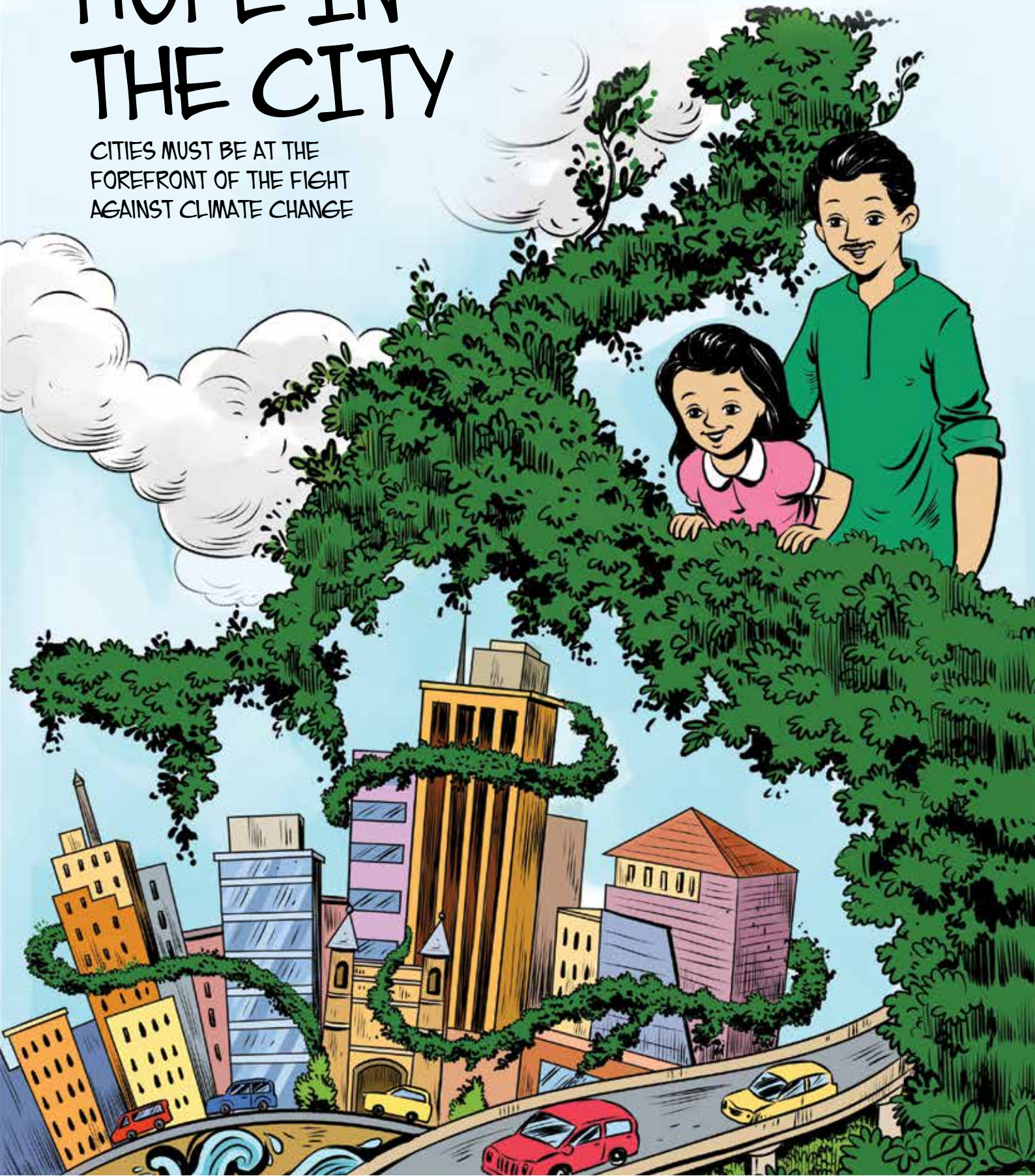


HOPE IN THE CITY

CITIES MUST BE AT THE FOREFRONT OF THE FIGHT AGAINST CLIMATE CHANGE



Funding Support

supported by:

 Federal Ministry
for the Environment, Nature Conservation
and Nuclear Safety

based on a decision of the German Bundestag

Developed under

 **INTERACT-Bio**
Integrated action on biodiversity

Supported in India by



Ministry of Environment,
Forest and Climate Change
Government of India



Implemented in India by

ICLEI
Local
Governments
for Sustainability

Title: Hope in the City

Prepared under the BMU supported INTERACT-Bio Project

INTERACT-Bio is implemented by ICLEI – Local Governments for Sustainability and supported by the German Federal Ministry for the Environment, Nature Conservation and Nuclear Safety (BMU) through the International Climate Initiative (IKI).

Project implemented in India by: ICLEI-Local Governments for Sustainability, South Asia

Story and illustration: Bee Ideas, Kolkata

Year of Publishing: 2019

Copyright@ICLEI South Asia (2019)

No part of this booklet may be disseminated or reproduced in any form (electronic or mechanical) without prior permission from or intimation to ICLEI South Asia. Permission and information may be sought at (iclei-southasia@iclei.org).

Contact

ICLEI-Local Governments for Sustainability, South Asia

C-3 Green Park Extension

New Delhi-110016

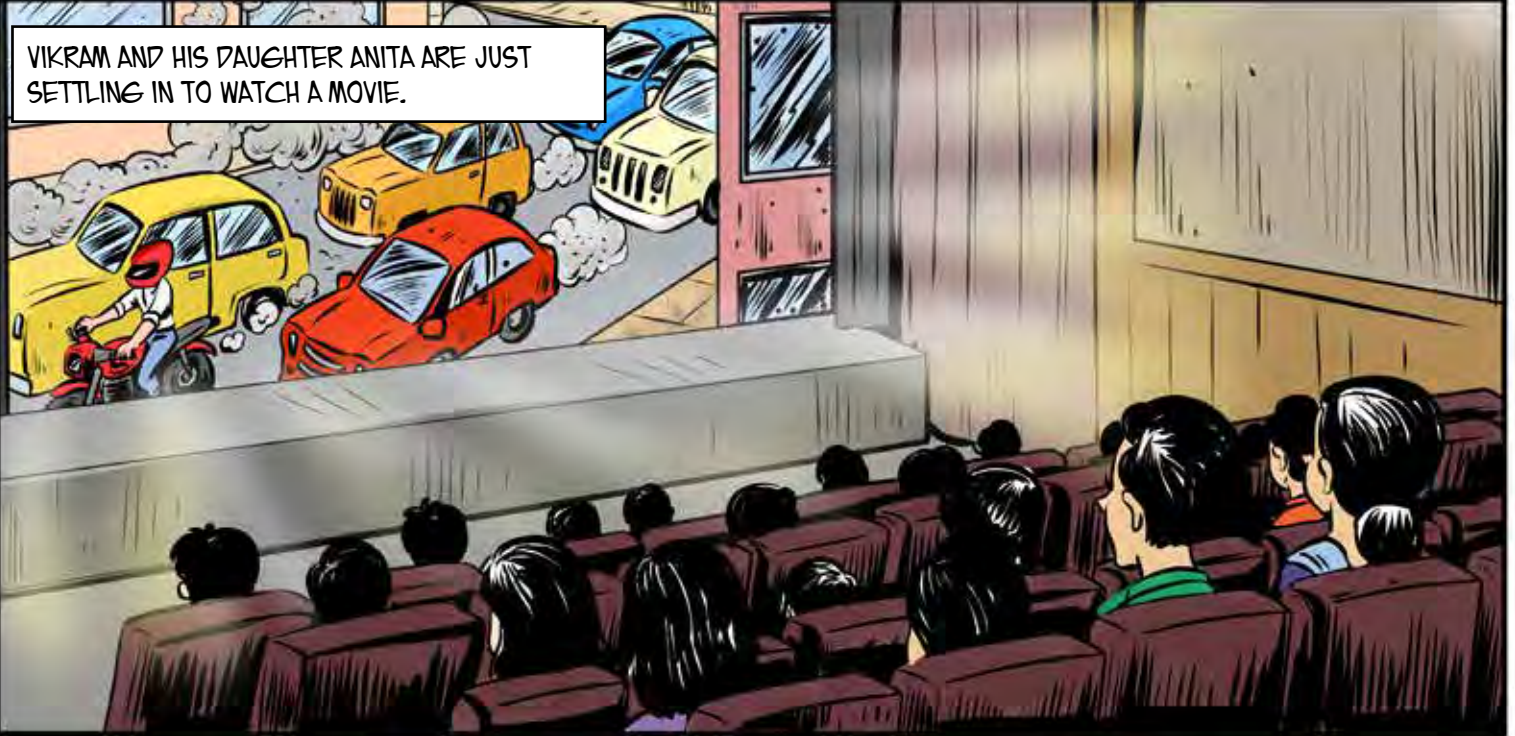
Tel: +91 – 11 – 4974 7200; Email: iclei-southasia@iclei.org

HOPE IN THE CITY



IT IS A BUSY EVENING IN THE GREAT CITY. THE ROADS ARE CHOKED BY TRAFFIC. THE AIR IS THICK WITH THE FUMES OF CARS AND BUSES.

VIKRAM AND HIS DAUGHTER ANITA ARE JUST SETTLING IN TO WATCH A MOVIE.

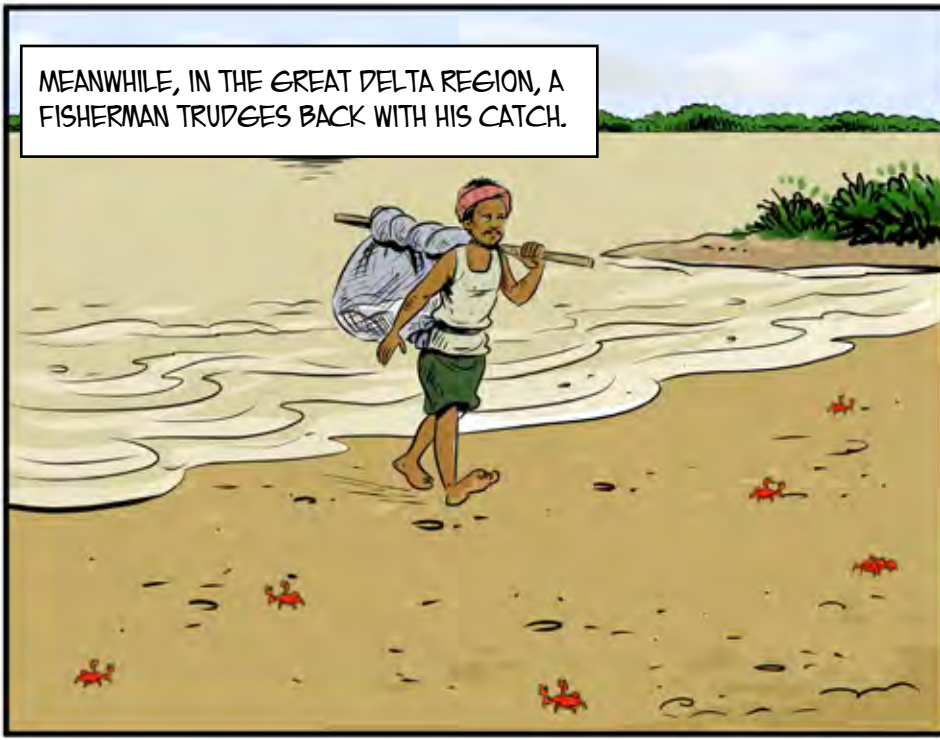


I HOPE WE DON'T GET STUCK IN TRAFFIC ON OUR WAY HOME.

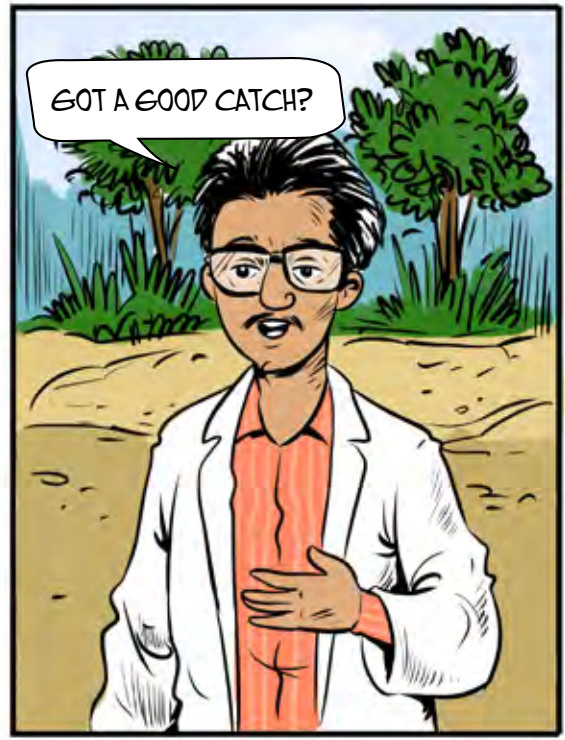
STOP WORRYING, PAPA. WATCH THE MOVIE.



MEANWHILE, IN THE GREAT DELTA REGION, A FISHERMAN TRUDGES BACK WITH HIS CATCH.



GOT A GOOD CATCH?



NO, SIR. THERE IS NOT MUCH FISH AROUND NOWADAYS.



AFTER THAT LAST CYCLONE, OUR CATCHES HAVE BEEN DROPPING.



WILL YOU SELL ME SOME FISH?



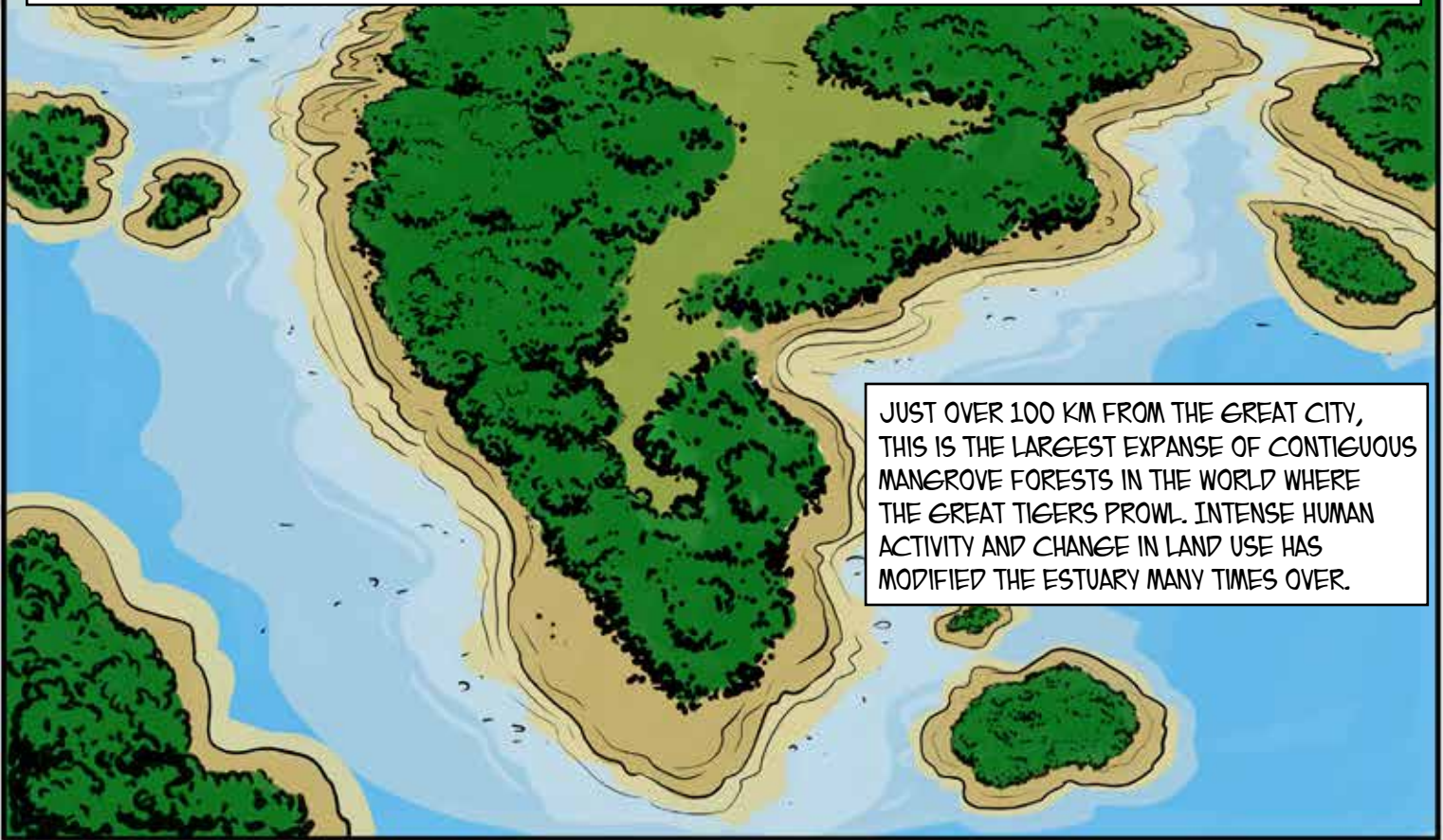
YES, CERTAINLY. HOW MANY?

HALF-A-DOZEN.

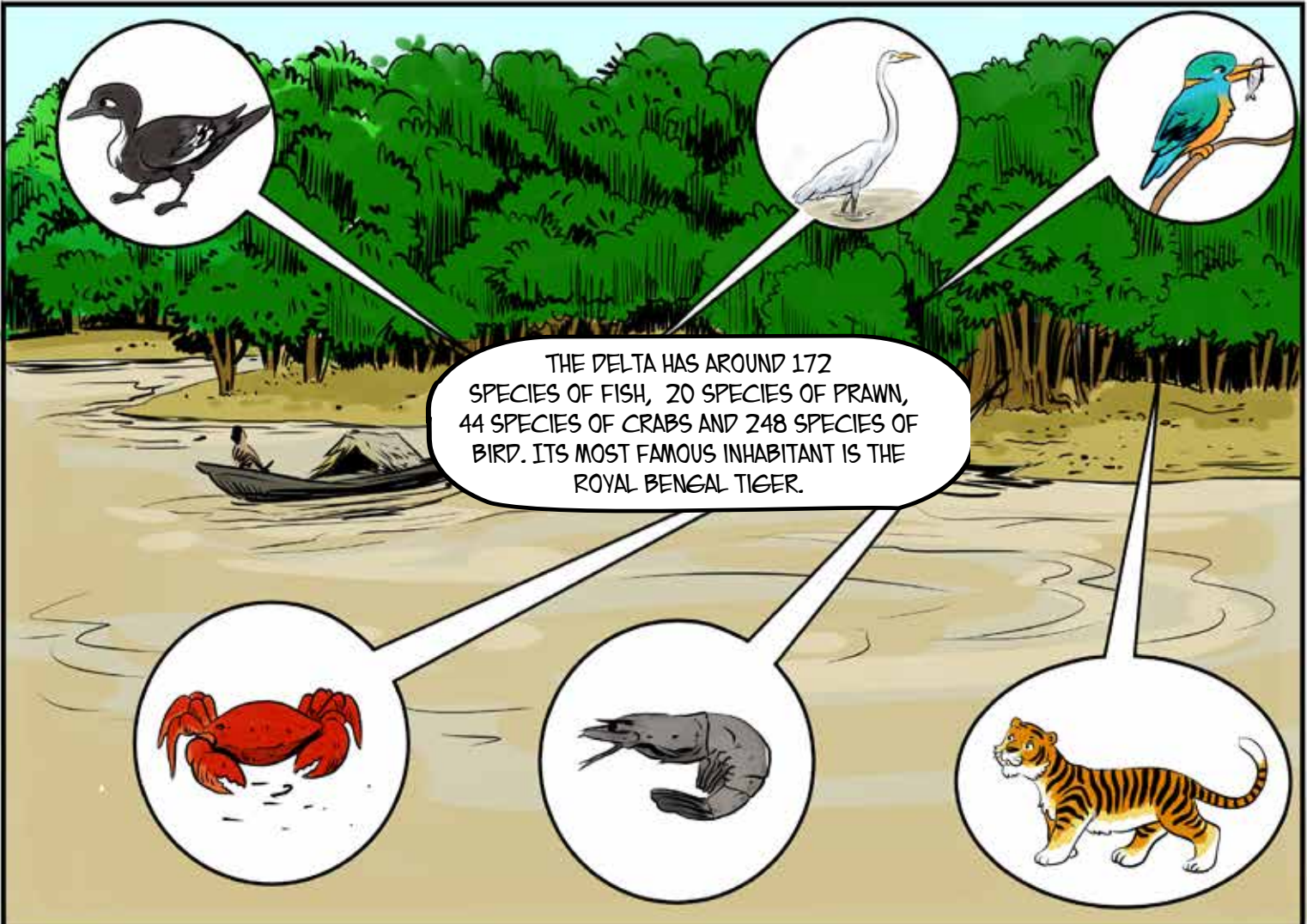




SHASHI IS ON AN ISLAND, ONE OF THE HUNDREDS THAT DOT THIS GREAT DELTA REGION CREATED BY THE CONFLUENCE OF TWO GIANT RIVERS AND THREE SMALLER ONES AS THEY CONVERGE AND FLOW INTO THE SEA.



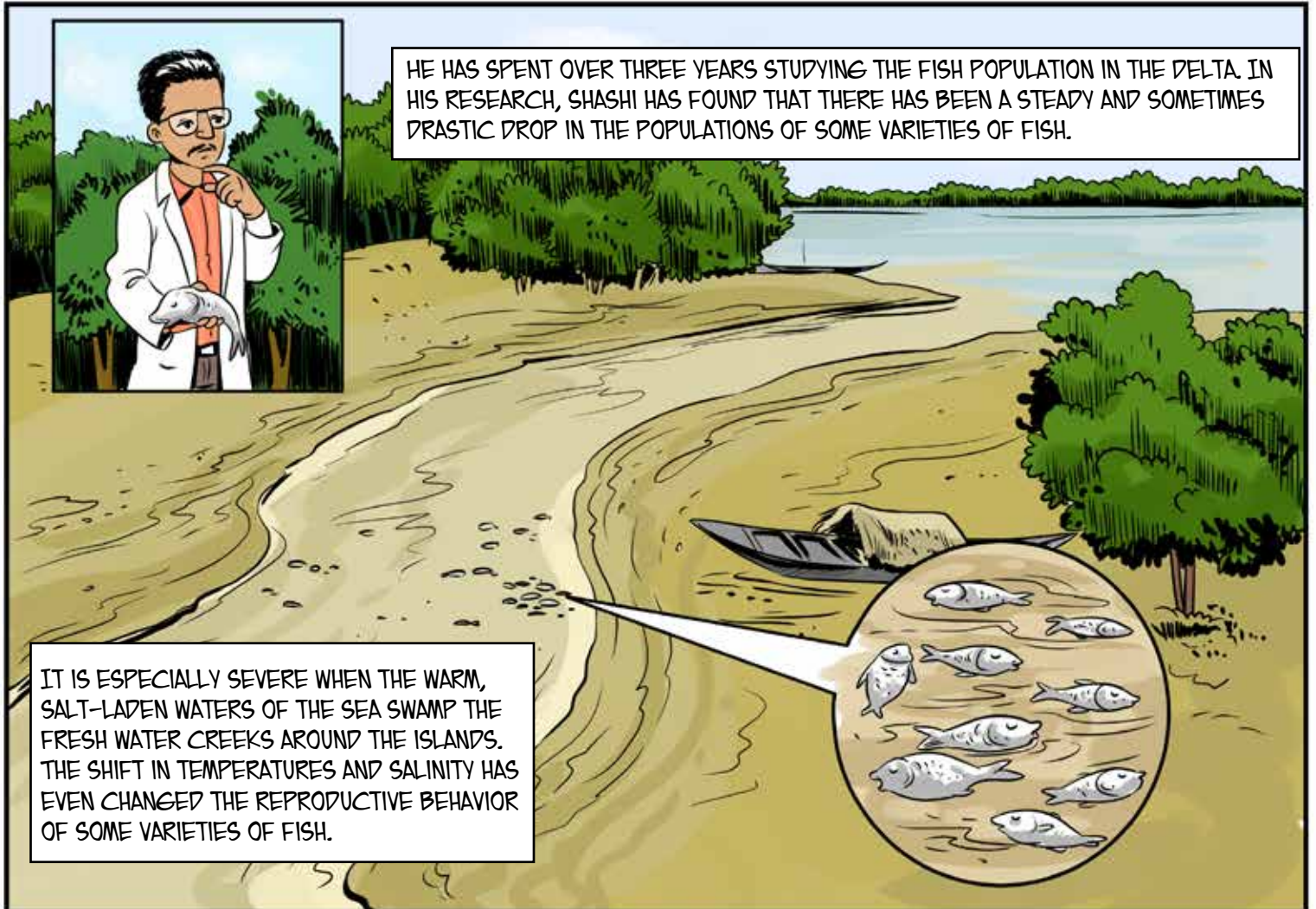
JUST OVER 100 KM FROM THE GREAT CITY, THIS IS THE LARGEST EXPANSE OF CONTIGUOUS MANGROVE FORESTS IN THE WORLD WHERE THE GREAT TIGERS PROWL. INTENSE HUMAN ACTIVITY AND CHANGE IN LAND USE HAS MODIFIED THE ESTUARY MANY TIMES OVER.



