NATURAL DIMENSIONS
CULTIVATION IN INNER CITIES
CONTENT

INTRODUCTION
- PROBLEM STATEMENT

RESEARCH
- RESEARCH QUESTION
- CASE STUDIES
- MOST IMPORTANT FINDINGS

MASTERPLAN
- SITE ANALYSIS
- GUIDELINES ARCHITECTURE

DESIGN
- IDEOLOGY
- CONCEPT
- THE LOCAL FOOD CYCLE
- CONSTRUCTION
- CLIMATE

REFLECTION

CONCLUSION
INTRODUCTION
INTRODUCTION

REFERENCE

MFO PARK ZURICH BY BURCKHARDT + PARTNER AND RADERSCHALL LANDSCHAFTSARCHITEKTEN AG
INTRODUCTION

REFERENCE

HIGH LINE NEW YORK CITY - FIELD OPERATIONS AND ARCHITECTS DILLER SCOFIDIO + RENFRO, WITH PLANTING DESIGN FROM PIET OUDOLF
INTRODUCTION

INTERNATIONAL ARCHITECTURE BIENNIAL ROTTERDAM

<table>
<thead>
<tr>
<th>PROGRAMMA</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>MEI, 2014</strong></td>
</tr>
<tr>
<td><strong>29 - 24 MEI AUG JULI, 2014</strong></td>
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<tr>
<td><strong>3 JUL</strong></td>
</tr>
<tr>
<td><strong>WIJ WILLEN GROEN!</strong></td>
</tr>
<tr>
<td>12:00 - 17:00</td>
</tr>
<tr>
<td>Conferentie</td>
</tr>
<tr>
<td><strong>4 JUL</strong></td>
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<tr>
<td><strong>JAAR VAN DE RUIMTE 2015</strong></td>
</tr>
<tr>
<td>12:30 - 17:30</td>
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<tr>
<td><strong>6 JUL</strong></td>
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<tr>
<td><strong>WILDPARK ROTTERDAM</strong></td>
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<tr>
<td>15:00 - 17:00</td>
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<td>Lezing</td>
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<td><strong>9 JUL</strong></td>
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<tr>
<td><strong>RUIMTE VOOR DUURZAME ENERGIE IN 2050</strong></td>
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<td>14:00 - 17:00</td>
</tr>
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<td>Debat</td>
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**BEKIJK HET VOLLEDIGE PROGRAMMA**
INTRODUCTION

ENVIRONMENTAL IMPACT OF CITIES

INTRODUCTION

LOST AWARENESS

SOURCING

PREPARATION

DISTRIBUTION

CONSUMPTION

Source: Newyork.thecityatlas.org, Nienoord 2012, unknown, CREM, 2013
In what way can urban farming be shaped, and become spatial integrated in existing urban areas in the Netherlands in a way that it will contribute to a sustainable living environment?
RESEARCH

CASE STUDIES
RESEARCH

MOST IMPORTANT FINDINGS

FRAMEWORK FOR A SUSTAINABLE LIVING ENVIRONMENT
TRANSLATION MOST IMPORTANT FINDINGS FROM RESEARCH
SITE

IDEOLOGY

SCALE
SITE
INNERCITY OF THE HAGUE
SITE

IMPORTANT ROUTING
SITE

PROJECT AREA
SITE
FUTURE AMBITIONS
SITE

FUTURE AMBITIONS
MASTERPLAN
MASTERPLAN

DESIGN PROPOSAL
MASTERPLAN

DESIGN PROPOSAL

[Map image with street names and landmarks such as Bijenkorf, HEMA, Grote Marktstraat, CiTy Hall, Gedempte Gracht, Nieuwe Kerk, Spui, and others.]
MASTERPLAN

