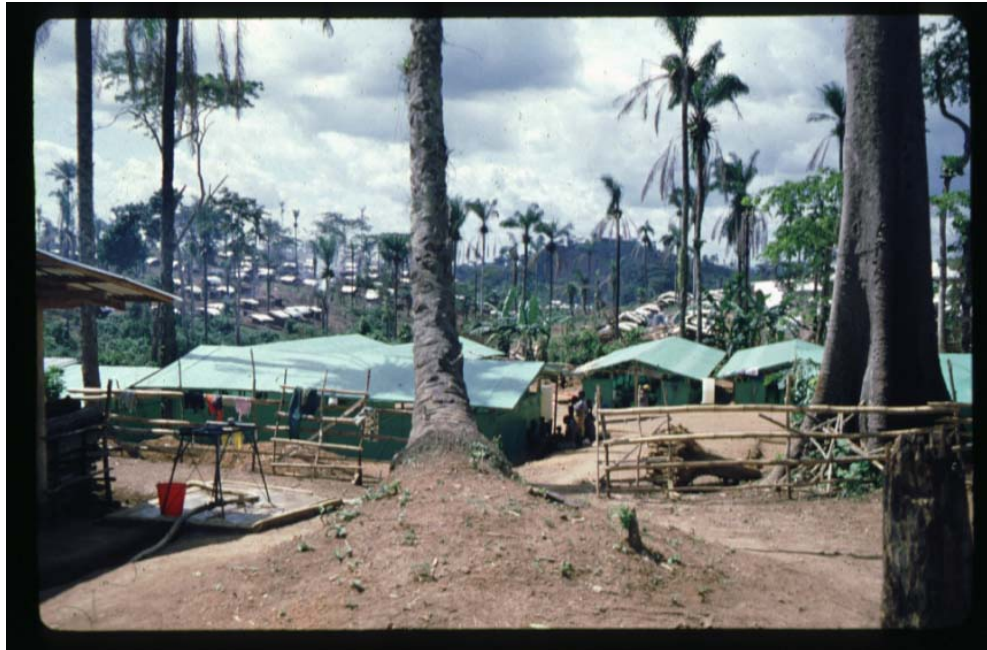
Largo camp,
Sierra Leone,
2002

- 'left over' space is not planned and is often used for social/agricultural purposes
- planned culs-de-sac allow 'left over' space to be allocated between community blocks

phase one conclusions

2. areas identified for further work – topographic implications

sites should ideally be located on gentle (2 – 4%) slopes, UNHCR p138 & Sphere p202



sites often located on steep, unfavourable land:
Kolahun camp, Liberia, 1998

phase one conclusions

2. areas identified for further work – topographic implications

"...slopes steeper than 10% gradient ... usually require complex and costly site preparations."

UNHCR p138

"The site gradient is not more than 7% unless extensive drainage and erosion control measures are taken."

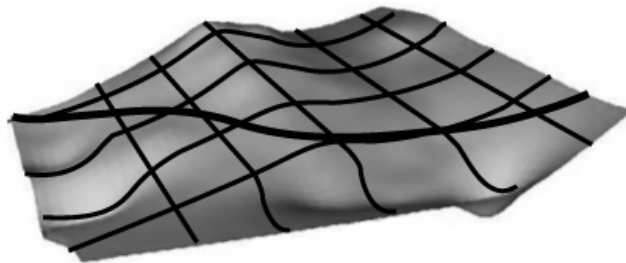
Sphere p205

phase one conclusions

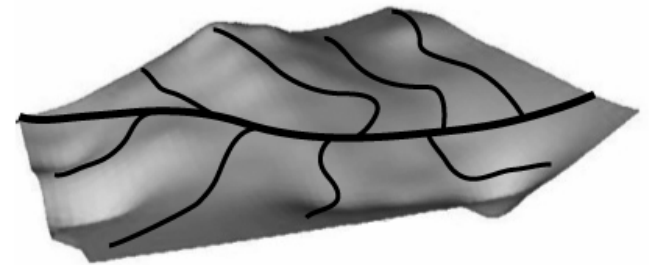
2. areas identified for further work – topographic implications

grid pattern causes drainage problems on disrupted topography and becomes unfeasible on steep gradients

cluster shape can easily adapt to fit contour, reducing risk of erosion/landslide



grid plan



cluster plan

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phase two

extend literature review

interviews with humanitarian workers

broaden study to cover significant number of camps
using analytical framework identified in phase one

include areas identified for further work - camps
with changing topography, inflexibility of
community block