THE DELTA HAS AROUND 172 SPECIES OF FISH, 20 SPECIES OF PRAWN, 44 SPECIES OF CRABS AND 248 SPECIES OF BIRD. ITS MOST FAMOUS INHABITANT IS THE ROYAL BENGAL TIGER.



IT SUPPLIES ALMOST A QUARTER OF THE CITY'S REQUIREMENTS OF FISH.



HE HAS SPENT OVER THREE YEARS STUDYING THE FISH POPULATION IN THE DELTA. IN HIS RESEARCH, SHASHI HAS FOUND THAT THERE HAS BEEN A STEADY AND SOMETIMES DRASTIC DROP IN THE POPULATIONS OF SOME VARIETIES OF FISH.

IT IS ESPECIALLY SEVERE WHEN THE WARM, SALT-LADEN WATERS OF THE SEA SWAMP THE FRESH WATER CREEKS AROUND THE ISLANDS. THE SHIFT IN TEMPERATURES AND SALINITY HAS EVEN CHANGED THE REPRODUCTIVE BEHAVIOR OF SOME VARIETIES OF FISH.

SOME TIME LATER, IN THE GREAT CITY,
VIKRAM AND ANITA LEAVE THE MOVIE HALL.



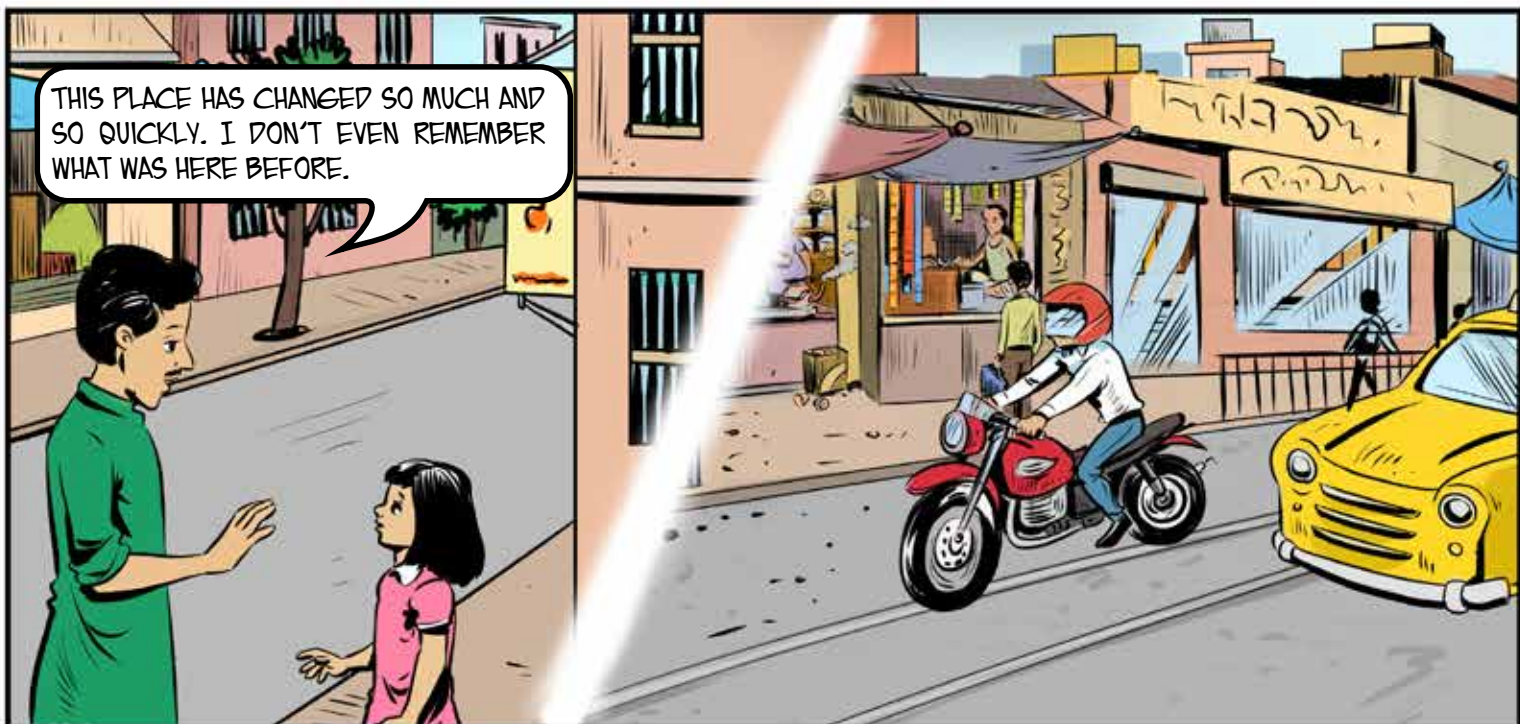
THE NIGHT IS COOL AND
A GENTLE BREEZE IS BLOWING.
IT IS THE BEGINNING OF MARCH

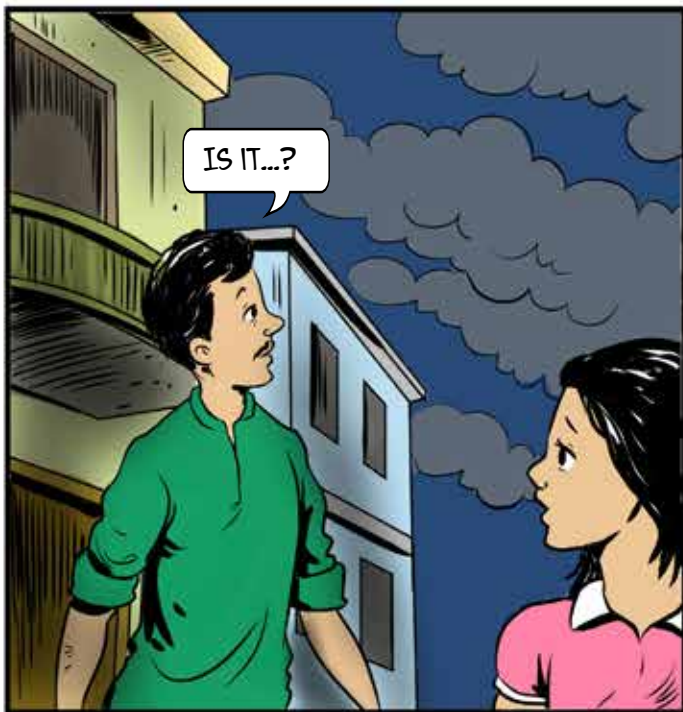


THE ROADS ARE BUSY WITH
CARS, BUSES AND PEOPLE



THIS PLACE HAS CHANGED SO MUCH AND
SO QUICKLY. I DON'T EVEN REMEMBER
WHAT WAS HERE BEFORE.





IS IT...?



YES, I THINK IT'S GOING TO RAIN, PAPA.



LET'S LOOK FOR SOME COVER!

AND THEN THE HEAVENS OPEN UP. HAIL, WIND AND LARGE DROPS OF RAIN WHIP DOWN. THEY RUN UNDER THE SHADE OF A BUILDING'S BALCONY AND PRESS AGAINST THE WALL TO ESCAPE THE HAIL AND RAIN.



THE HAIL AND RAIN STOP SUDDENLY.



CAN YOU HEAR IT?

WHAT?



PAPA, IT IS HEADING
IN OUR DIRECTION!



A TUBE-LIKE EXTRUSION IS FORMING UNDER A DARK
CLOUD AND IT GROWS RAPIDLY.




THE TUBE COMES WHIPLASHING TOWARDS THEM AND THE WIND ALMOST PUSHES
THEM OVER. OBJECTS START FLYING PAST THEM - BICYCLES, SCOOTERS, LAMP
POSTS, SHEETS OF CORRUGATED IRON, AND EVEN ENTIRE TEA STALLS.



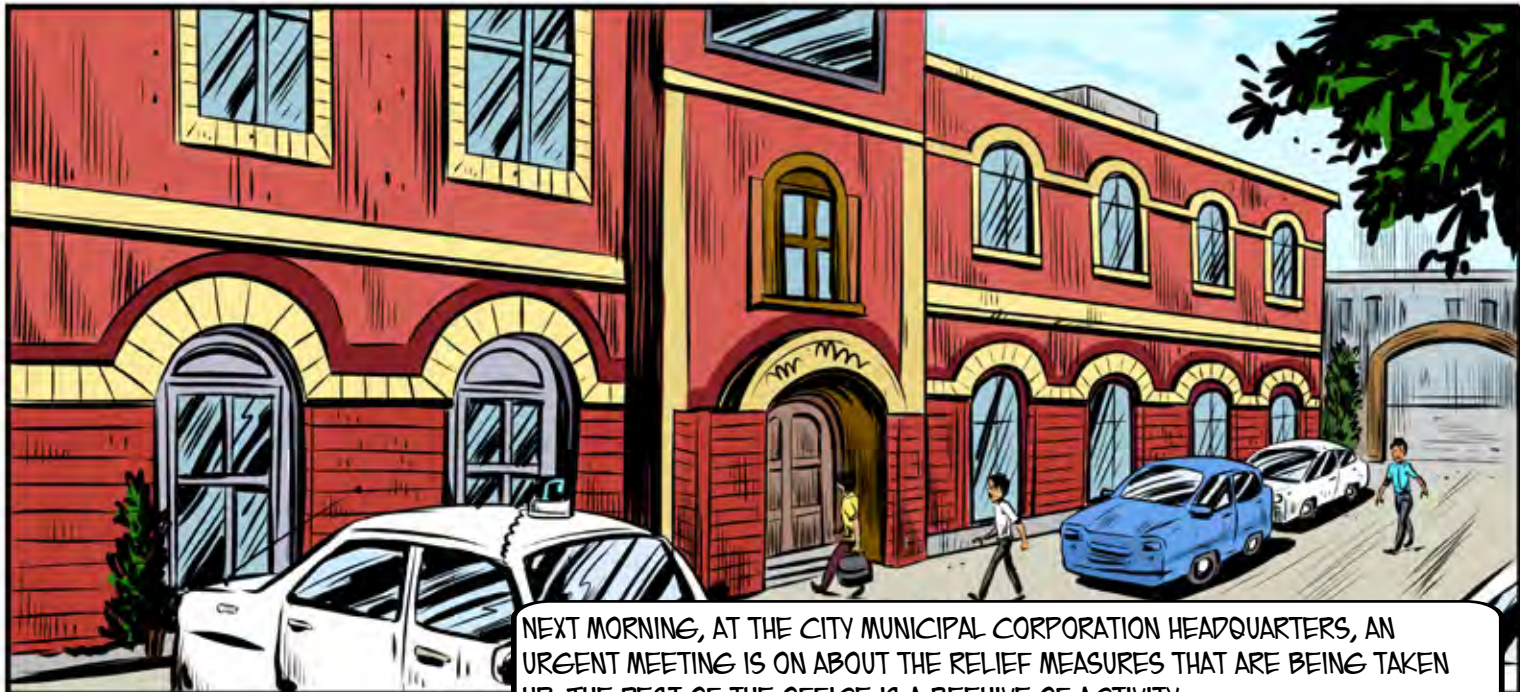
AND THEN, SUDDENLY, THERE IS SILENCE.



WHAT WAS THAT?! NOTHING OF THIS SORT HAS EVER HAPPENED HERE!



AT HOME, THE FAMILY HUDDLE AROUND IN CANDLELIGHT TALKING ABOUT THE EVENT. MOBILE AND LAND PHONES HAVE STOPPED WORKING. THEY ARE WITHOUT ELECTRICITY.



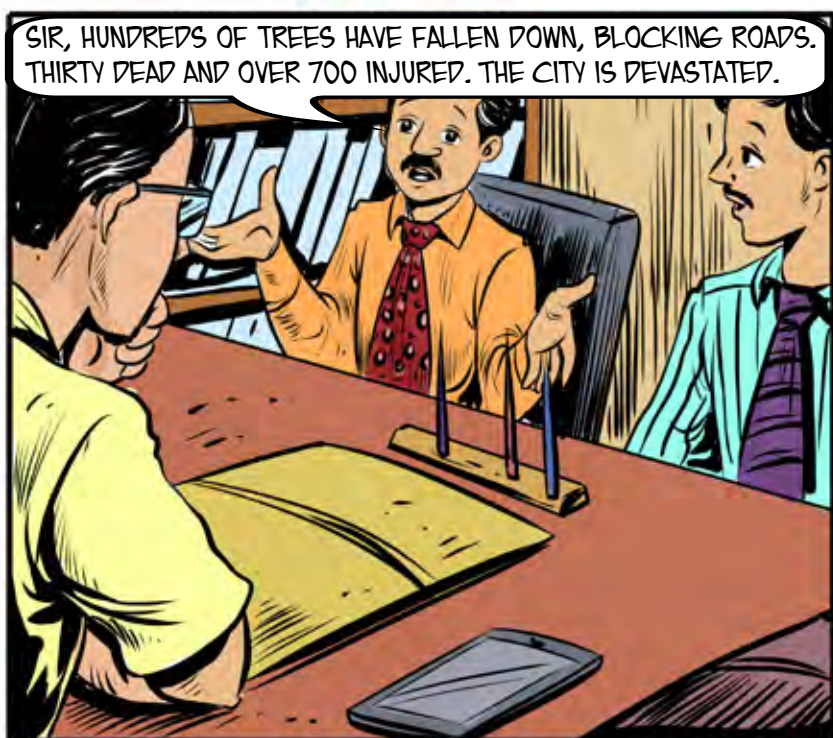
NEXT MORNING, AT THE CITY MUNICIPAL CORPORATION HEADQUARTERS, AN URGENT MEETING IS ON ABOUT THE RELIEF MEASURES THAT ARE BEING TAKEN UP. THE REST OF THE OFFICE IS A BEEHIVE OF ACTIVITY.

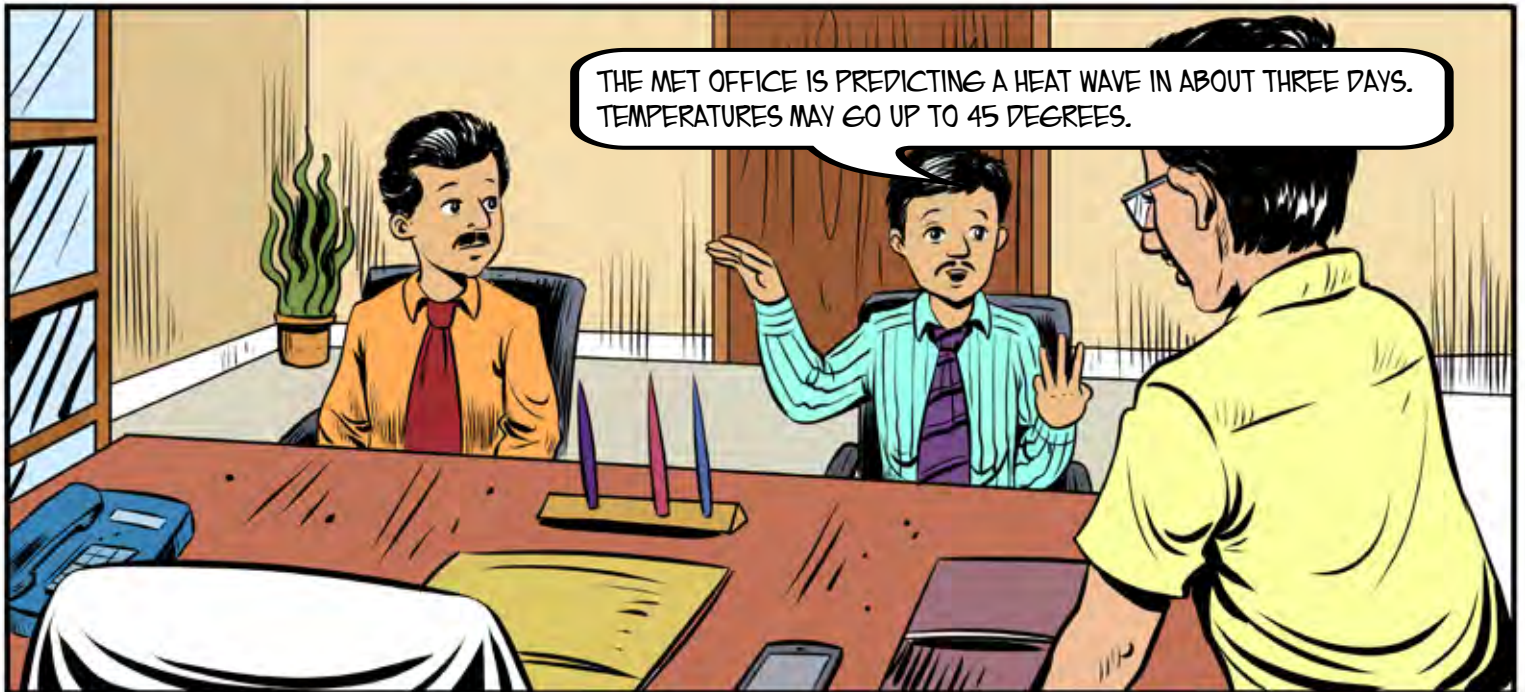
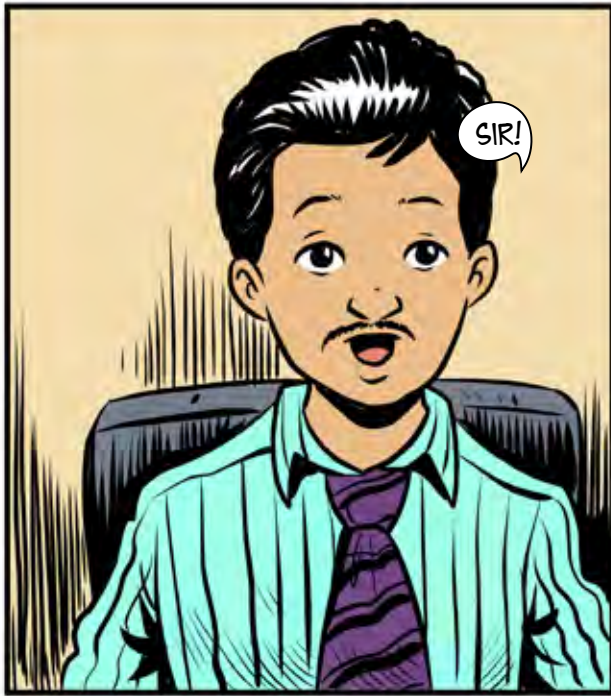


WE HAVE BEEN HIT BY A FORCE THAT HAS NEVER BEEN WITNESSED BEFORE. A FREAK TORNADO!



SIR, HUNDREDS OF TREES HAVE FALLEN DOWN, BLOCKING ROADS. THIRTY DEAD AND OVER 700 INJURED. THE CITY IS DEVASTATED.



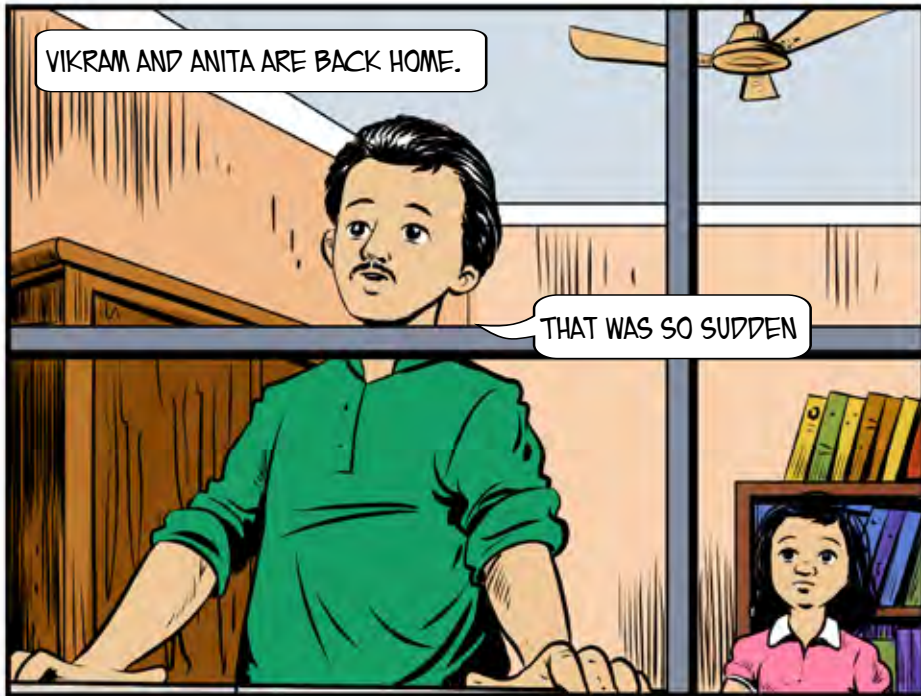


THE CITY HAS GROWN RAPIDLY IN THE PAST 30 YEARS. IT HAS MOVED FURTHER OUTWARDS, GOBLING UP PERI-URBAN AND EVEN BORDERING VILLAGES. THE EXPANSION IS INEXORABLE AND MERCILESS. NOTHING IN ITS PATH IS LEFT UNTOUCHED.