VISIBILITY
MASTERPLAN

VISIBILITY
MASTERPLAN

VISIBILITY
MASTERPLAN

VISIBILITY
MASTERPLAN
DESIGN PROPOSAL
MASTERPLAN

DESIGN PROPOSAL
MASTERPLAN
ACCESSIBILITY
ACCESSIBILITY
ACCESSIBILITY
DESIGN
DESIGN

CONCEPT

GENERIC SYSTEM
DESIgn
GENERIC SYSTEM

STRUCTURE
DESIGN
GENERIC SYSTEM

STRUCTURE

FACADE ELEMENTS

FLOOR ELEMENTS

VERTICAL TRANSPORT ELEMENTS
DESIGN

GENERIC SYSTEM

STRUCTURE

FACADE ELEMENTS

FLOOR ELEMENTS

VERTICAL TRANSPORT ELEMENTS
DESIGN

FLOOR ELEMENT - CULTIVATION
DESIGN

CONCEPT

AWARENESS
# Design Program

<table>
<thead>
<tr>
<th>Facility</th>
<th>Area</th>
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<tbody>
<tr>
<td>Market</td>
<td>580</td>
</tr>
<tr>
<td>Cultivation Ground</td>
<td>2530</td>
</tr>
<tr>
<td>Storage</td>
<td>250</td>
</tr>
<tr>
<td>Distribution</td>
<td>100</td>
</tr>
<tr>
<td>Bicycle Storage</td>
<td>1500</td>
</tr>
<tr>
<td>Compost</td>
<td>25</td>
</tr>
<tr>
<td>Glasshouse</td>
<td>360</td>
</tr>
<tr>
<td>Restaurant</td>
<td>190</td>
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<tr>
<td>Kitchen</td>
<td>120</td>
</tr>
<tr>
<td>Workshop Space</td>
<td>190</td>
</tr>
<tr>
<td>Storage</td>
<td>25</td>
</tr>
</tbody>
</table>
DESIGN

ACCESSIBILITY
DESIGN
ACCESSIBILITY
DESIGN

ACCESSIBILITY
Programma
- BG levendig door functies
- Plein leeg gehouden voor activiteiten.
- WK - IJsbaan winter/kerstboomverkoop.
- Twee onderbrekingen
  - Entree toren
  - Laden lossen.
- Boerenmarkt:
  - Als een van de uitzonderingen als verdraaiing element
- Fietsenstalling:
  - entree
  - fietsenmaker

START ROUTE
Functies voornamelijk om rond toren en op bg
Cultivation rond trap
Programma
- BG levendig door functies
  - Plein leeg gehouden voor activiteiten.
  - WK
  - IJsbaan winter/kerstboomverkoop.
- Twee onderbrekingen
  - Entree toren
  - Laden lossen.
- Boerenmarkt:
  - Als een van de uitzonderingen als verdraaiing element
- Fietsenstalling:
  - entree
  - fietsenmaker
  - START ROUTE

Functies voornamelijk om rond toren en op bg
- Cultivation rond trap
CROSS SECTION

SEASONAL VEGETABLES AND FRUITS
Programma
- BG levendig door functies
- Plein leeg gehouden voor activiteiten.
- WK
- IJsbaan winter/kerstboomverkoop.

Twee onderbrekingen
- Entree toren
- Laden lossen.

Boerenmarkt:
- Als een van de uitzonderingen als verdraaiing element

Fietsenstalling:
- entree
- fietsenmaker

START ROUTE

Functies voornamelijk om rond toren en op bg
Cultivation rond trap
Programma
- BG levendig door functies
- Plein leeg gehouden voor activiteiten.
- WK
- IJsbaan winter/kerstboomverkoop.
- Twee onderbrekingen
  - Entree toren
  - Laden lossen.

Boerenmarkt:
- Als een van de uitzonderingen als verdraaiing element
- Fietsenstalling:
  - Entree
  - Fietsenmaker