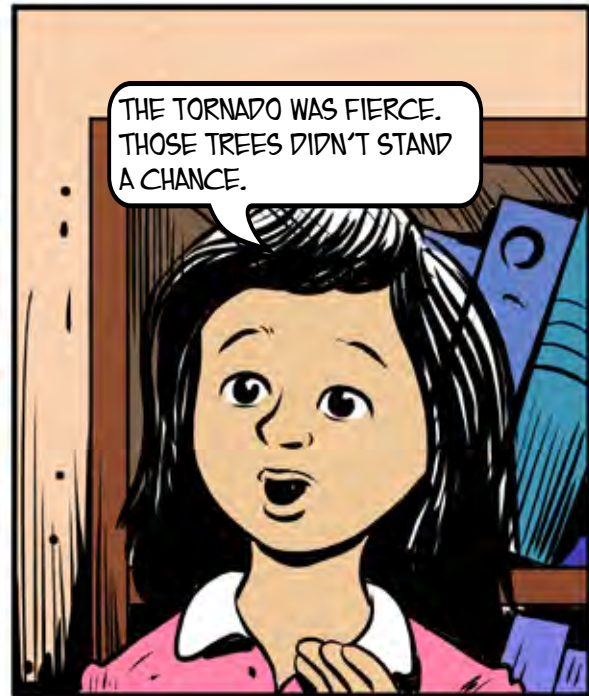


WHERE THERE ONCE STOOD MAJESTIC TREES SURROUNDED BY LUSH OVERGROWTH AND WETLANDS, ALL THAT REMAINED WERE CONCRETE JUNGLES. URBAN EXPANSION DEGRADES AND DESTROYS NATURAL HABITATS IN THE CITY, POLLUTING THE WATER AND AIR, AND TRANSFORMING GREEN PATCHES AND WATERBODIES INTO VAST EXPANSES OF CONCRETE CONSTRUCTION.



VIKRAM AND ANITA ARE BACK HOME.

THAT WAS SO SUDDEN



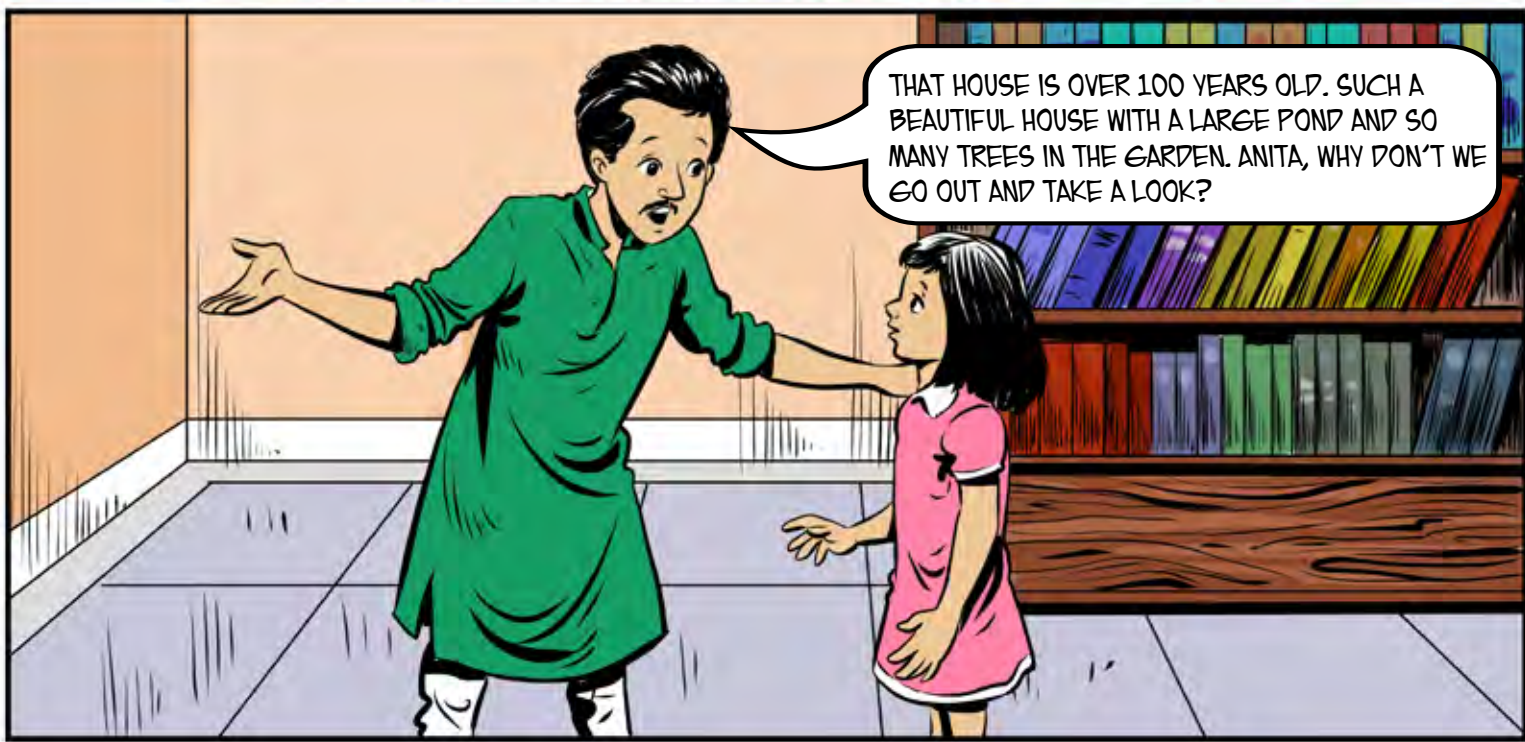
THE TORNADO WAS FIERCE. THOSE TREES DIDN'T STAND A CHANCE.



PAPA, PARTS OF THAT OLD HOUSE NEXT DOOR HAVE COLLAPSED!



I HOPE NOBODY IS HURT.



THAT HOUSE IS OVER 100 YEARS OLD. SUCH A BEAUTIFUL HOUSE WITH A LARGE POND AND SO MANY TREES IN THE GARDEN. ANITA, WHY DON'T WE GO OUT AND TAKE A LOOK?

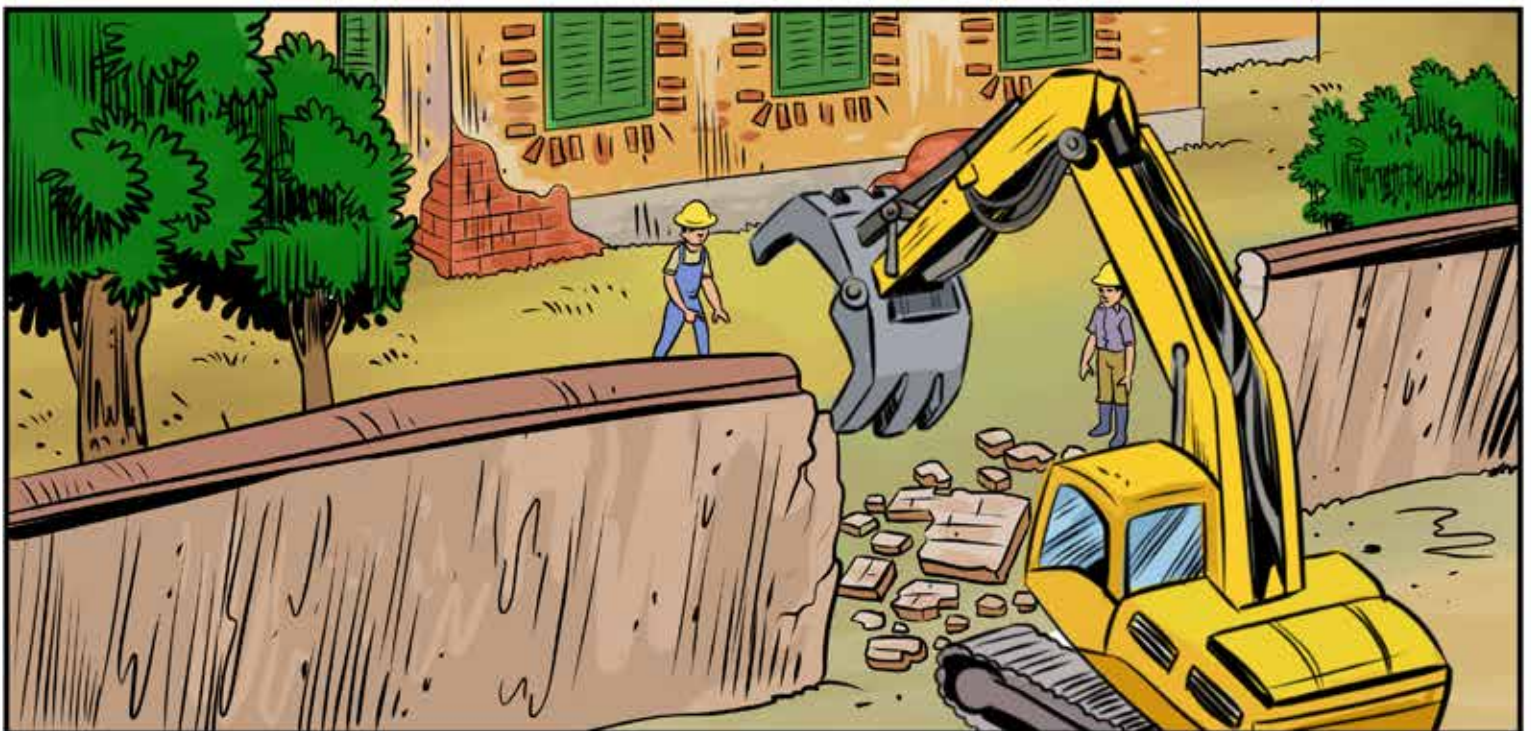
WHAT ARE THOSE WORKMEN DOING AT THE OLD HOUSE?



PAPA, THEY'RE DEMOLISHING THE BUILDING!



THEY CAN'T DO THAT! THAT'S A HERITAGE BUILDING.



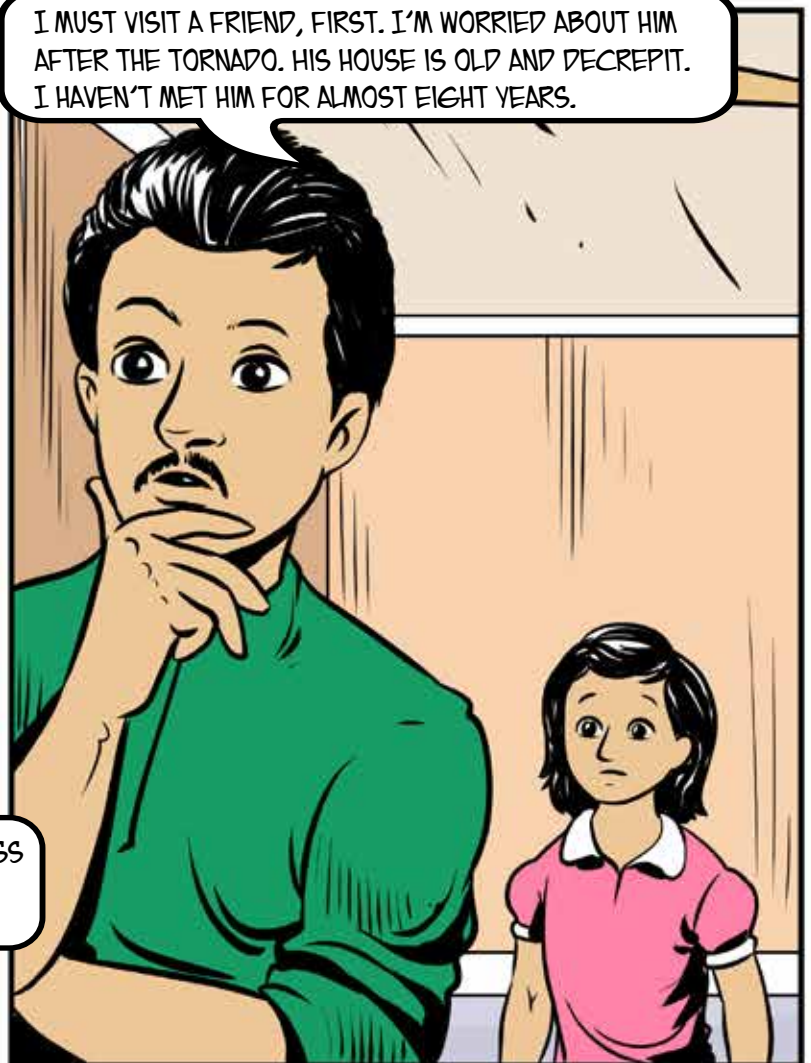
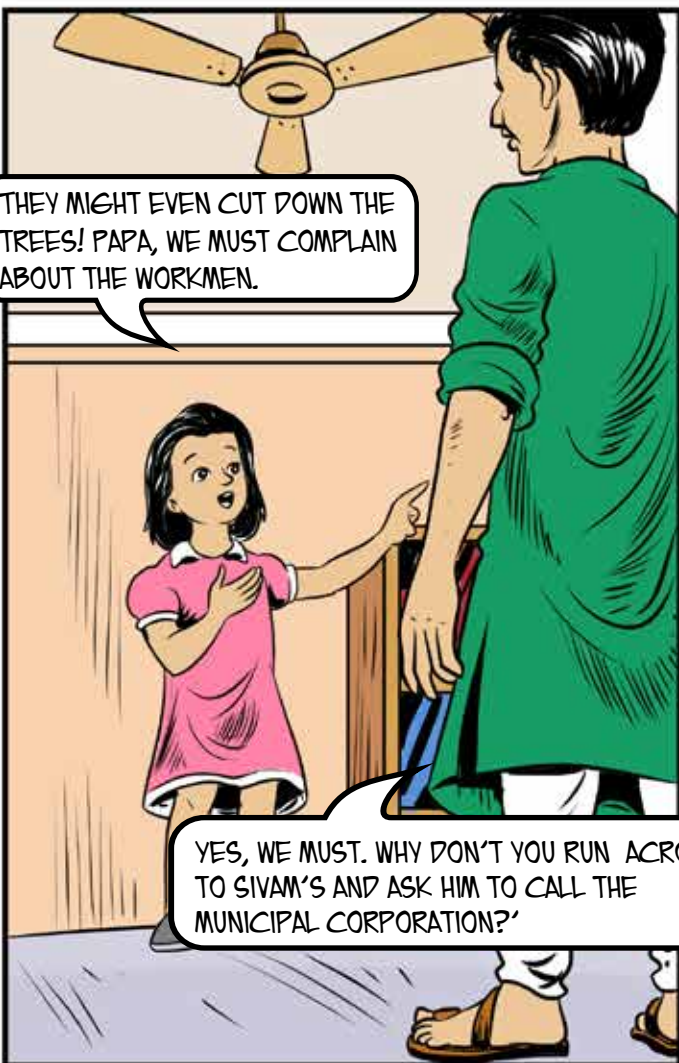
THE GROUNDS OF THE OLD HOUSE ARE BEAUTIFUL WITH LARGE TREES, A STONE-PAVED PATHWAY OVERGROWN WITH GRASS LEAD ALL AROUND THE POND. THE HOUSE EVEN AFTER THE DAMAGE IS MYSTERIOUS, BUT GRAND. IT NEEDS UPKEEP.



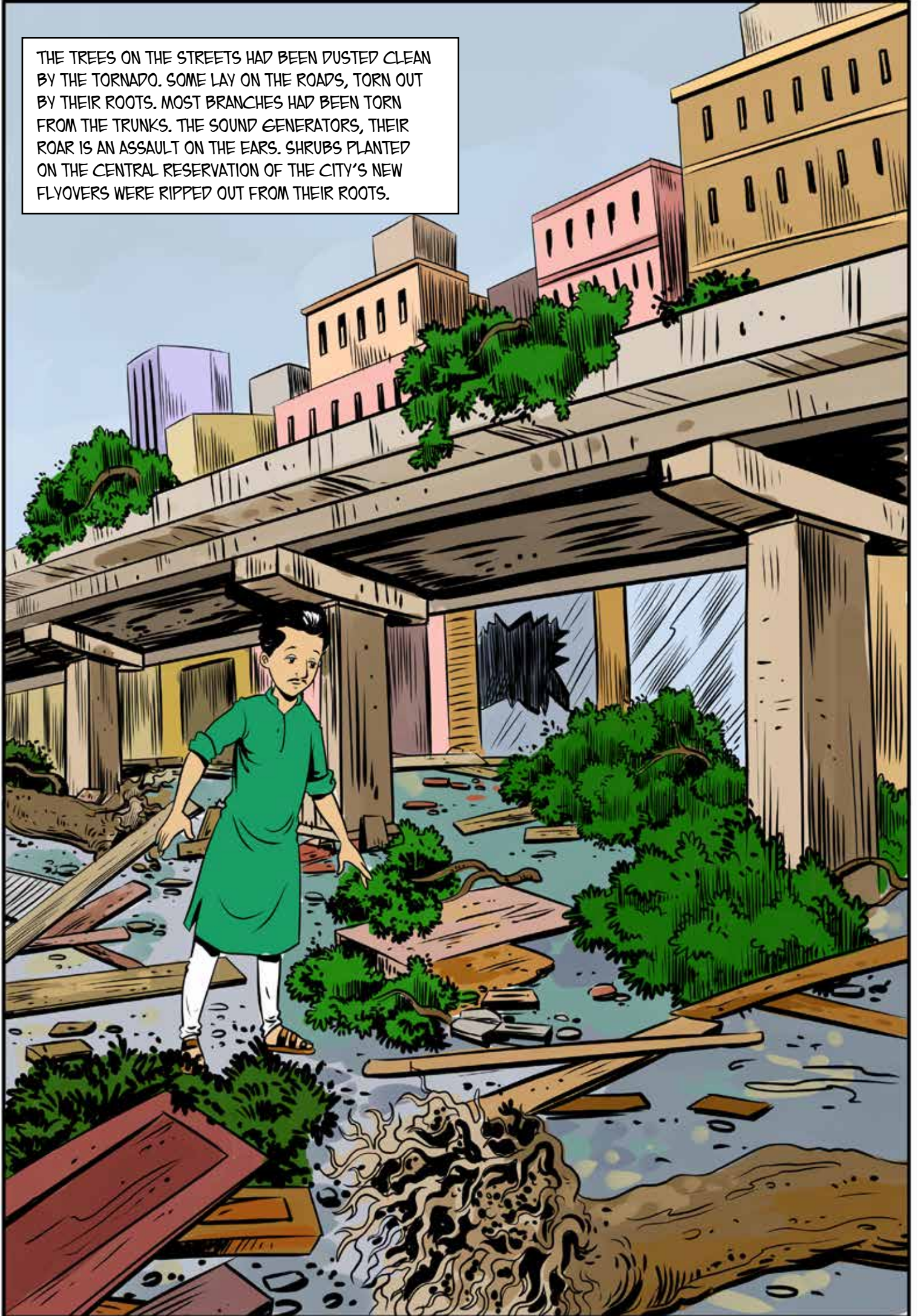
THEY MIGHT EVEN CUT DOWN THE TREES! PAPA, WE MUST COMPLAIN ABOUT THE WORKMEN.

YES, WE MUST. WHY DON'T YOU RUN ACROSS TO SIVAM'S AND ASK HIM TO CALL THE MUNICIPAL CORPORATION?'

I MUST VISIT A FRIEND, FIRST. I'M WORRIED ABOUT HIM AFTER THE TORNADO. HIS HOUSE IS OLD AND DECREPIT. I HAVEN'T MET HIM FOR ALMOST EIGHT YEARS.

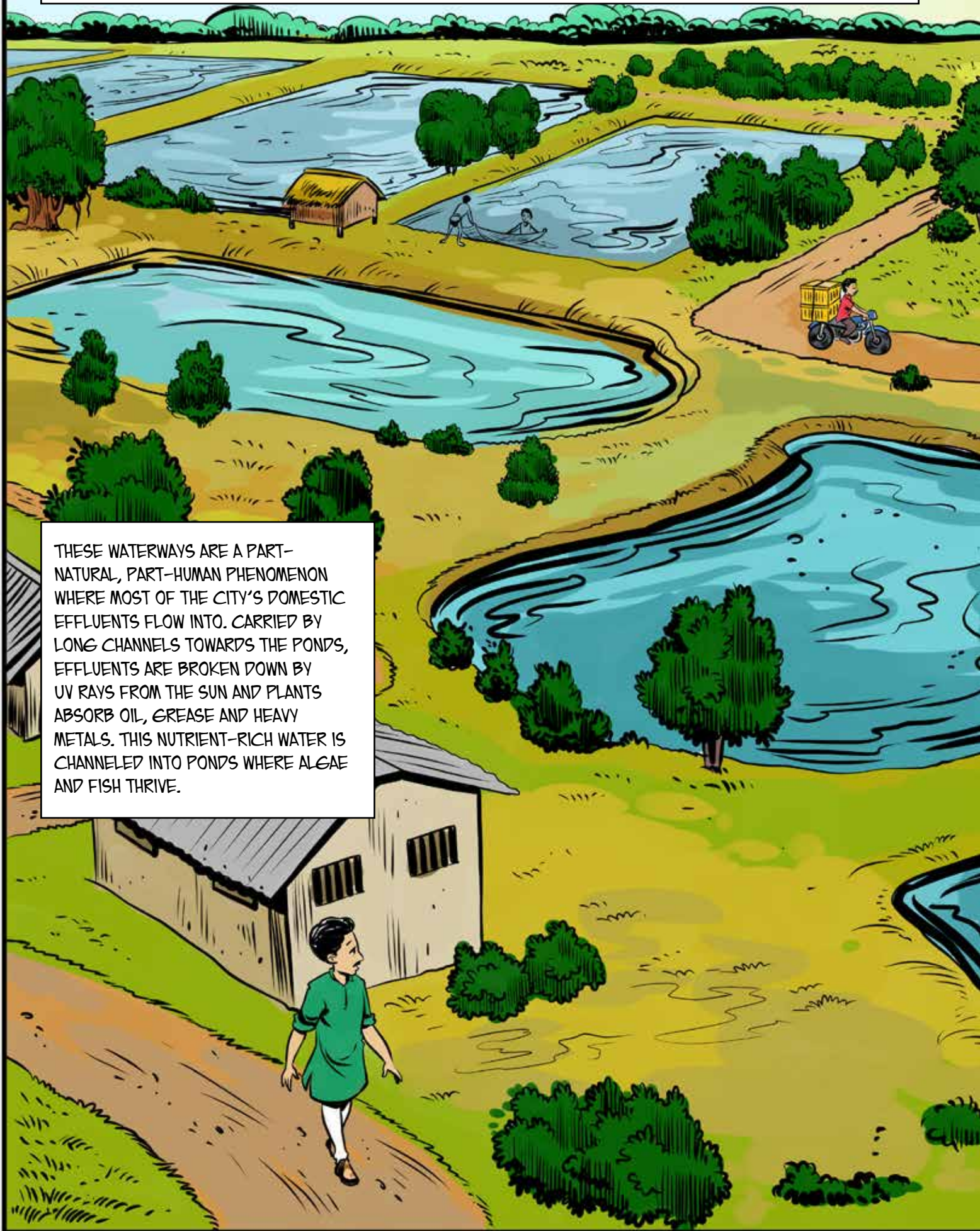


THE TREES ON THE STREETS HAD BEEN DUSTED CLEAN BY THE TORNADO. SOME LAY ON THE ROADS, TORN OUT BY THEIR ROOTS. MOST BRANCHES HAD BEEN TORN FROM THE TRUNKS. THE SOUND GENERATORS, THEIR ROAR IS AN ASSAULT ON THE EARS. SHRUBS PLANTED ON THE CENTRAL RESERVATION OF THE CITY'S NEW FLYOVERS WERE RIPPED OUT FROM THEIR ROOTS.



TO THE EAST, RIGHT UP AGAINST THE CITY SPARKLES A VAST EXPANSE OF WATER OF ABOUT 125 SQ KM: A PATCHWORK OF TINY FLOODED FIELDS BORDERED BY GREEN EMBANKMENTS, PONDS, CHANNELS AND MUCH LARGER LAKES.

THESE WATERWAYS ARE A PART-NATURAL, PART-HUMAN PHENOMENON WHERE MOST OF THE CITY'S DOMESTIC EFFLUENTS FLOW INTO. CARRIED BY LONG CHANNELS TOWARDS THE PONDS, EFFLUENTS ARE BROKEN DOWN BY UV RAYS FROM THE SUN AND PLANTS ABSORB OIL, GREASE AND HEAVY METALS. THIS NUTRIENT-RICH WATER IS CHANNLED INTO PONDS WHERE ALGAE AND FISH THRIVE.

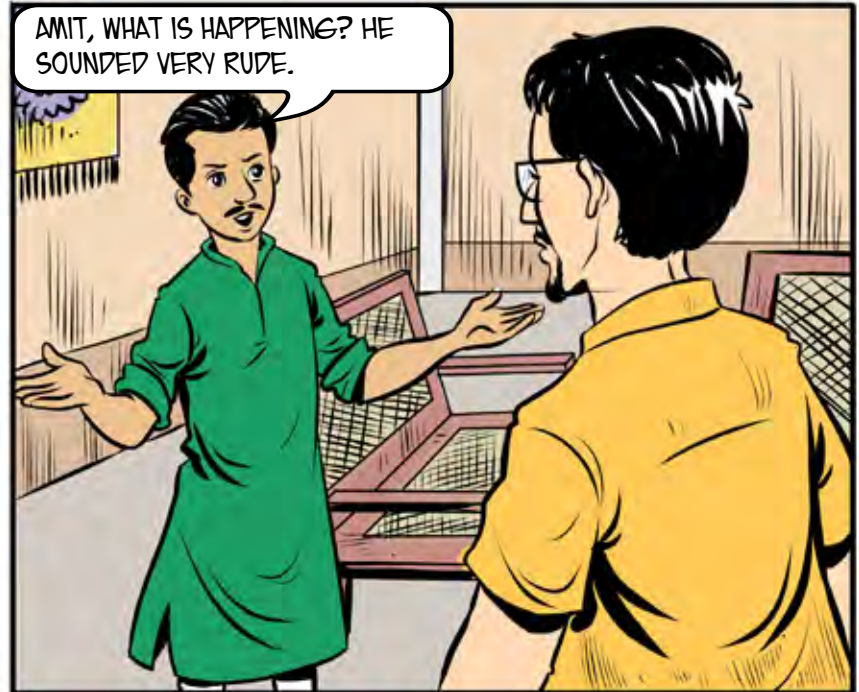
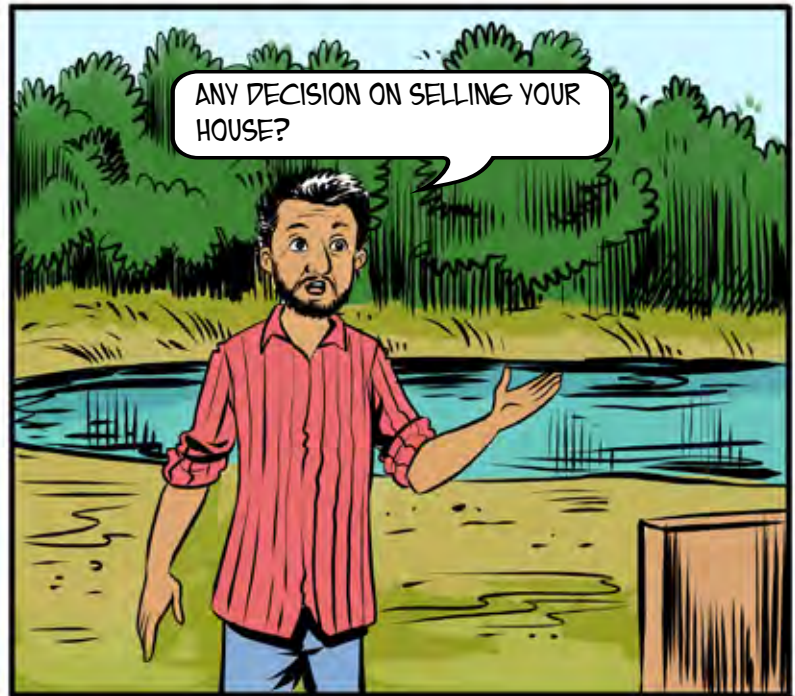




THE WETLANDS SERVE TWO FUNCTIONS THAT AT FIRST GLANCE SEEM CONTRADICTIONARY: THEY CLEAN 80 PERCENT OF THE CITY'S SEWAGE FREE OF COST; BUT THEY ARE ALSO A FERTILE AQUATIC GARDEN, PRODUCING ALMOST 18,000 TONS OF FISH EVERY YEAR AND 150 TONS OF VEGETABLES EVERY DAY.









WHAT HAPPENED TO THOSE BEAUTIFUL PONDS BEHIND THE HOUSE? I SEE NOTHING BUT BUILDINGS.

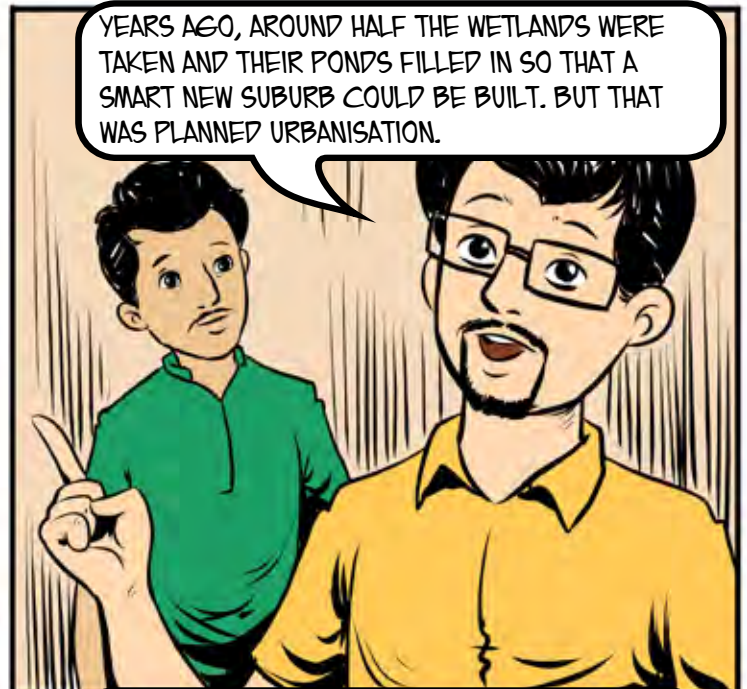


THEY'VE BEEN FILLED UP AND BUILT OVER. THE VILLAGES HAVE DISAPPEARED AND THE FISHERMEN AND FARMERS HAVE MOVED TO THE CITY TO WORK ON CONSTRUCTION PROJECTS.



BUT THESE WETLANDS ARE PROTECTED BY LAW!

THE LAW DOESN'T EXIST HERE.




YEARS AGO, AROUND HALF THE WETLANDS WERE TAKEN AND THEIR PONDS FILLED IN SO THAT A SMART NEW SUBURB COULD BE BUILT. BUT THAT WAS PLANNED URBANISATION.



WHAT IS HAPPENING HERE IS COMPLETELY UNPLANNED.

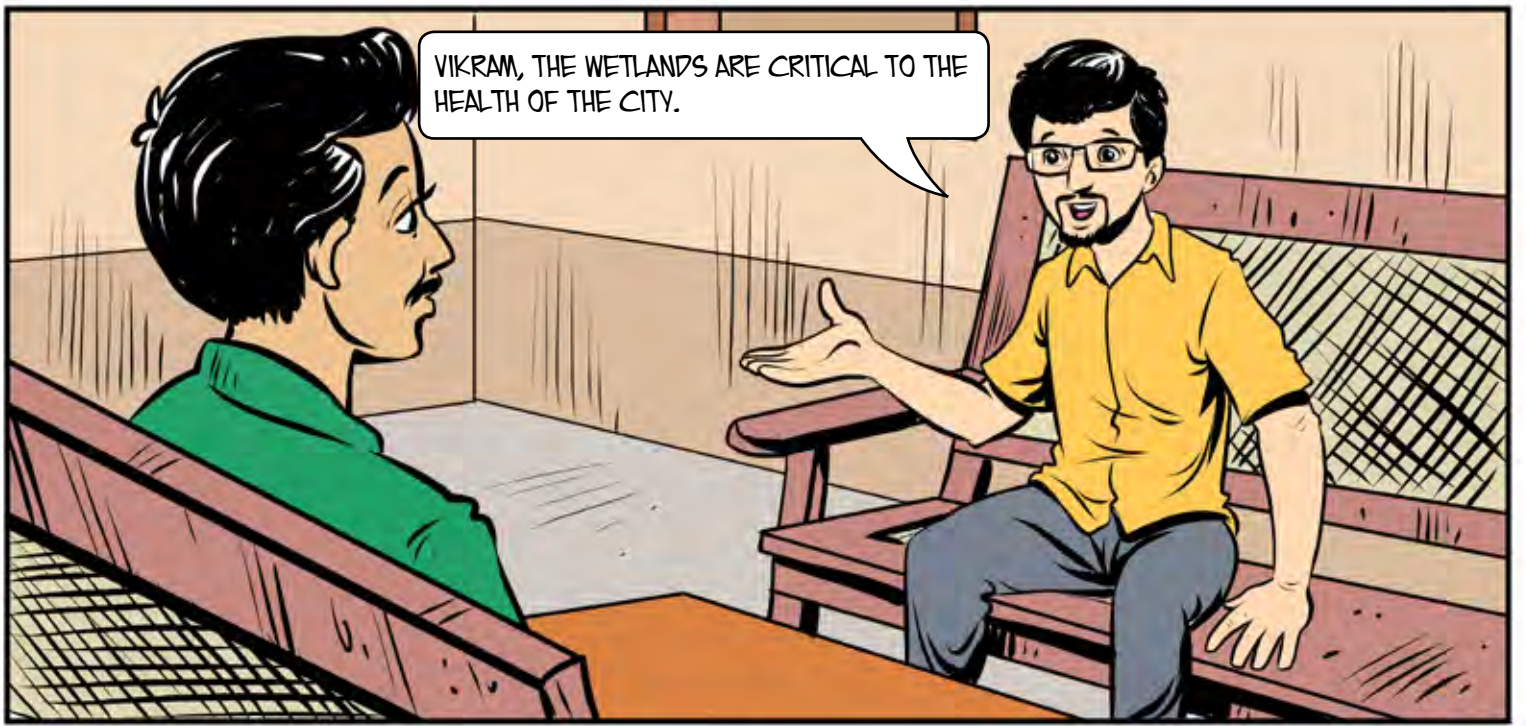


DO YOU KNOW THAT THAT THE ECOLOGIST MUKHERJEE WHO FOUGHT TO PRESERVE THESE WETLANDS DIED A BROKEN MAN?

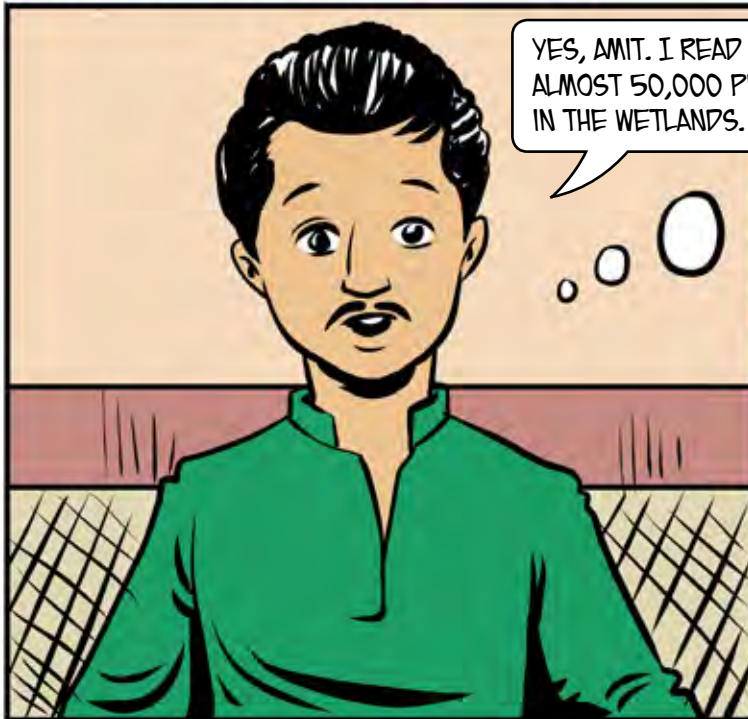
An aerial illustration of a wetland system. A central grey road runs vertically, with several smaller roads branching off to the left and right. The wetlands are depicted as a network of blue water channels and yellowish-brown mudflats, separated by green vegetation. In the background, a city skyline with several tall buildings is visible under a clear blue sky. In the foreground, a road with a billboard and a person is visible. The billboard shows a woman's face and some text. The person is standing next to the billboard. The overall scene shows the integration of natural wetlands with urban infrastructure.

ABOUT 100 PLANT SPECIES HAVE BEEN RECORDED IN AND AROUND THE WETLANDS. 20 DIFFERENT MAMMALS, 40 SPECIES OF BIRDS AND NUMEROUS SPECIES OF FISH HAVE MADE THE WETLANDS THEIR HOME.

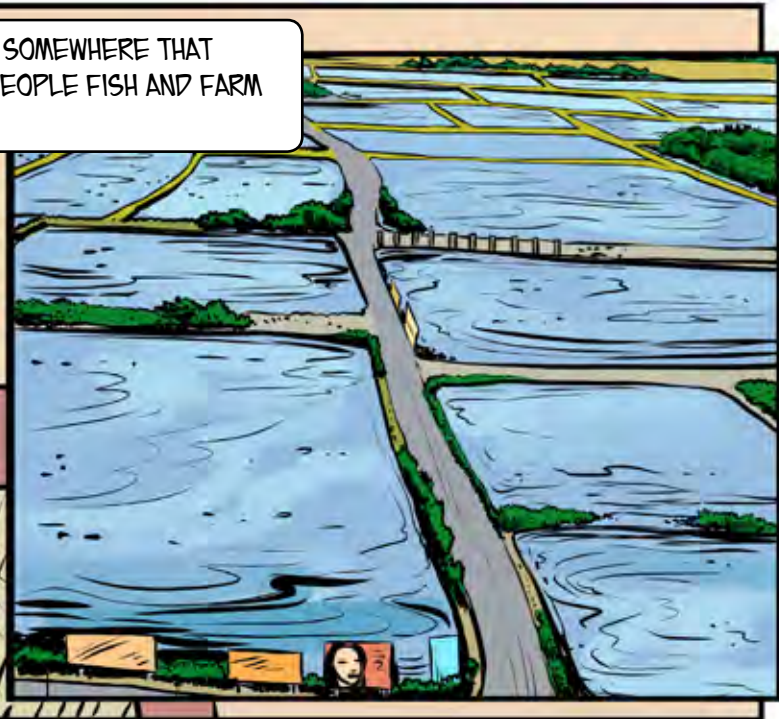
THE WETLANDS ACT AS A CARBON SINK AND CLEAN UP THE CITY'S AIR. THE CARBON IS SEQUESTERED IN SOIL AND PLANT AND ANIMAL LIFE OF THE ECOSYSTEM OF THE WETLANDS. IF THIS CARBON IS NOT STORED BY THE WETLANDS, THEN IT WOULD HAVE ADDED TO THE LOAD IN THE ATMOSPHERE



VIKRAM, THE WETLANDS ARE CRITICAL TO THE HEALTH OF THE CITY.



YES, AMIT. I READ SOMEWHERE THAT ALMOST 50,000 PEOPLE FISH AND FARM IN THE WETLANDS.

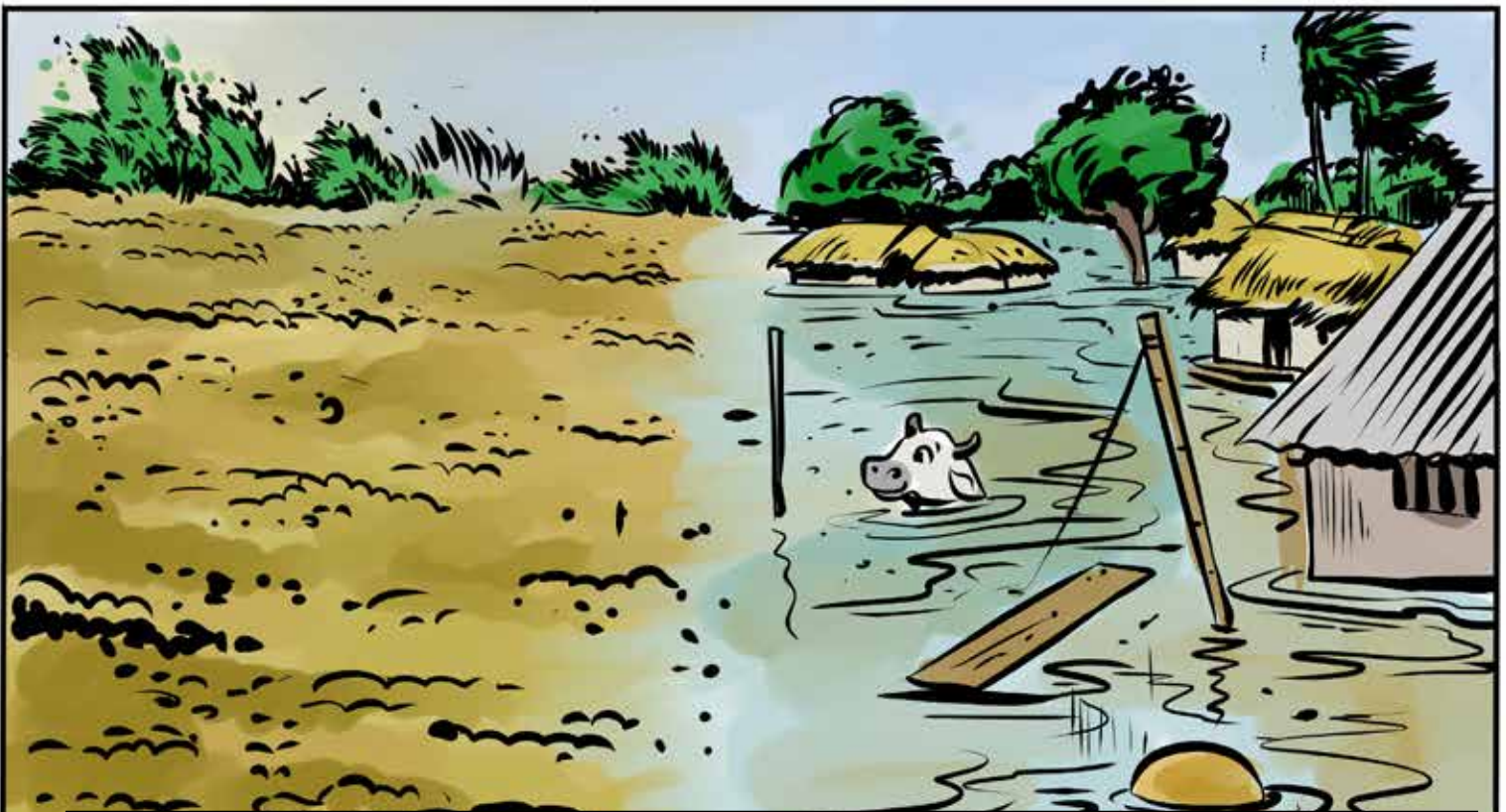


YOU'RE RIGHT. WE CANNOT ALLOW THIS SUSTAINABLY PRODUCTIVE NATURAL TREATMENT SYSTEM IN THE CITY'S BACKYARD TO FAIL.



NOT ONLY DOES IT PROVIDE THESE PEOPLE WITH LIVELIHOODS, IT ALSO RENDERS SO MANY SERVICES TO THE CITY.

IN THE DELTA, MOU STANDS AND LOOKS AT HER SMALL PIECE OF LAND ON WHICH SHE HAD PLANNED WITH HER HUSBAND TO GROW PADDY THIS YEAR. BUT THE SALINITY OF THE SOIL HAS MADE IT IMPOSSIBLE TO GROW ANYTHING.



SHE HAS LOST COUNT OF THE NUMBER OF CYCLONES THAT HAVE HIT HER VILLAGE AND MANY OTHERS. EVERY TIME, THE FAMILY PICKS ITSELF UP FROM ONE DISASTER, THE NEXT ONE STRIKES. AND WITH THE CYCLONES COME STORM SURGES THAT INUNDATE INNUMERABLE ISLANDS WITH SALT WATER. SHE DOESN'T KNOW WHEN THE WATERS WILL REACH HER HOME. BUT INSTINCTIVELY SHE KNOWS THAT IT WILL, SOMEDAY.

SHASHI IN A COLLEGE CLASSROOM...

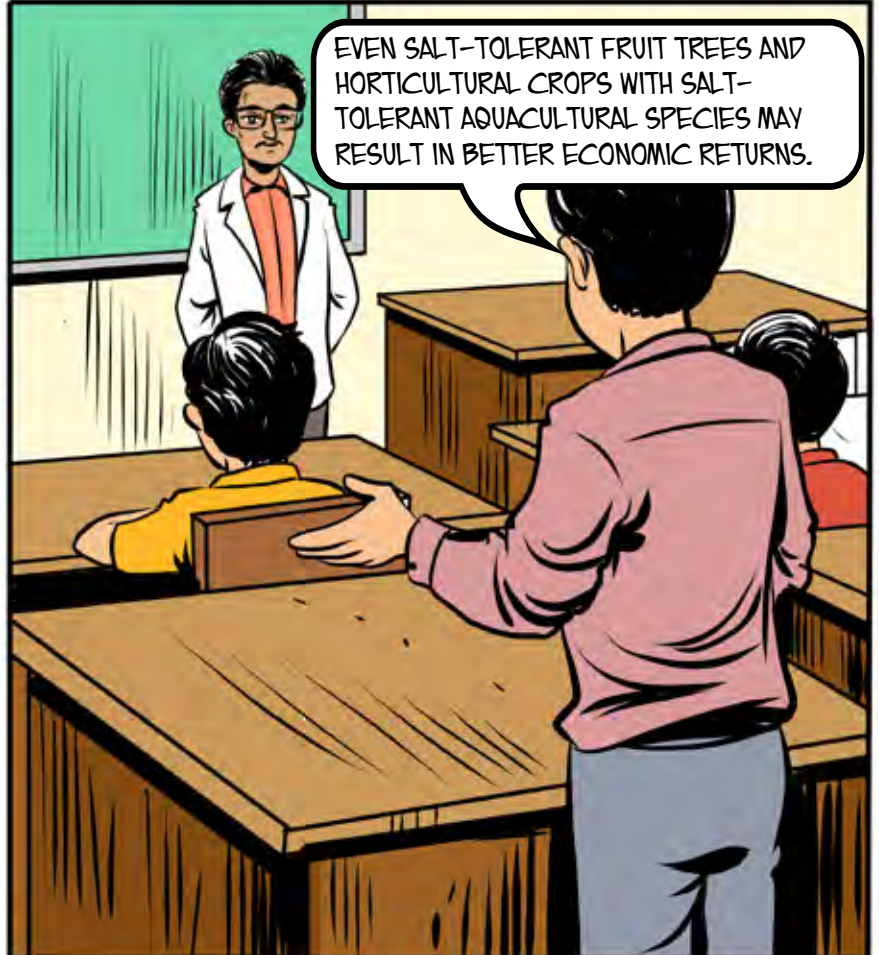
WE ARE EXPLORING MANY WAYS OF SAVING THE FISHING GROUNDS OF THE DELTA. ANY IDEAS?



SIR, WE COULD INTRODUCE SALT-TOLERANT SPECIES OF FISH IN THOSE AQUACULTURE PONDS THAT ARE PRONE TO SALT-WATER INUNDATION.



EVEN SALT-TOLERANT FRUIT TREES AND HORTICULTURAL CROPS WITH SALT-TOLERANT AQUACULTURAL SPECIES MAY RESULT IN BETTER ECONOMIC RETURNS.