Functies voornamelijk om rond toren en op bg
Cultivation rond trap
DESIGN

SOUTH WEST ELEVATION
DESIGN
SOUTH WEST ELEVATION
DESIGN

IMPRESSION
THIRD FLOOR PLAN
DESIGN
CROSS SECTION

SEASONAL VEGETABLES AND FRUITS
FOURTH FLOOR PLAN
FOURTH FLOOR PLAN

300 M2
35,000 KWH / YEAR
DESIGN
CULTIVATION GROUND

2.500 M2
DESIGN

PLANT GROWTH INDICATION
CONSTRUCTION
CONSTRUCTION

GENERIC SYSTEM

DIVIDED
CONSTRUCTION

CONCEPT

HORIZONTAL VS VERTICAL
CONSTRUCTION

BUILDING SEQUENCE
BUILDING SEQUENCE
CONSTRUCTION

BUILDING SEQUENCE
CONSTRUCTION

BUILDING SEQUENCE
CONSTRUCTION

BUILDING SEQUENCE
CONSTRUCTION

BUILDING SEQUENCE
CONSTRUCTION
BUILDING SEQUENCE
CONSTRUCTION
BUILDING SEQUENCE
CONSTRUCTION
ORDER OF MAGNITUDE

STRUCTURAL ELEMENTS

BEAMS
304 x 10800 MM
309 x 5400 MM

JOINTS
612 x

COLUMNS
52 x 2600 MM
312 x 3400 MM
108 x 4000 MM
52 x 5300 MM
36 x 6000 MM

FACADE ELEMENTS

STRAW WITH GLASS

STRAW

TRANSLUCENT CORRUGATED S

RAILINGS

VERTICAL TRANSPORT

ELEVATOR
1

STAIRS
30

RAMPS
2

FLOOR ELEMENTS

CULTIVATION
310

SLATTED GRID
155

CHECKERED PLATE
100

DOUGLAS
75

INSULATED
60

STRUCTURE
1000
IDENTITY
CONSTRUCTION

GENERAL TO SPECIFIC
CONSTRUCTION

GENERIC TO SPECIFIC

1:1  2:3  3:4
CONSTRUCTION

GENERIC TO SPECIFIC
CONSTRUCTION§

GENERIC TO SPECIFIC
CONSTRUCTION

GENERIC TO SPECIFIC
FAÇADE ELEMENTS

- Beam, rectangular profile 200 x 300 mm
- Bitumen layer
- Wood panel, 15 mm
- Insulation (wool of sheep), 200 mm
- Vapour barrier
- Wood panel, 15 mm
- Battens
- Interior finishing, to be defined by the renter

Design
CLIMATE
# CLIMATE PROGRAM

<table>
<thead>
<tr>
<th>Function</th>
<th>Area</th>
</tr>
</thead>
<tbody>
<tr>
<td>MARKET</td>
<td>580</td>
</tr>
<tr>
<td>CULTIVATION GROUND</td>
<td>2530</td>
</tr>
<tr>
<td>STORAGE</td>
<td>250</td>
</tr>
<tr>
<td>DISTRIBUTION</td>
<td>100</td>
</tr>
<tr>
<td>BICYCLE STORAGE</td>
<td>1500</td>
</tr>
<tr>
<td>COMPOST</td>
<td>25</td>
</tr>
<tr>
<td>GLASSHOUSE</td>
<td>360</td>
</tr>
</tbody>
</table>

**NO CLIMATE CONTROLLED USER FUNCTIONS**

- MARKET: 580
- CULTIVATION GROUND: 2530
- STORAGE: 250
- DISTRIBUTION: 100
- BICYCLE STORAGE: 1500
- COMPOST: 25
- GLASSHOUSE: 360

**CLIMATE CONTROLLED USER FUNCTIONS**

- RESTAURANT: 190
- KITCHEN: 120
- WORKSHOP SPACE: 190
- STORAGE: 25
HEATING IN WINTERTIME
CLIMATE
HEATING AND COOLING

SEASONAL VEGETABLES AND FRUITS

COOLING IN SUMMERTIME
HEATING IN WINTERTIME
CLIMATE

RAINWATER COLLECTION

MATERIALISATION
Recyclable materials
Demountable construction
'Hard' outside, 'soft' inside

ENERGY USE
300 m² roof surface pv-panel orientated southwest
Capacity of 35,000 KWh per year (= 10 households)

BUILDING IS FULLY SELF-SUPPORTING

WATER SUPPLY
Total needed for cultivation is 2.5 Million liters per year
Average rainfall in The Hague is 990 liters/m²
Roof surface is 1,500 m², this results in 1.5 Million liters rain water
Additional 1.0 Million liters tap water is needed (= 23 persons per year)