THE WATER TRUCK IS LATE.

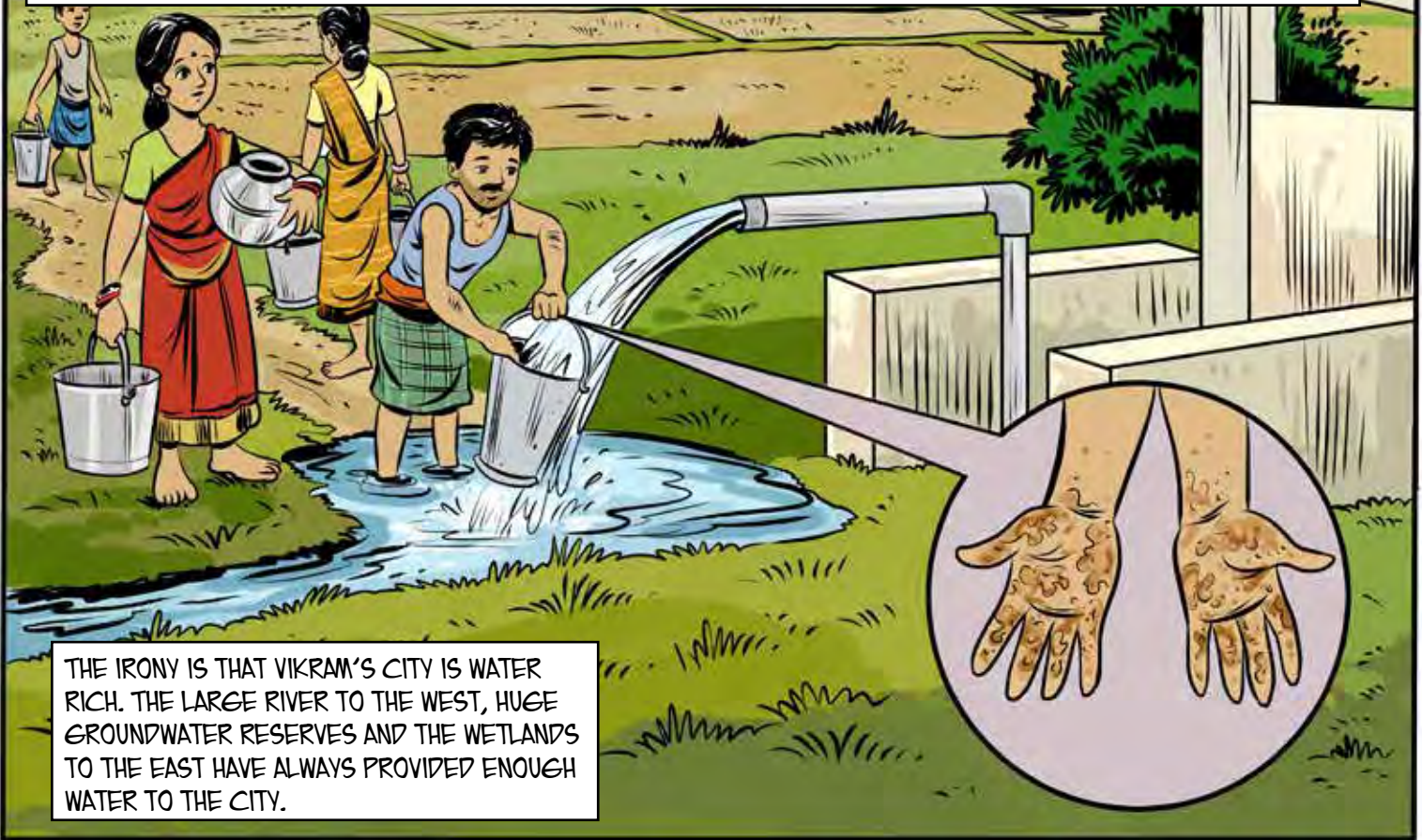


I NEED A BATH, MAMA.



THE ROADS ARE IN A SHAMBLES AFTER THE TORNADO. MAYBE THAT'S WHY THE TRUCK'S LATE.

VIKRAM LIVES IN AN AREA THAT HAS NO PIPED WATER. TILL RECENTLY, DEEP TUBE WELLS WERE THE ONLY SOURCE OF WATER. BUT INDISCRIMINATE DIGGING OF TUBE WELLS THREW UP WATER HIGHLY CONTAMINATED BY IRON AND ARSENIC. VIKRAM HAD THEN SWITCHED TO WATER TANKERS THAT USED TO VISIT HIS HOME AND OTHER HOUSES IN THE NEIGHBOURHOOD IN THE MORNING.



THE IRONY IS THAT VIKRAM'S CITY IS WATER RICH. THE LARGE RIVER TO THE WEST, HUGE GROUNDWATER RESERVES AND THE WETLANDS TO THE EAST HAVE ALWAYS PROVIDED ENOUGH WATER TO THE CITY.



THE UNPLANNED EXPANSION OF THE CITY HAS MEANT THAT THOSE AREAS WITHOUT MUNICIPAL PIPELINES HAVE BEEN DRAWING WATER FROM UNDERGROUND SOURCES WITHOUT RESTRICTION. AS A RESULT, THE WATER TABLE HAS DROPPED FROM SEVEN METRES TO 12 METRES. NEW STUDIES HAVE SHOWN ANOTHER ALARMING CONSEQUENCE OF ALL THIS: THE CITY IS SLOWLY SINKING AND MAJOR SUBSIDENCE IN DENSELY POPULATED AREAS IS A DISTINCT POSSIBILITY.



VIKRAM IS BACK HOME.



NO WATER AND NO ELECTRICITY!



PAPA, WHY DON'T WE HARVEST RAINWATER?



HOW DO WE DO THAT?



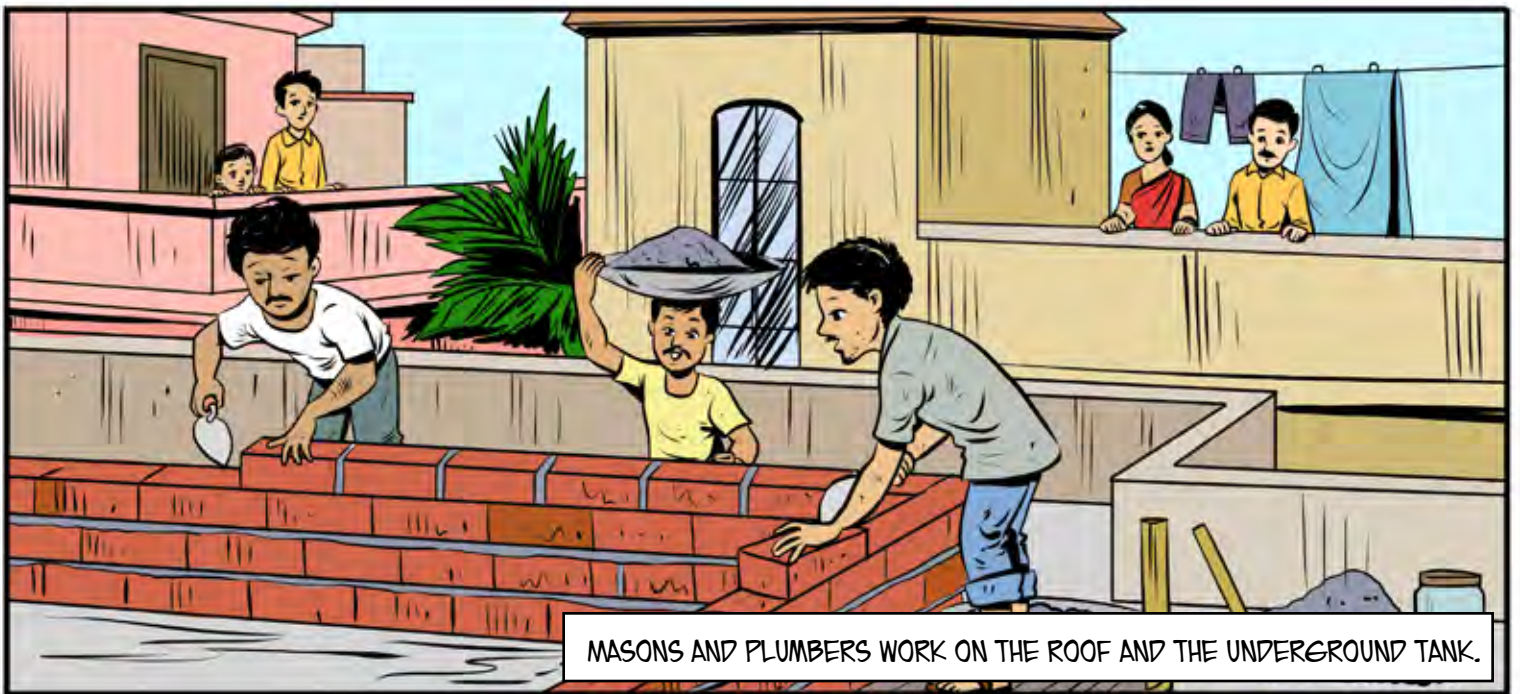
SIMPLE! LET ALL THE RAINWATER ON THE ROOF FLOW DOWN INTO AN UNDERGROUND TANK.



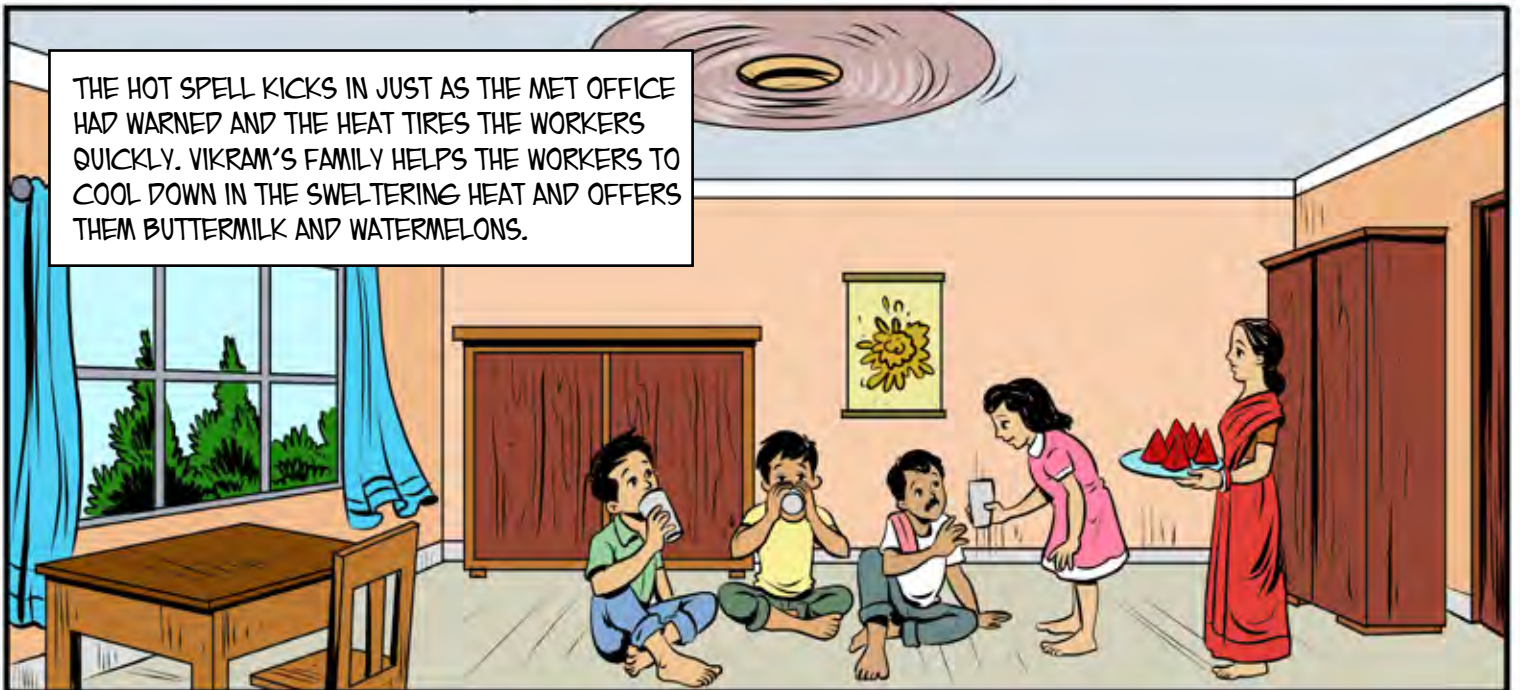
BUT IT'LL BE DIRTY WATER.



WE CAN USE FILTERS TO CLEAN THE WATER.



MASONS AND PLUMBERS WORK ON THE ROOF AND THE UNDERGROUND TANK.



THE HOT SPELL KICKS IN JUST AS THE MET OFFICE HAD WARNED AND THE HEAT TIRES THE WORKERS QUICKLY. VIKRAM'S FAMILY HELPS THE WORKERS TO COOL DOWN IN THE SWELTERING HEAT AND OFFERS THEM BUTTERMILK AND WATERMELONS.



IN A FEW DAYS, THE RAINWATER HARVESTING SYSTEM IS READY.

OH, WHERE ARE THE
NORWESTERS?



AS IF IN ANSWER TO HER PRAYERS, THE SKY STARTS TO
DARKEN AND LARGE RAINDROPS THUD INTO THE GROUND.



THE WIND PICKS UP AND THE TREES START SWAYING.
AND THEN, THE HEAVENS OPEN UP.

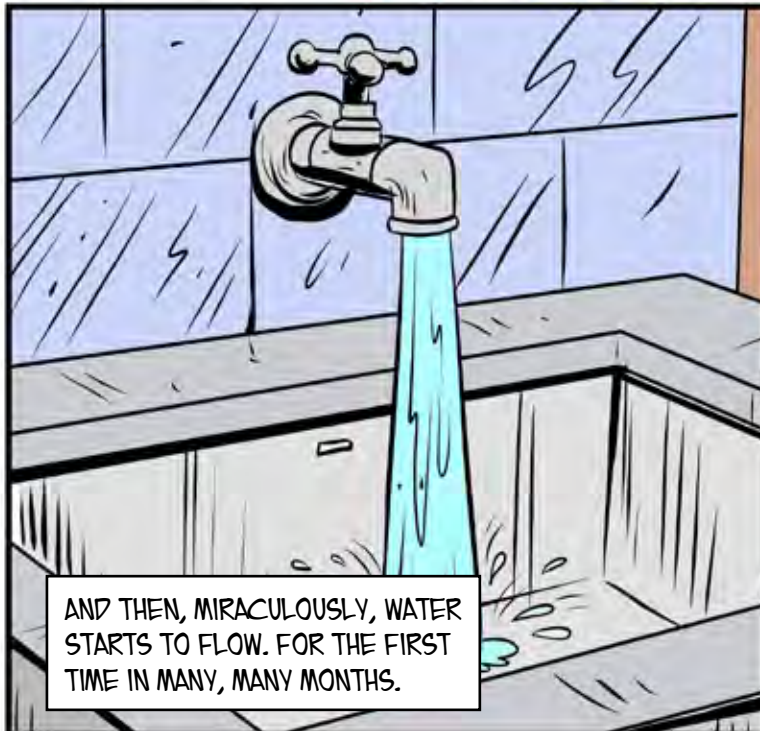
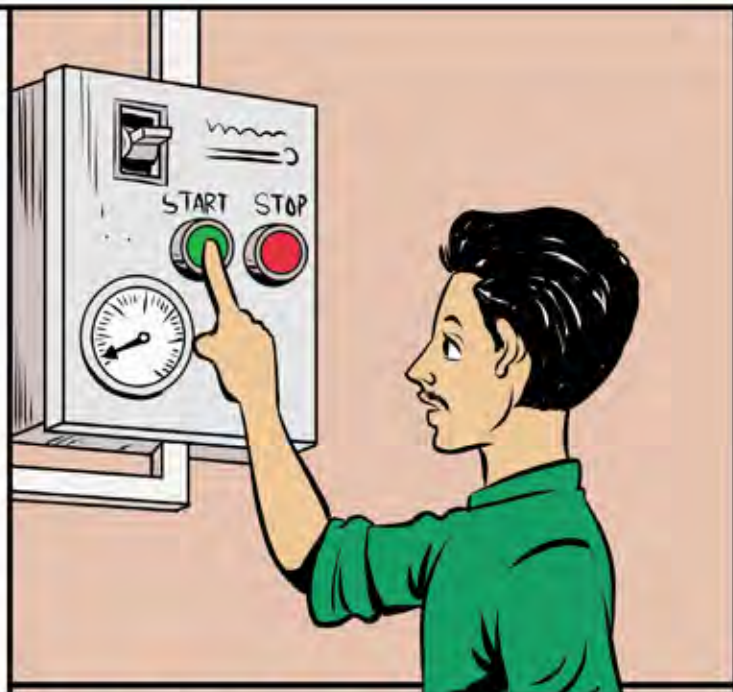
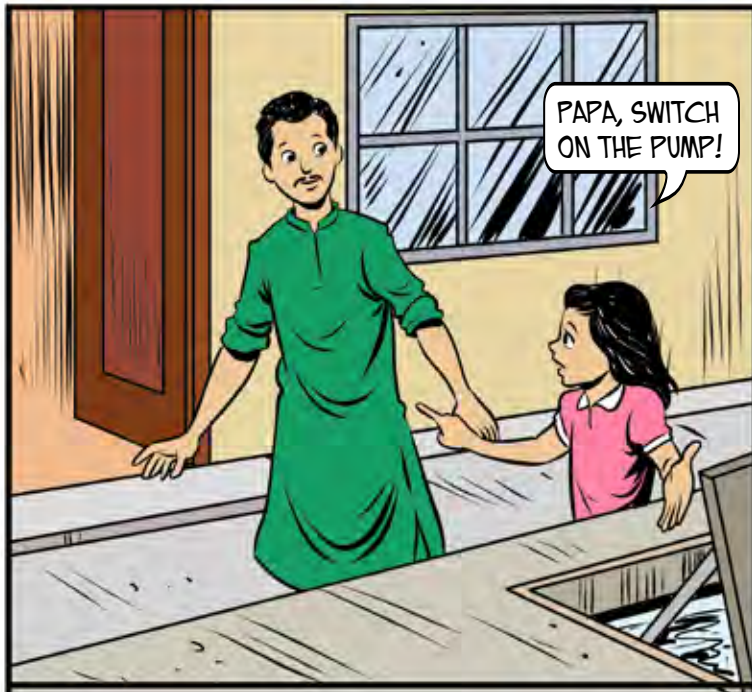


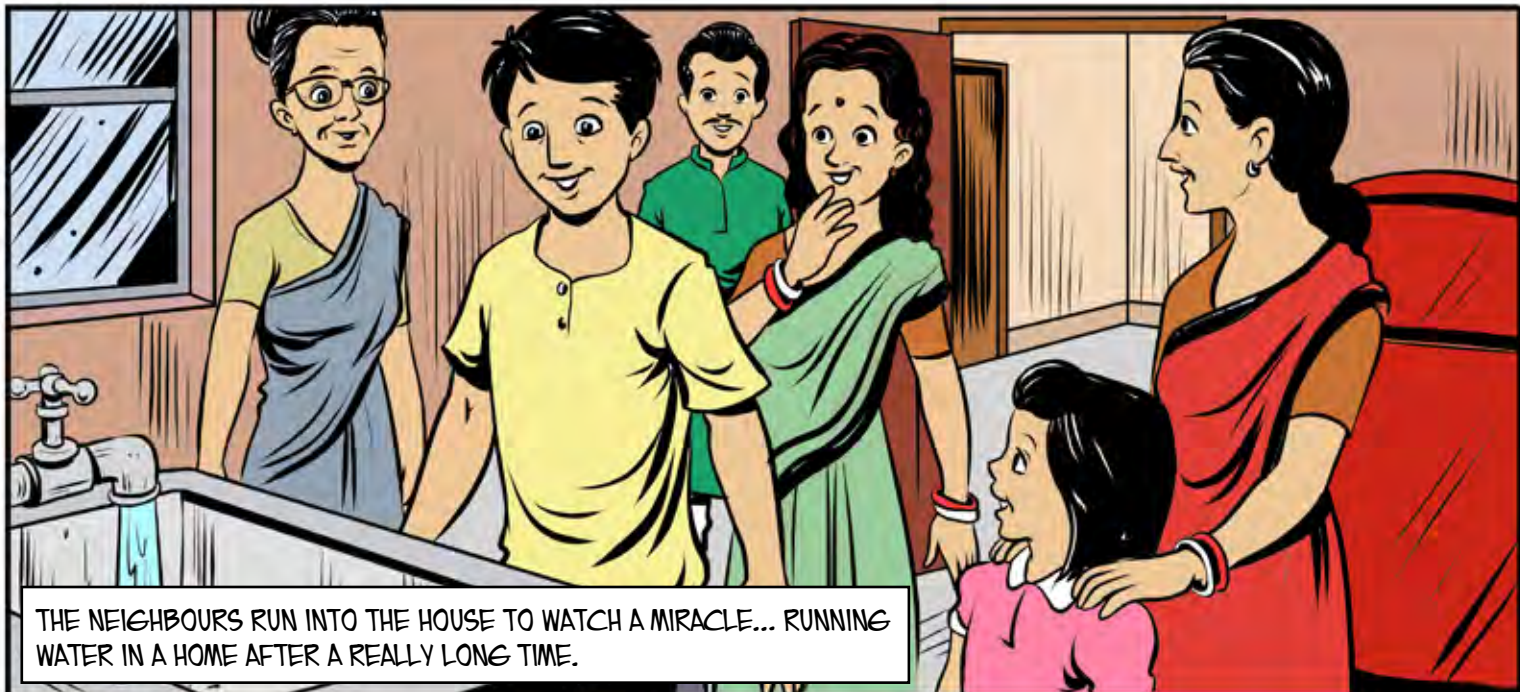
ANITA IS ECSTATIC.



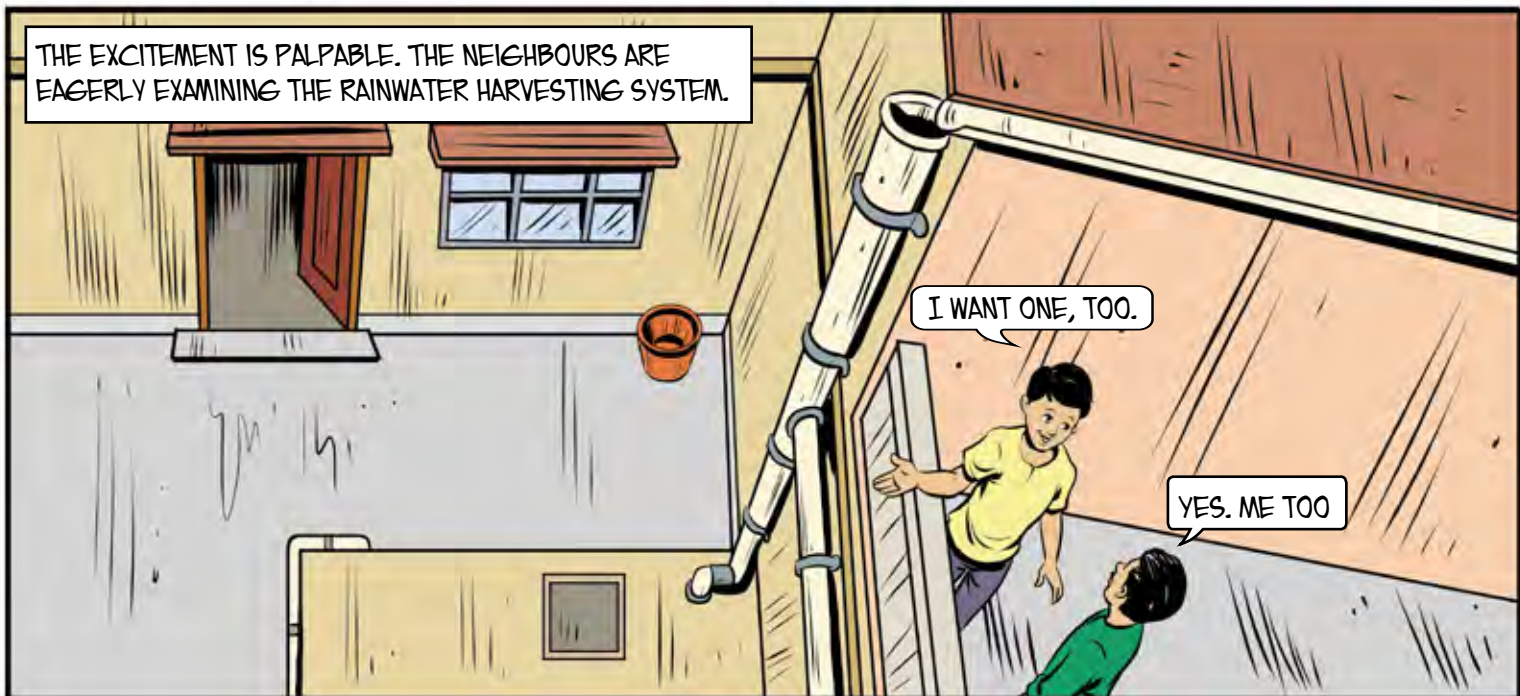
SHE CAN HEAR THE GURGLE OF WATER AS
THE TANK FILLS UP.