BICYCLE PARKING
Parking for 800 bicycles
First floor is good accessible through ramp

GREENERY
2,500 m² cultivation (6300 lettuce)
Fruits, vegetables, spices and flowers, insects

Biodiversity
Water retention

2,5 MILLION LITER
CLIMATE

RAINWATER COLLECTION

9 MILLION LITER

ENERGY - USE
300 m² roof surface pv-panel orientated southwest
Capacity of 35.000 KWh per year (= 10 households)
Buidling is fully self-supporting

WATER SUPPLY
Total needed for cultivation is 2.5 Million liter per year
Average rainfall in the Hague is 990 liter / m²
Roof surface is 1.500 m², this results in 1.5 Million liter rain water
Additional 1.0 M liter tap water is needed (= 23 persons p jaar)

BICYCLE PARKING
Parking for 800 bicycles
First floor is good accessible trough ramp

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2.500 m² cultivation (6300 lettuce)
(fruits, vegetables, spices and flowers, insects)
Biodiversity
Water retention
**SUSTAINABILITY**

**ENERGY -USE**
300 m² roof surface pv-panel orientated southwest
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Water retention

**BICYCLE PARKING**
Parking for 800 bicycles
First floor is good accessible through ramp
SUSTAINABILITY

REFLECTION

SOCIAL QUALITY

SUSTAINABLE LIVING ENVIRONMENT

ENVIRONMENTAL QUALITY

ECONOMIC QUALITY
REFLECTION
SUSTAINABILITY

SUSTAINABLE LIVING ENVIRONMENT

SOCIAL QUALITY

ENVIRONMENTAL QUALITY

ECONOMIC QUALITY

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SUSTAINABLE LIVING ENVIRONMENT

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ENVIRONMENTAL QUALITY

ECONOMIC QUALITY

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- Water retention
REFLECTION

SUSTAINABILITY

SOCIAL QUALITY

SUSTAINABLE LIVING ENVIRONMENT

ENVIRONMENTAL QUALITY

ECONOMIC QUALITY

MATERIALISATION
- Recyclable materials
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ENERGY USE
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- First floor is good accessible through ramp

GREENERY
- 2.500 m² cultivation (6300 lettuce)
- (fruits, vegetables, spices and flowers, insects)
- Biodiversity
- Water retention
THANK YOU!
HIGH RISE THE HAGUE
### CASE STUDY

**SPATIAL CONSIDERATIONS WITH RELATIVE INDICATION**

<table>
<thead>
<tr>
<th>Farming Facilities</th>
<th>Hoeve Biesland</th>
<th>Moëstuin</th>
<th>Dak Akker</th>
<th>Marconistrip</th>
<th>Villa Augustus</th>
</tr>
</thead>
<tbody>
<tr>
<td>Build on surface</td>
<td>3.200</td>
<td>3</td>
<td>130</td>
<td>1.600</td>
<td>2.100</td>
</tr>
<tr>
<td>Floor surface</td>
<td>3.500</td>
<td>3</td>
<td>130</td>
<td>1.600</td>
<td>3.800</td>
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<tr>
<td>Cultivation ground</td>
<td>1.300.000</td>
<td>210</td>
<td>480</td>
<td>8.180</td>
<td>5.000</td>
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<tr>
<td>Composting place</td>
<td>1.300</td>
<td>1</td>
<td>2</td>
<td>140</td>
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<td>Waterbasin</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>20</td>
<td>0</td>
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<tr>
<td>Chicken</td>
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<td>1.140</td>
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<td>Mushroom</td>
<td>0</td>
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<td>0</td>
<td>20-30</td>
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<tr>
<td>Aquaponic</td>
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<td>0</td>
<td>0</td>
<td>150</td>
<td>0</td>
</tr>
<tr>
<td>Cow stable</td>
<td>1.400 - 2.900</td>
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<td>0</td>
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<td>0</td>
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<tr>
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<td>2.910</td>
<td>4.130</td>
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<td>500</td>
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<td>100</td>
<td>480</td>
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<tr>
<td>Kitchen</td>
<td>0</td>
<td>0</td>
<td>10</td>
<td>60</td>
<td>300</td>
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<td>Multifunctional room</td>
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<td>60</td>
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<td>0</td>
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<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Backery</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>50</td>
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<tr>
<td>Butcher</td>
<td>70</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Storage</td>
<td>400 - 1.900</td>
<td>3</td>
<td>10</td>
<td>160</td>
<td>200</td>
</tr>
<tr>
<td>Other</td>
<td>700</td>
<td>0</td>
<td>1</td>
<td>520</td>
<td>284</td>
</tr>
<tr>
<td>Bicycle parking</td>
<td>10</td>
<td>0</td>
<td>-</td>
<td>0</td>
<td>90</td>
</tr>
<tr>
<td>Parking</td>
<td>0</td>
<td>0</td>
<td>60</td>
<td>950</td>
<td>1.820</td>
</tr>
</tbody>
</table>