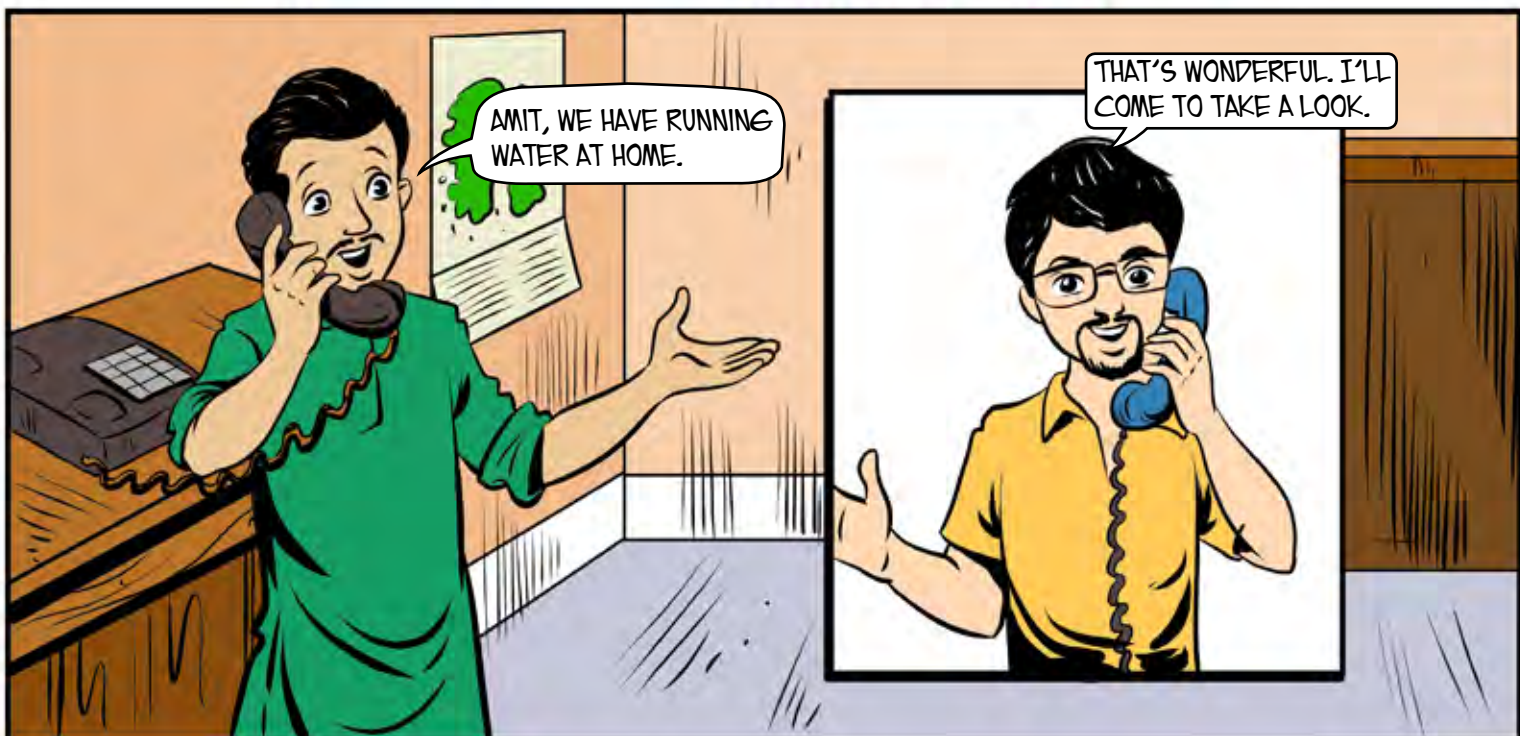
THE NEIGHBOURS RUN INTO THE HOUSE TO WATCH A MIRACLE... RUNNING WATER IN A HOME AFTER A REALLY LONG TIME.



THE EXCITEMENT IS PALPABLE. THE NEIGHBOURS ARE EAGERLY EXAMINING THE RAINWATER HARVESTING SYSTEM.

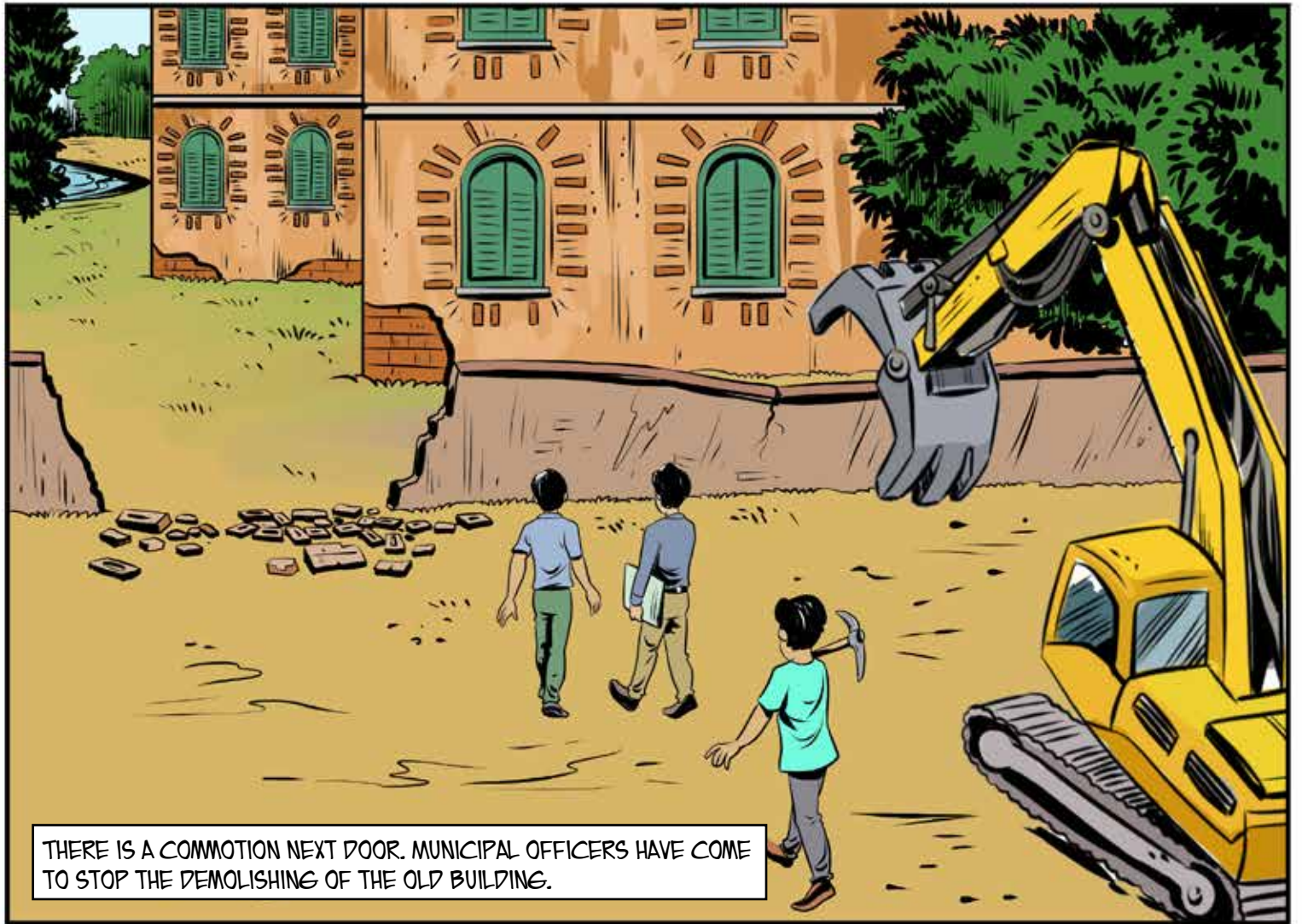
I WANT ONE, TOO.

YES. ME TOO



AMIT, WE HAVE RUNNING WATER AT HOME.

THAT'S WONDERFUL. I'LL COME TO TAKE A LOOK.



THERE IS A COMMOTION NEXT DOOR. MUNICIPAL OFFICERS HAVE COME TO STOP THE DEMOLISHING OF THE OLD BUILDING.



QUARRELS BREAK OUT AND THE NEIGHBOURS JOIN IN TO SUPPORT THE OFFICIALS.



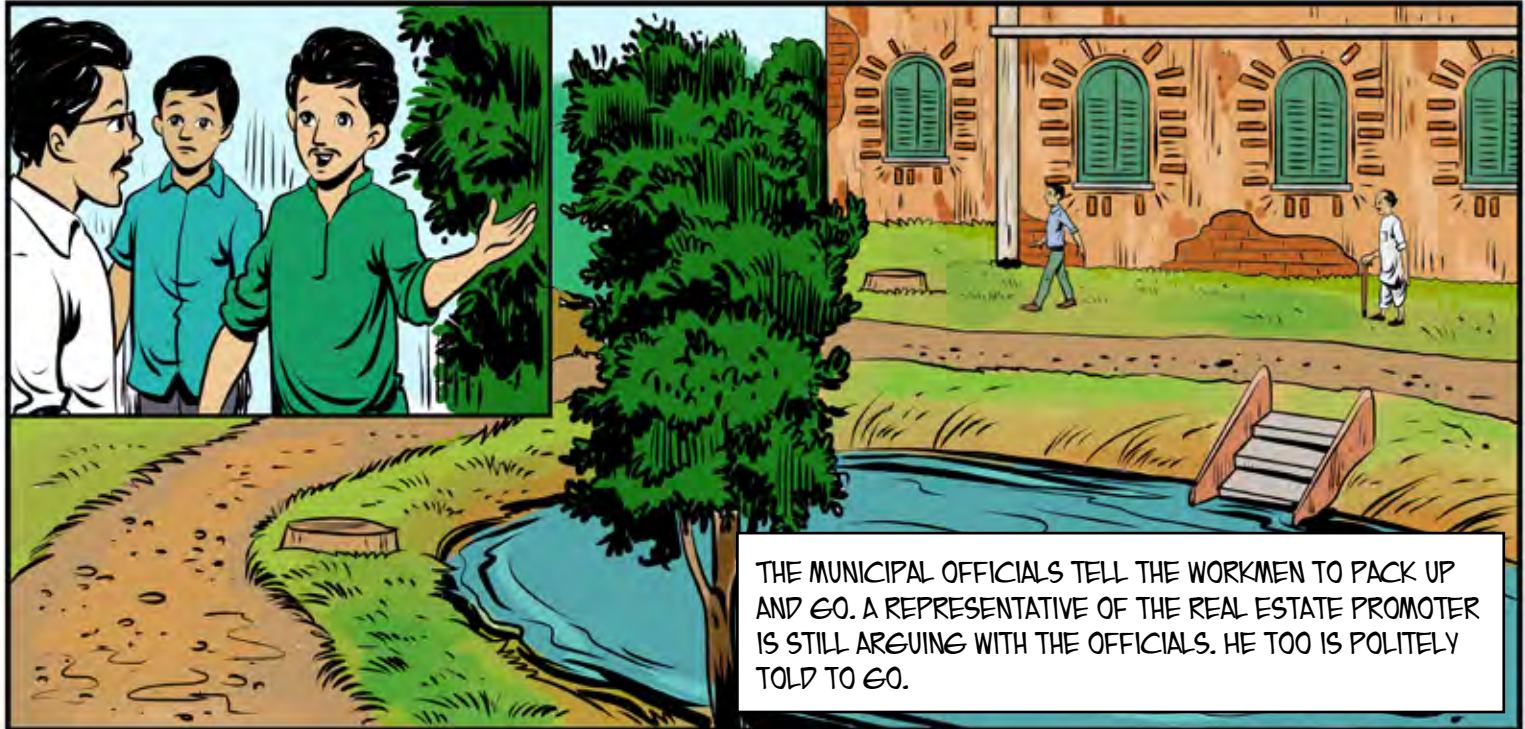
ANITA, THE COMPLAINT WORKED!



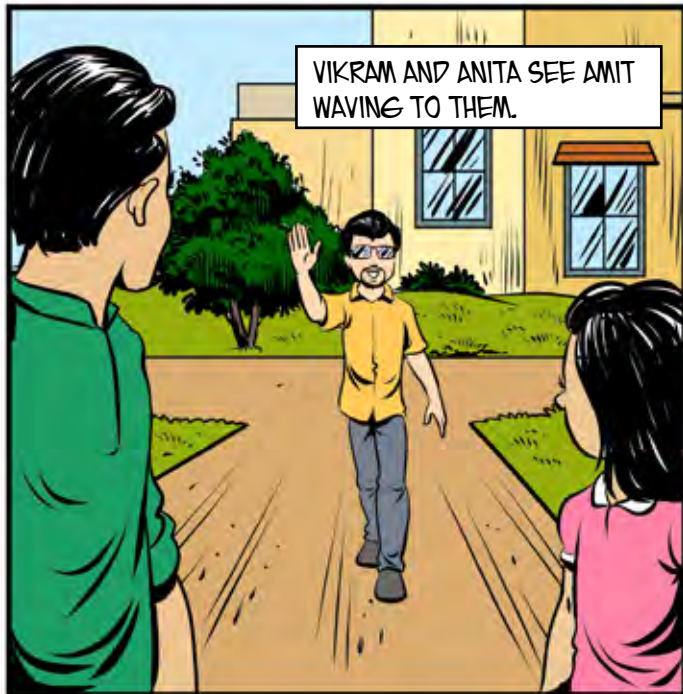
WE USE THE GROUNDS FOR MORNING WALKS. IT'S A LOVELY PLACE TO RELAX. DON'T ALLOW THEM TO DO THIS, SIR!



BUT, SIR...



THE MUNICIPAL OFFICIALS TELL THE WORKMEN TO PACK UP AND GO. A REPRESENTATIVE OF THE REAL ESTATE PROMOTER IS STILL ARGUING WITH THE OFFICIALS. HE TOO IS POLITELY TOLD TO GO.



VIKRAM AND ANITA SEE AMIT WAVING TO THEM.



HI, AMIT. WE WERE TRYING TO STOP THEM FROM DEMOLISHING THE BUILDING AND CUTTING DOWN THE TREES.



GOOD JOB!



THE PRESERVATION OF HERITAGE BUILDINGS IS AN IMPORTANT PART OF OUR CULTURAL HERITAGE.

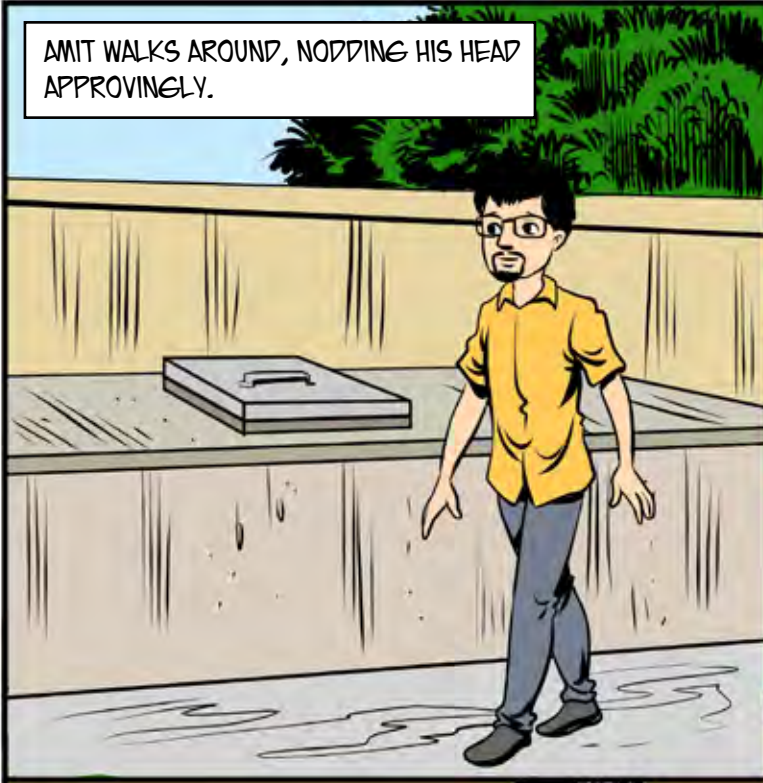


WITHOUT THE OPEN, GREEN SPACES, THESE HERITAGE BUILDINGS WOULD LOSE ALL THEIR BEAUTY.



LET'S TAKE A LOOK AT MY RAINWATER MARVEL.

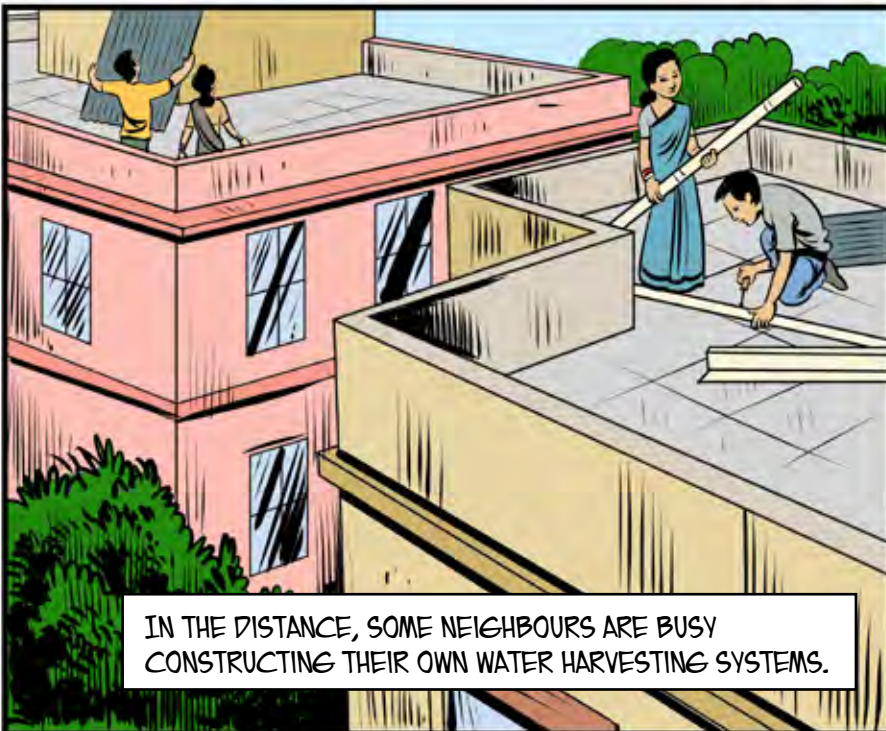
AMIT WALKS AROUND, NODDING HIS HEAD APPROVINGLY.



VIKRAM, YOU'VE DONE A GREAT JOB.



I HAVE AN IDEA. WANT TO KNOW WHAT IT IS?



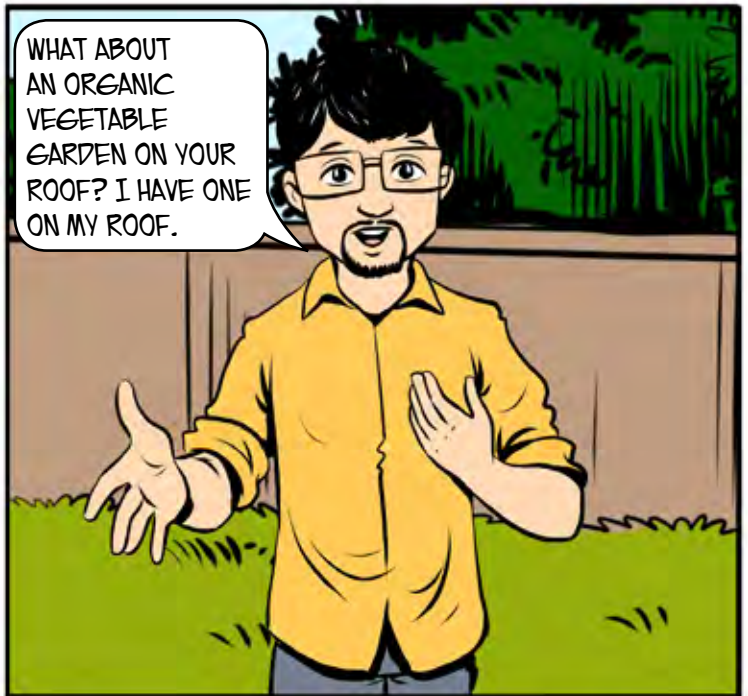
IN THE DISTANCE, SOME NEIGHBOURS ARE BUSY CONSTRUCTING THEIR OWN WATER HARVESTING SYSTEMS.

VIKRAM, DO YOU HAVE GREEN FINGERS?





I LOVE PLANTS. BUT GROWING THEM...?



WHAT ABOUT AN ORGANIC VEGETABLE GARDEN ON YOUR ROOF? I HAVE ONE ON MY ROOF.



THAT'LL NEED A LOT OF WATER!



NO, IT WON'T. YOU WON'T NEED SOIL.



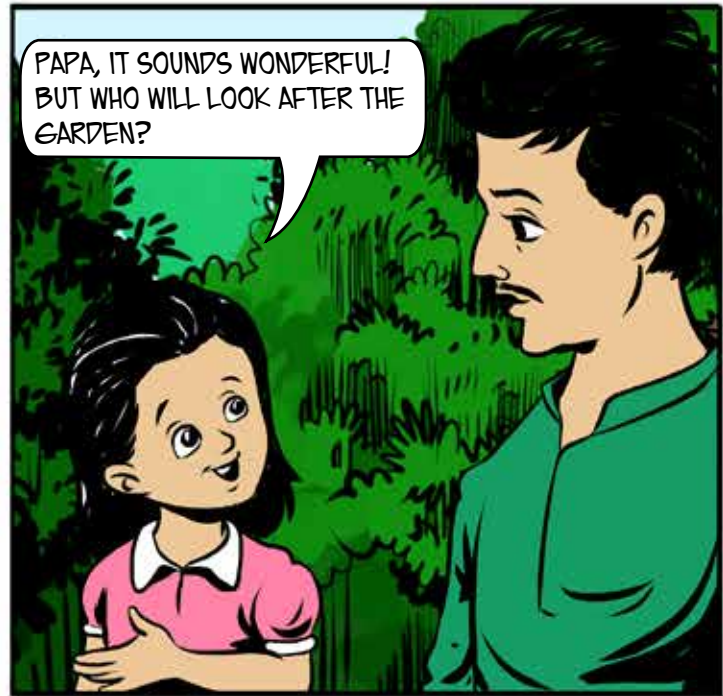
WITHOUT SOIL?!