Source: Nienoord, 2013
# CASE STUDY

## SPATIAL DESIGN CONSIDERATIONS

<table>
<thead>
<tr>
<th>Spatial Design Considerations</th>
<th>Hoeve Biesland</th>
<th>Moëstuin</th>
<th>Dakker</th>
<th>Marconistrip</th>
<th>Villa Augustus</th>
</tr>
</thead>
<tbody>
<tr>
<td>Size</td>
<td>+++</td>
<td>+</td>
<td>+</td>
<td>++</td>
<td>++</td>
</tr>
<tr>
<td>Accessibility</td>
<td>+</td>
<td>++</td>
<td>+</td>
<td>+</td>
<td>++</td>
</tr>
<tr>
<td>Experience</td>
<td>+++</td>
<td>+</td>
<td>-</td>
<td>+</td>
<td>++</td>
</tr>
<tr>
<td>Close to market</td>
<td>-</td>
<td>+++</td>
<td>++</td>
<td>+</td>
<td>++</td>
</tr>
<tr>
<td>Activities</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>++</td>
</tr>
<tr>
<td>Visibility of the location</td>
<td>+++</td>
<td>+</td>
<td>-</td>
<td>++</td>
<td>+</td>
</tr>
<tr>
<td>Visibility into the garden</td>
<td>+</td>
<td>+++</td>
<td>++</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Replace paved surfaces</td>
<td>N/A</td>
<td>-</td>
<td>+++</td>
<td>++</td>
<td>++</td>
</tr>
<tr>
<td>Meeting place (through seasons)</td>
<td>-</td>
<td>+</td>
<td>+++</td>
<td>+++</td>
<td>+++</td>
</tr>
<tr>
<td>Use unutilized space</td>
<td>N/A</td>
<td>+</td>
<td>+++</td>
<td>+++</td>
<td>+++</td>
</tr>
<tr>
<td>Design garden</td>
<td>-</td>
<td>+</td>
<td>++</td>
<td>+</td>
<td>+++</td>
</tr>
<tr>
<td>Additional facilities</td>
<td>N/A</td>
<td>-</td>
<td>+</td>
<td>++</td>
<td>+++</td>
</tr>
<tr>
<td>Flexible</td>
<td>+</td>
<td>+++</td>
<td>++</td>
<td>+</td>
<td>++</td>
</tr>
<tr>
<td>Feeling of safety</td>
<td>-</td>
<td>-</td>
<td>+++</td>
<td>++</td>
<td>++</td>
</tr>
<tr>
<td>Attracts visitors</td>
<td>++</td>
<td>-</td>
<td>+++</td>
<td>+++</td>
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</tr>
<tr>
<td>Vacant land or buildings</td>
<td>N/A</td>
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<td>++</td>
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<tr>
<td>Diverse methods</td>
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<td>Characteristic building</td>
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<td>Landmark</td>
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<tr>
<td>Integration</td>
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</table>

Source: Nienoord, 2013
CASE STUDY

DESIRED RATIO’S FOR SPATIAL ORGANIZATION URBAN FARM

Source: Nienoord, 2013
CASE STUDY

IDEAL TYPICAL MODEL OF GOALS
CLIMATE

SUN

SUMMER SUN RAY

WINTER SUN RAY

SEASONAL VEGETABLES AND FRUITS