YES. USE COCO PEAT AND SOME NATURAL FERTILIZER THAT WILL COME FROM YOUR KITCHEN WASTE.



YOU CAN GROW ALL KINDS OF VEGETABLES... TOMATOES, CUCUMBERS, BEANS, CARROTS, LETTUCE, BRINJALS...



PAPA, IT SOUNDS WONDERFUL! BUT WHO WILL LOOK AFTER THE GARDEN?



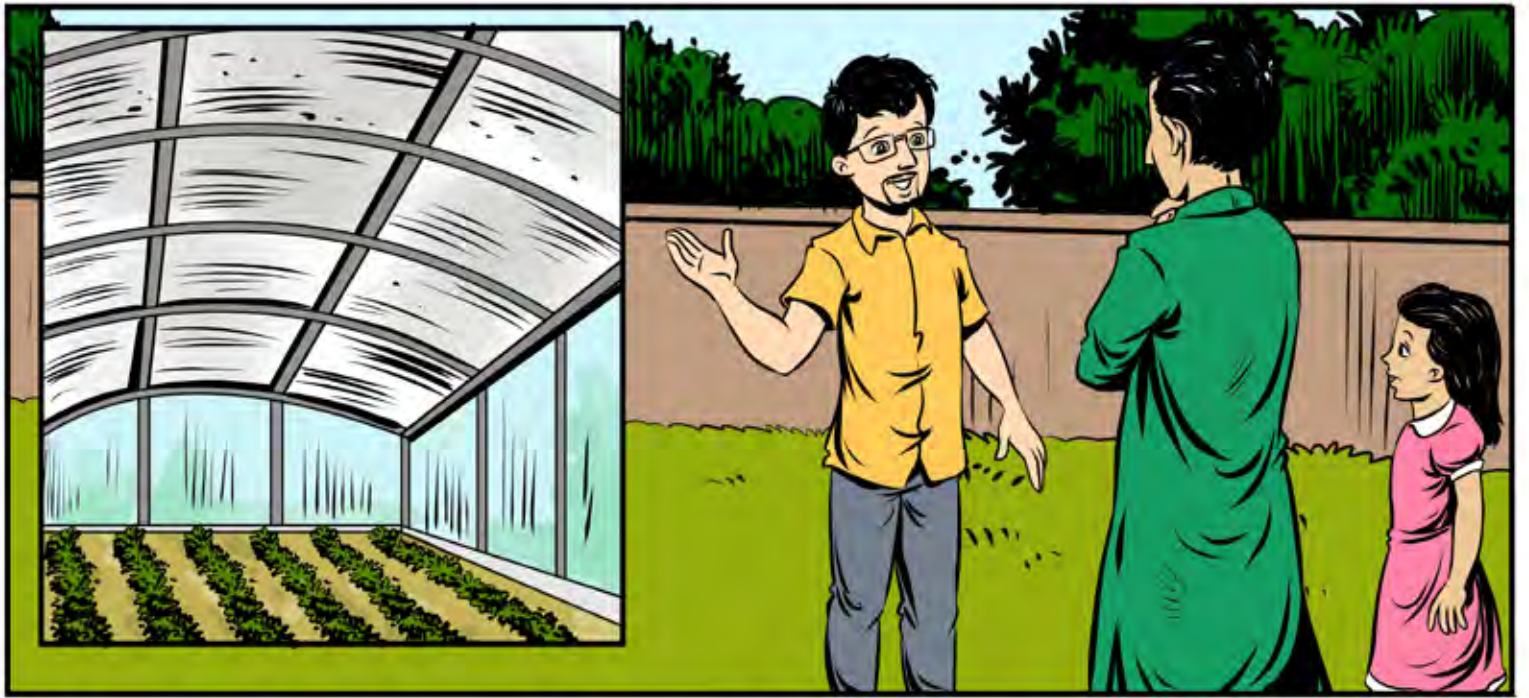
IT DOESN'T NEED MUCH LOOKING AFTER. ONCE YOU GET THE POTTING MIX READY, ALL YOU NEED TO DO IS TO WATER THEM REGULARLY AND WATCH OUT FOR PEST ATTACKS.



IN A WEEK'S TIME, I'LL BRING THE BASKETS, THE POTTING MIX, THE SAPLINGS AND SEEDS AND NATURAL PEST CONTROL INGREDIENTS.



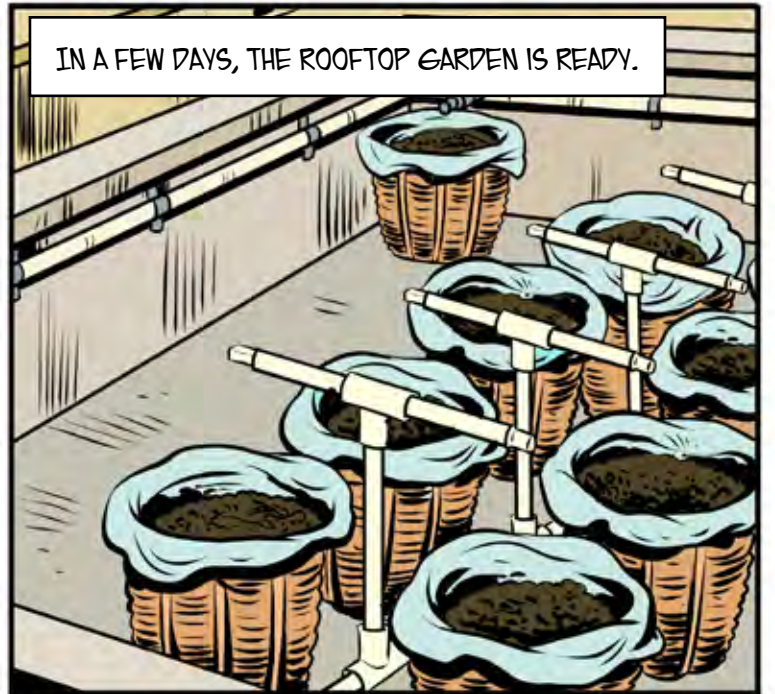
WE WILL HAVE TO BUILD A RUDIMENTARY GREENHOUSE TO PROTECT THE PLANTS FROM DIRECT SUNLIGHT AND RAIN.



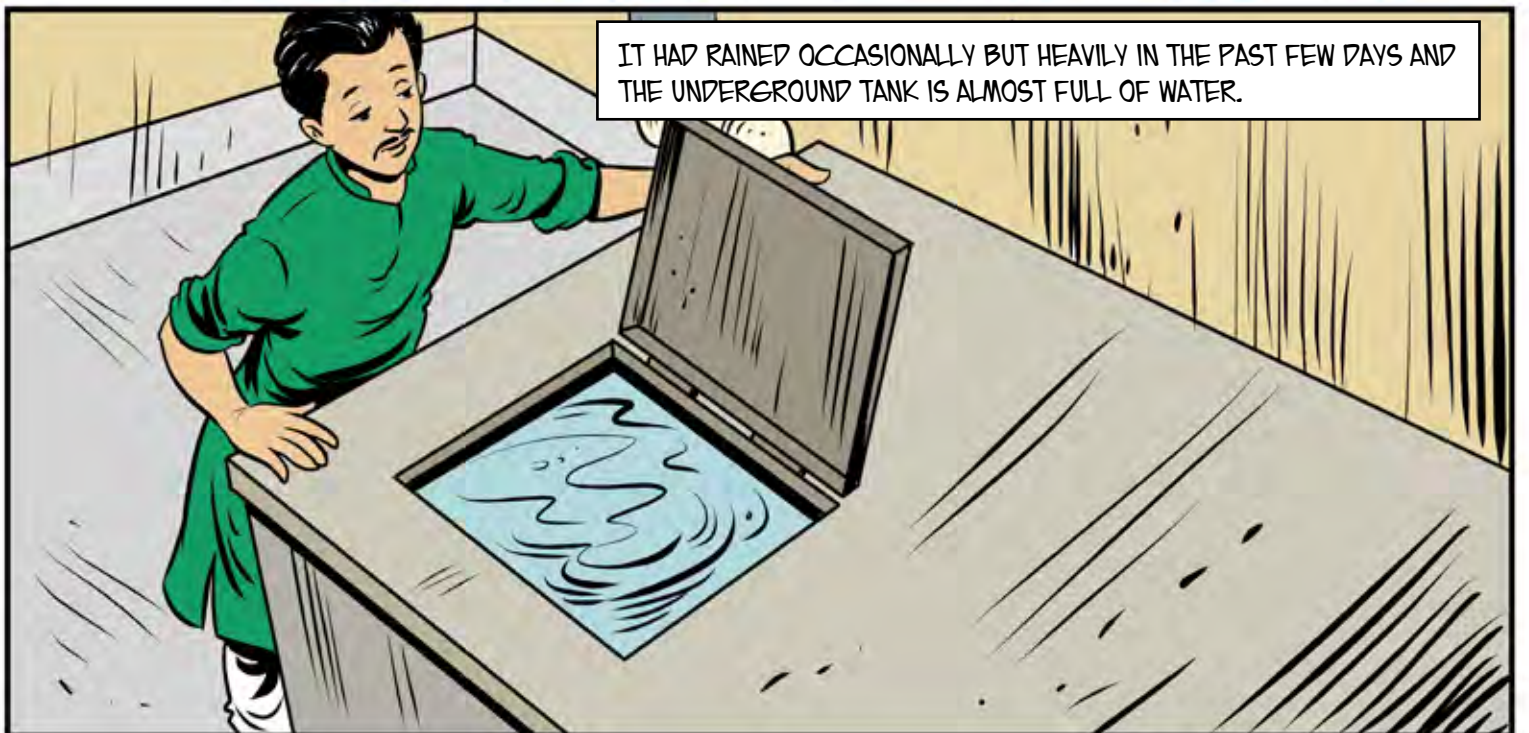
AFTER A WEEK, WORKERS BUILD THE GARDEN WHILE AMIT SUPERVISES THEM.



IN A FEW DAYS, THE ROOFTOP GARDEN IS READY.



IT HAD RAINED OCCASIONALLY BUT HEAVILY IN THE PAST FEW DAYS AND THE UNDERGROUND TANK IS ALMOST FULL OF WATER.



VIKRAM GETS UP EARLY EVERY MORNING TO WATER THE PLANTS.



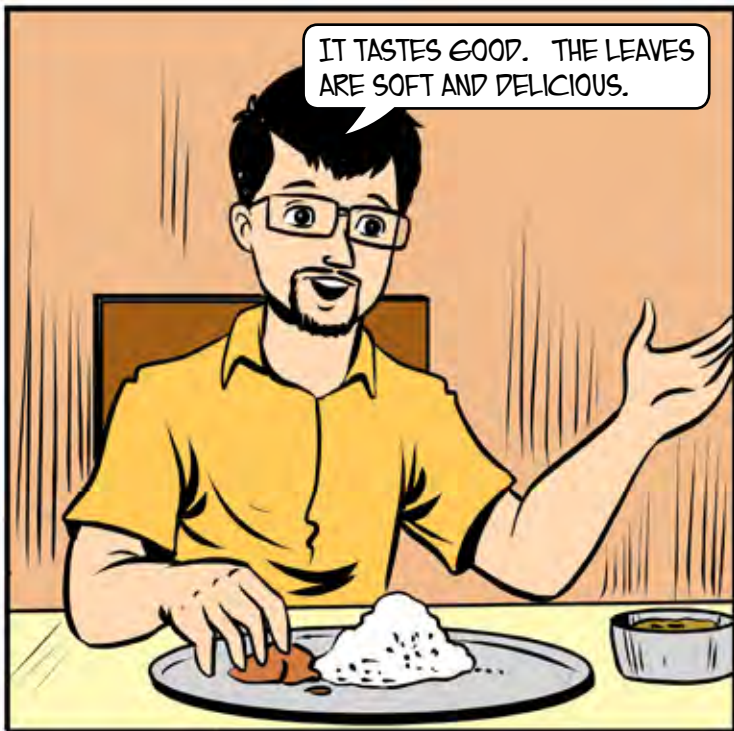
IN ABOUT A MONTH, THE FIRST SPINACH AND LETTUCE LEAVES ARE OUT.



THE FAMILY AND AMIT GATHER AROUND THE DINNER TABLE TO TASTE THEM.



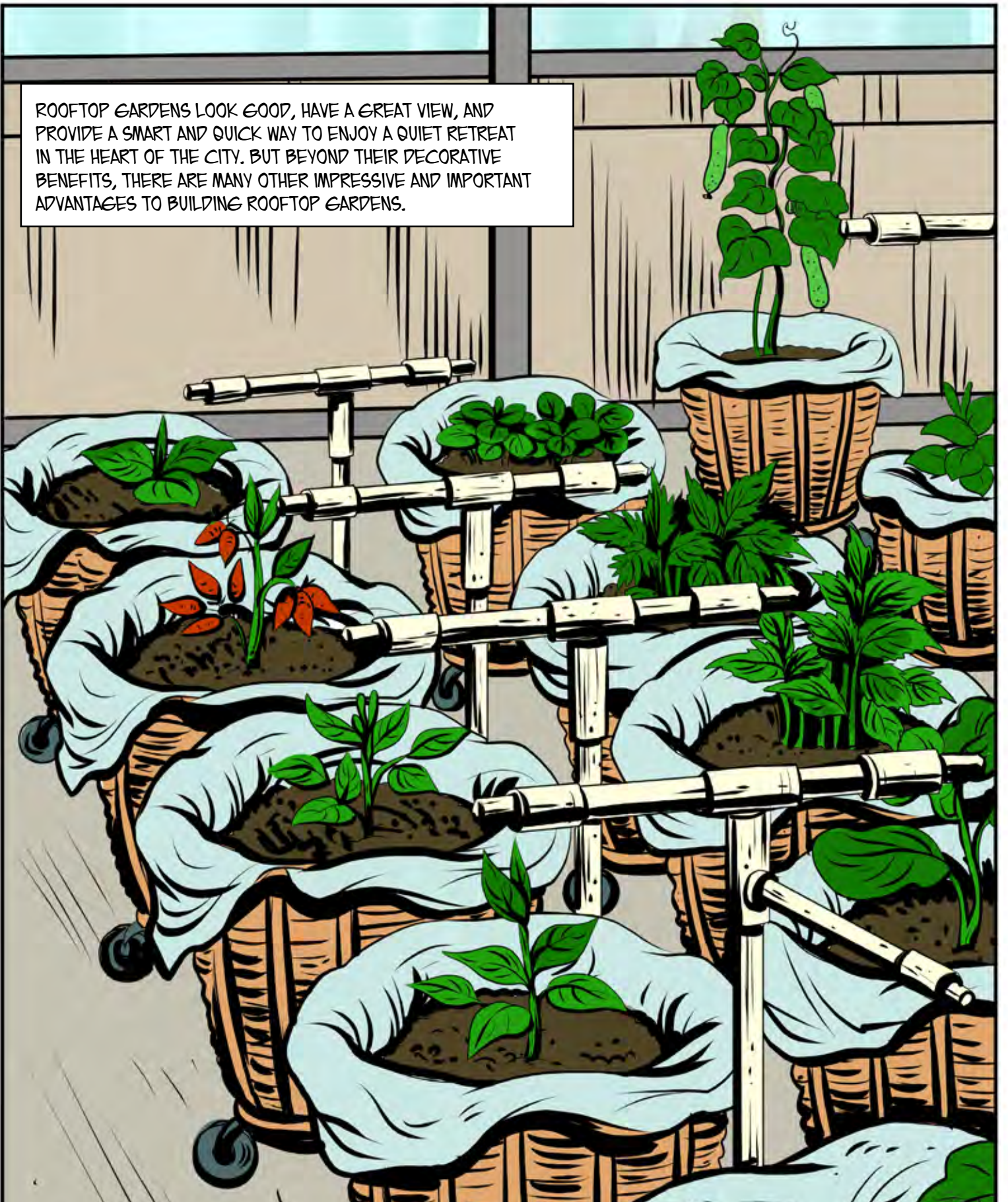
IT TASTES GOOD. THE LEAVES ARE SOFT AND DELICIOUS.



ORGANIC LETTUCE. THAT'S WHY IT IS SO DELICIOUS.



ROOFTOP GARDENS LOOK GOOD, HAVE A GREAT VIEW, AND PROVIDE A SMART AND QUICK WAY TO ENJOY A QUIET RETREAT IN THE HEART OF THE CITY. BUT BEYOND THEIR DECORATIVE BENEFITS, THERE ARE MANY OTHER IMPRESSIVE AND IMPORTANT ADVANTAGES TO BUILDING ROOFTOP GARDENS.



ROOFTOP VEGETABLE GARDENS HELP TO IMPROVE AIR QUALITY; DECREASE THE USE OF AIR-CONDITIONING; MAKE BETTER USE OF RAINWATER; DECREASES THE URBAN HEAT ISLAND (UHI) EFFECT BECAUSE THROUGH THE DAILY EVAPORATION CYCLE, PLANTS ARE ABLE TO COOL DOWN ENTIRE CITIES, REDUCING THE UHI EFFECT; PRODUCE ORGANIC FOOD; PROVIDE BETTER INSULATION; AND ATTRACT BIRDS AND BEES WHICH IN TURN HELPS PLANT PROPAGATION.



VIKRAM, YOU NEED TO STEP UP YOUR GAME.



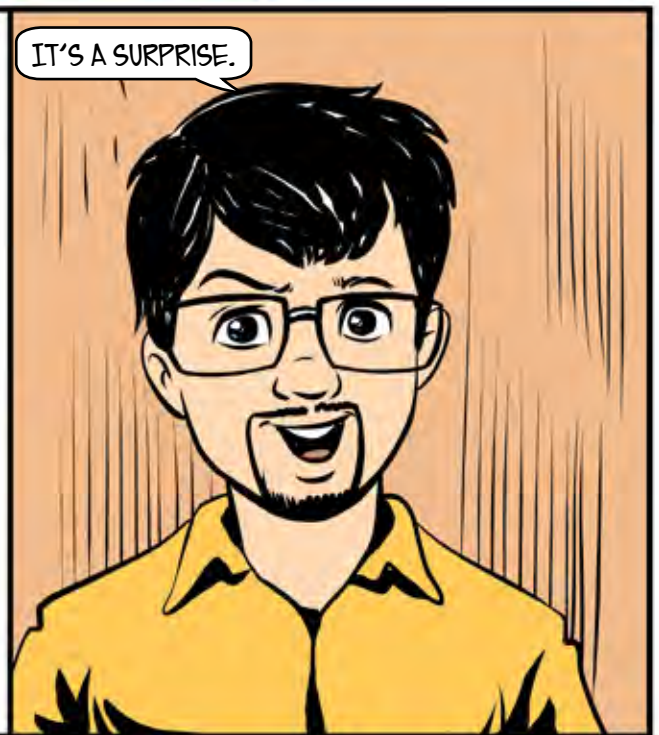
GAME?



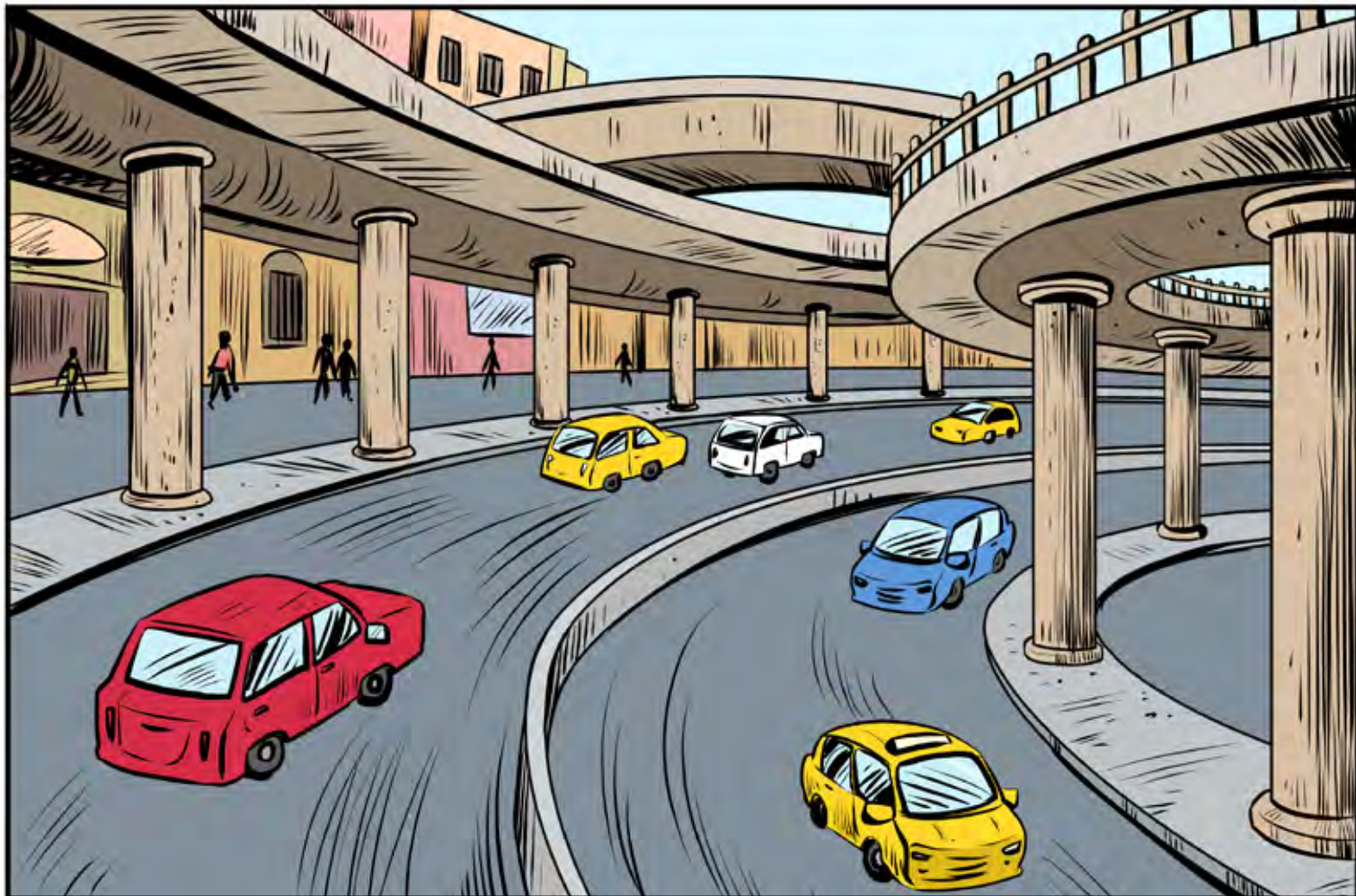
YES. I WOULD LIKE TO TAKE YOU FOR AN EXPERIMENT THAT WE ARE DOING NEAR MY HOUSE.



YOU AND WHO ELSE...?



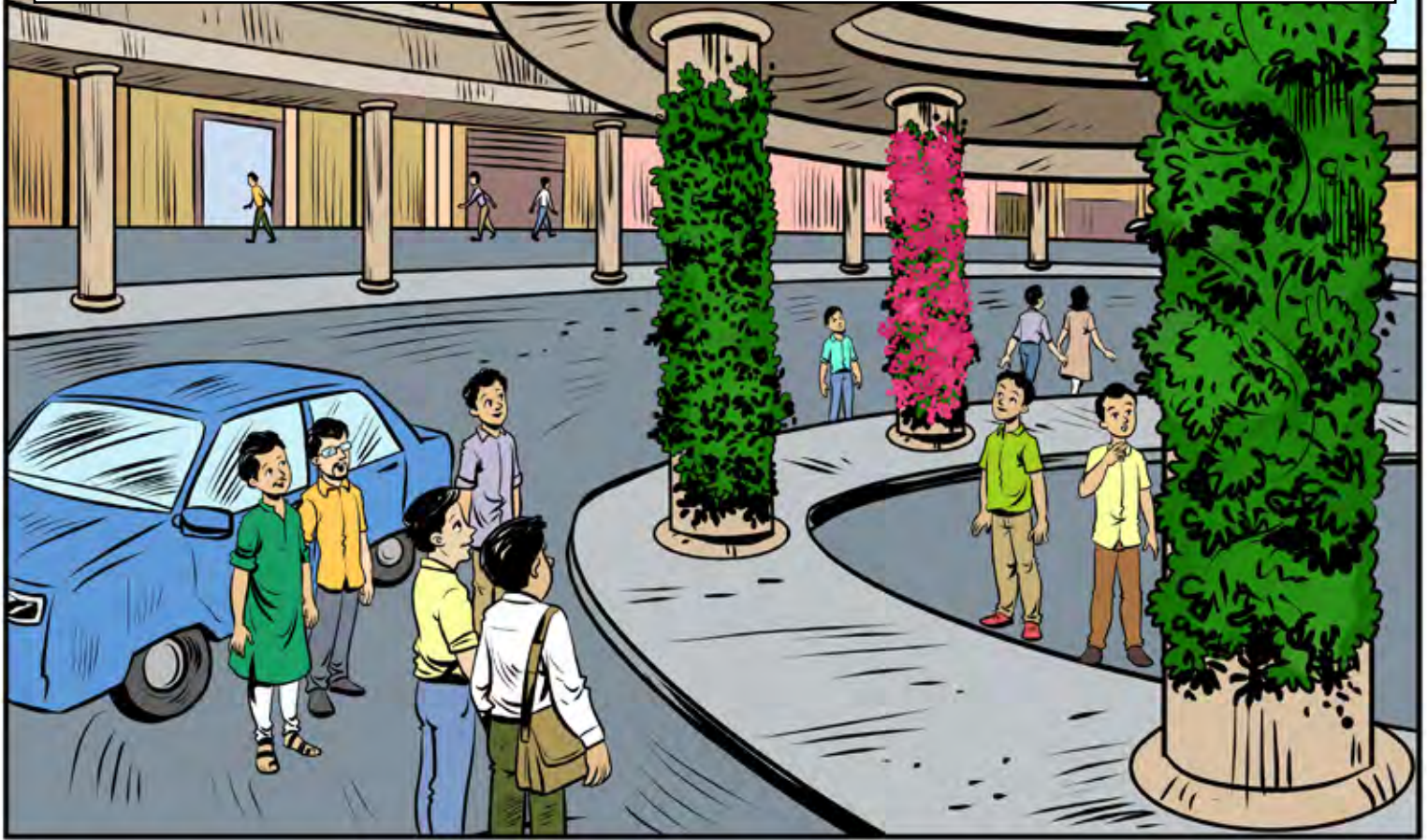
IT'S A SURPRISE.



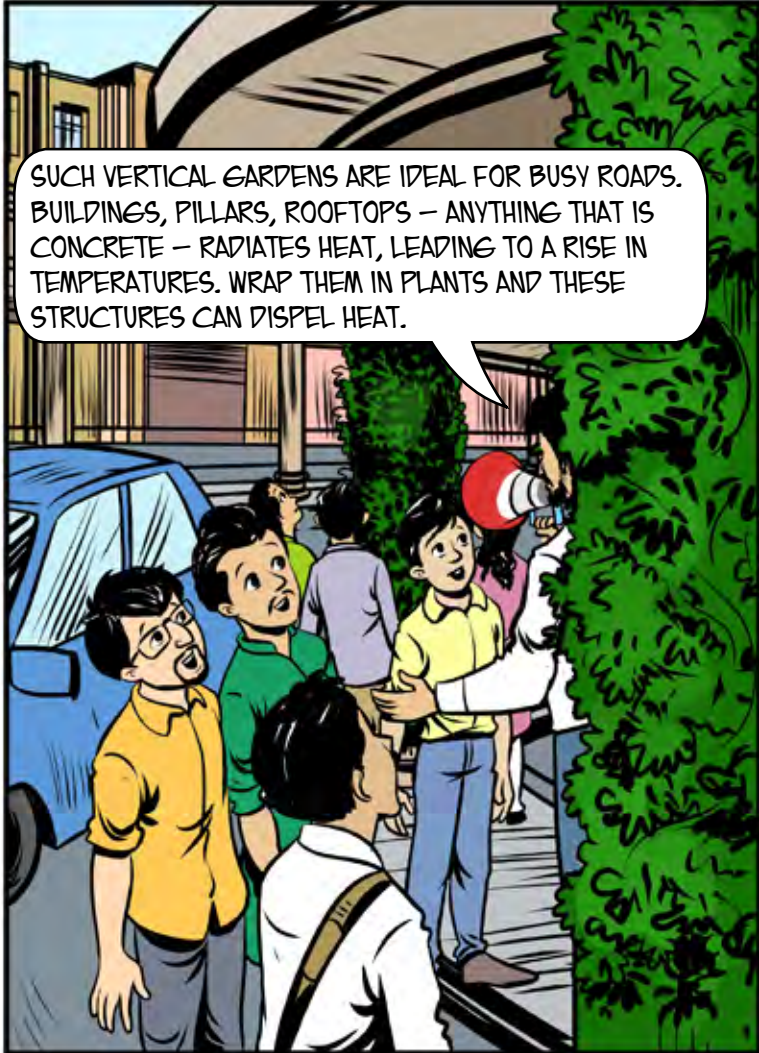
THE CITY IS ON A BUILDING SPREE. SIX LARGE FLYOVERS IN THREE YEARS. AND NINE MORE PLANNED. WITH THE UNDERGROUND RAILWAY SYSTEM INCREASINGLY LOOKING FOR OVERLAND ROUTES, THE RAIL LINES SNAKE PAST ROADS OVERHEAD, THEIR HUGE PILLARS STRETCHING INTO THE DISTANCE LIKE A LINE OF GIANT, UGLY FENCES.



VIKRAM LOOKS UP AND GASPS IN DISBELIEF. THE WHOLE PILLAR IS COVERED IN A RICH COATING OF CREEPERS. THE ADJOINING PILLAR HAS A LUSH COVERING OF BOUGAINVILLEA FLOWERS - PINK, MAGENTA AND PURPLE. AND THE PILLAR AFTER THAT. IT WENT ON AND ON:




SUCH VERTICAL GARDENS ARE IDEAL FOR BUSY ROADS. BUILDINGS, PILLARS, ROOFTOPS - ANYTHING THAT IS CONCRETE - RADIATES HEAT, LEADING TO A RISE IN TEMPERATURES. WRAP THEM IN PLANTS AND THESE STRUCTURES CAN DISPEL HEAT.



...THESE PLANTS ARE GOING TO MAKE OUR LIVES EASIER. YOU CAN SEE THE RESULTS. CITIES HAVE THE POWER TO CHANGE THE WORLD...

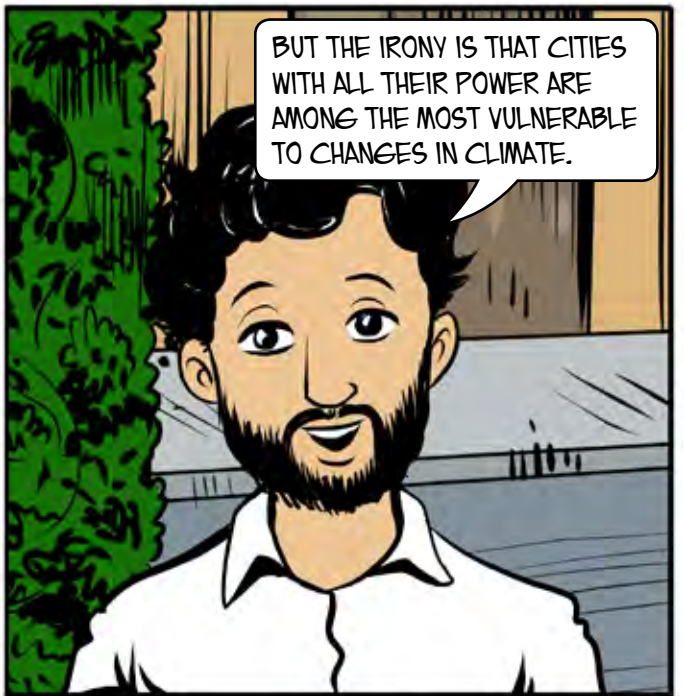





YOU WERE SAYING THAT CITIES HAVE THE POWER TO CHANGE THE WORLD AND LEAD THE FIGHT AGAINST CLIMATE CHANGE. WHY IS THAT?



CITIES ARE THE CENTRES OF COMMERCE, CULTURE AND INNOVATION. AT THIS CRITICAL JUNCTURE, WE NEED GREAT IDEAS. THAT CAN COME MOSTLY FROM THOSE WHO LIVE IN CITIES.



BUT THE IRONY IS THAT CITIES WITH ALL THEIR POWER ARE AMONG THE MOST VULNERABLE TO CHANGES IN CLIMATE.



I REALISED THAT AFTER THAT LAST MONTH'S TORNADO.



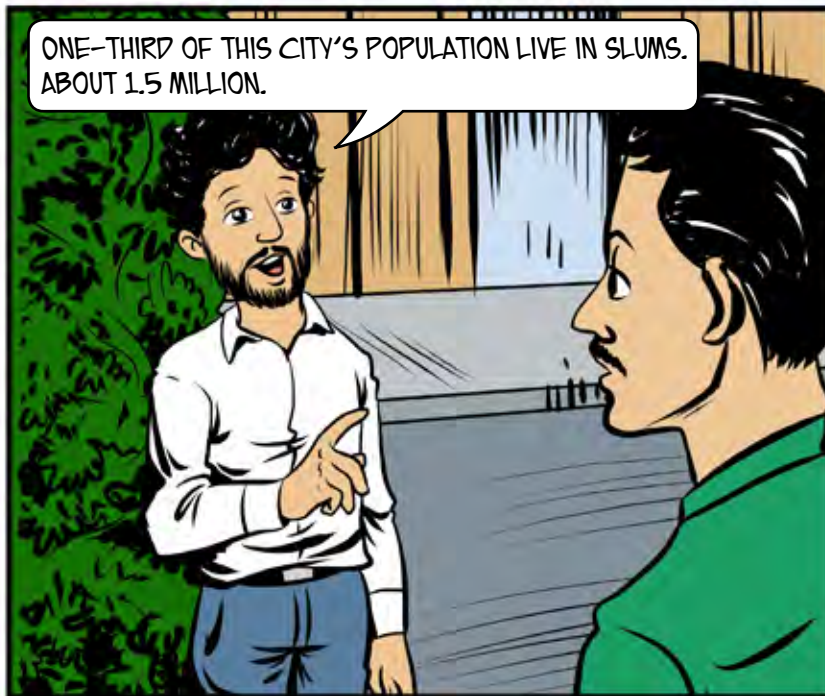
THE FINANCIAL DEVASTATION FROM SUDDEN NATURAL DISASTERS CAN BE EVEN MORE CRIPPLING.



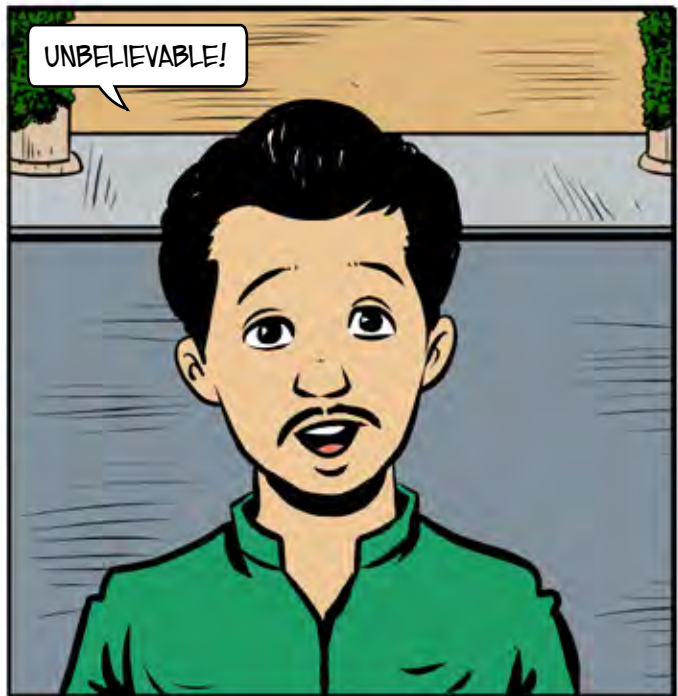
IN FACT, IT WILL BE THE POOR IN THE CITIES THAT WILL BE HIT THE HARDEST.



THE POOR LIVE IN AREAS AND IN CONDITIONS THAT ARE MOST VULNERABLE TO CLIMATE CHANGE.



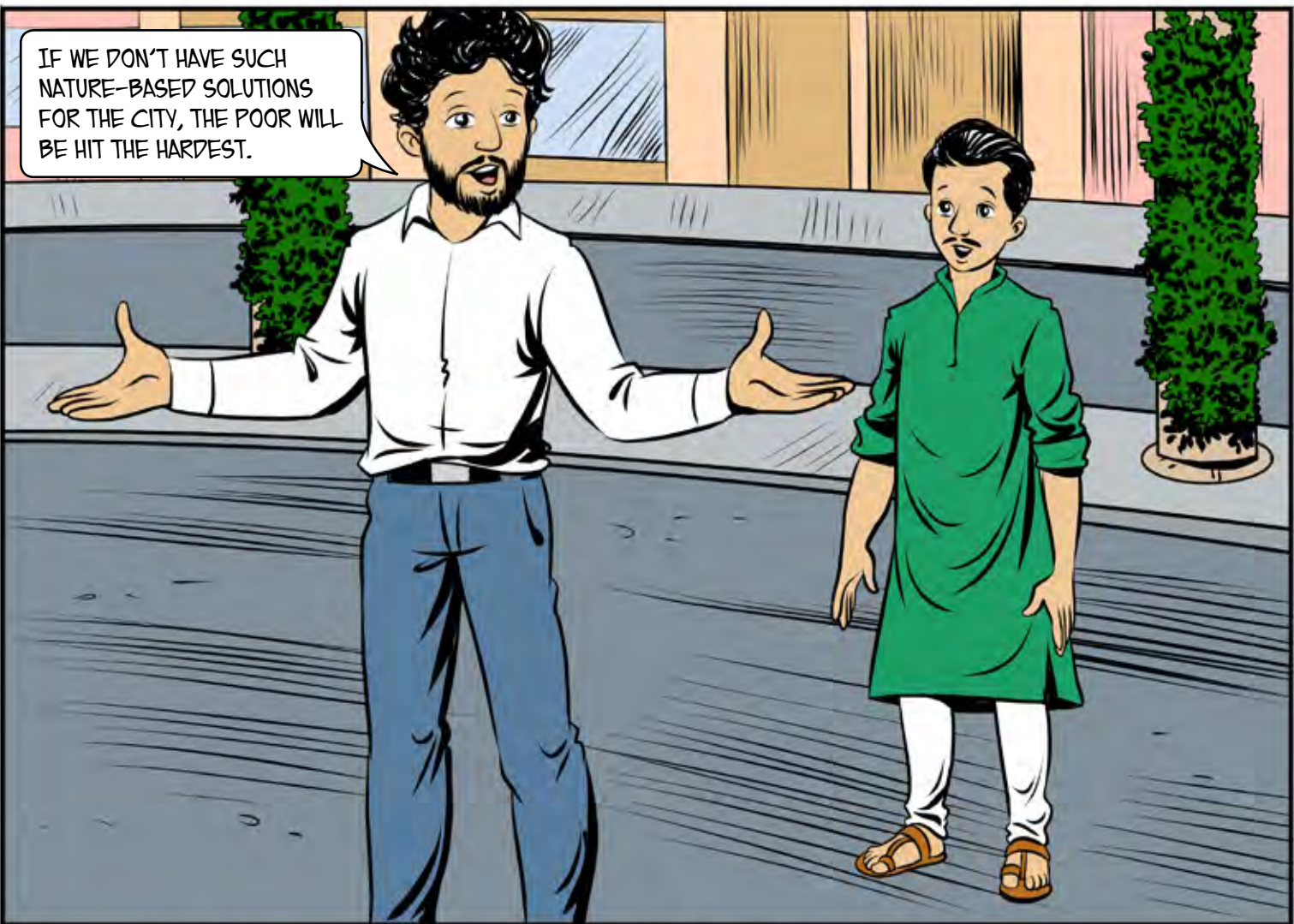
ONE-THIRD OF THIS CITY'S POPULATION LIVE IN SLUMS. ABOUT 1.5 MILLION.




UNBELIEVABLE!



THEY LIVE IN THE MOST POLLUTED AREAS OF THE CITY. WATER IS SCARCE. THE CONDITIONS ARE ABYSMAL AND ARE BREEDING GROUNDS FOR DISEASE.



IF WE DON'T HAVE SUCH NATURE-BASED SOLUTIONS FOR THE CITY, THE POOR WILL BE HIT THE HARDEST.



NATURE-BASED SOLUTIONS ARE LOW RISK, LOW MAINTENANCE AND LOW COST AND CAN MITIGATE MANY CLIMATE CHANGE-RELATED HAZARDS AND IMPACTS.



IT CAN HELP CITIES BECOME MORE RESILIENT TO CHANGING CLIMATE

AMIT MUST HAVE TOLD YOU ABOUT THE WETLANDS. THEIR ROLE BECOMES EVEN MORE CRITICAL IN TODAY'S CONTEXT WHEN THE CITY IS FACING THE CHALLENGE OF RAPID AND UNPLANNED URBANIZATION.'



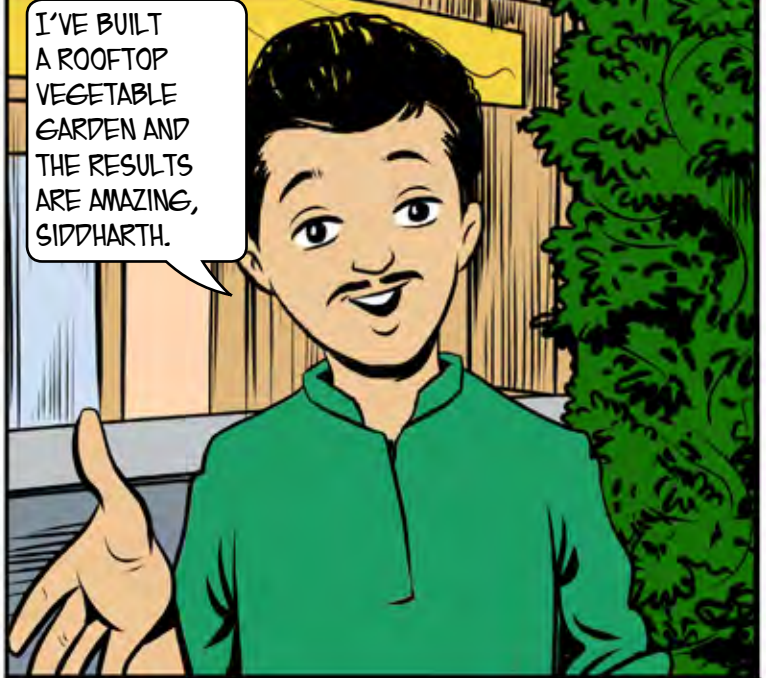
IF THEY COLLAPSE, THE PRICE WE MAY HAVE TO PAY WILL BE TOO ENORMOUS TO CALCULATE.



ADD TO THAT THE RESULTANT MIGRATION FROM THE WETLANDS TO THE CITY. THE SCENARIO IS TOO HORRIBLE TO IMAGINE.



I'VE BUILT A ROOFTOP VEGETABLE GARDEN AND THE RESULTS ARE AMAZING, SIDDHARTH.

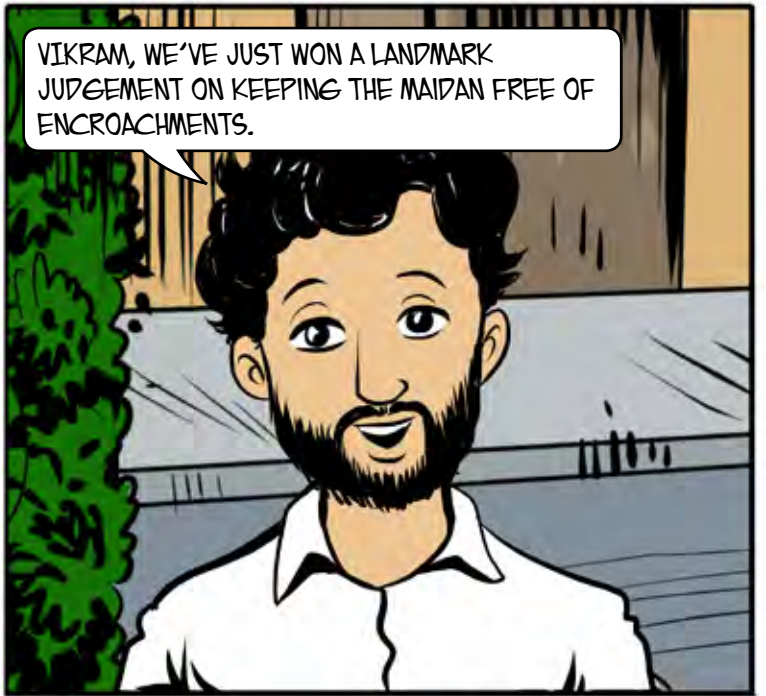


ARE YOUR NEIGHBOURS INTERESTED AFTER YOU BUILT IT?





YES, QUITE A FEW WANT TO BUILD THEM TOO.



VIKRAM, WE'VE JUST WON A LANDMARK JUDGEMENT ON KEEPING THE MAIDAN FREE OF ENCROACHMENTS.



THAT'S GREAT NEWS. SO, WHERE DOES THE BOOK FAIR GO?



THE GOVERNMENT WILL HELP THEM FIND AN ALTERNATIVE LOCATION.



THAT'S GOOD NEWS!



THE MAIDAN IN THE CENTRAL PART OF THE CITY IS A 400-HECTARE PARK THAT IS CALLED 'THE LUNGS OF THE CITY'. COMPRISING 60 PERCENT OF THE CITY'S GREEN SPACE, IT HAS BEEN UNDER THE CONTROL OF THE ARMY FOR A LONG TIME. THE VERY POPULAR ANNUAL BOOK FAIR THAT WAS HELD THERE LEFT THE GREEN CARPET OF GRASS MANGLED WITH CRATERS AND POLLUTED BY PLASTIC AND PAPER LITTER. NOBODY THOUGHT MUCH ABOUT TILL A TOUGH ACTIVIST TOOK UP ITS CAUSE. HE WENT TO COURT AND GOT THE BOOK FAIR TO RELOCATE TO ANOTHER PLACE. THE MAIDAN IS NOW FREE OF MAJOR LITTER AND DESTRUCTION. EVEN POLITICAL PARTIES USE THEIR WORKERS TO CLEAN UP THE PLACE AFTER THE OCCASIONAL RALLY.





I'M DEBU.



WHAT IS IT? I'M BUSY COOKING.



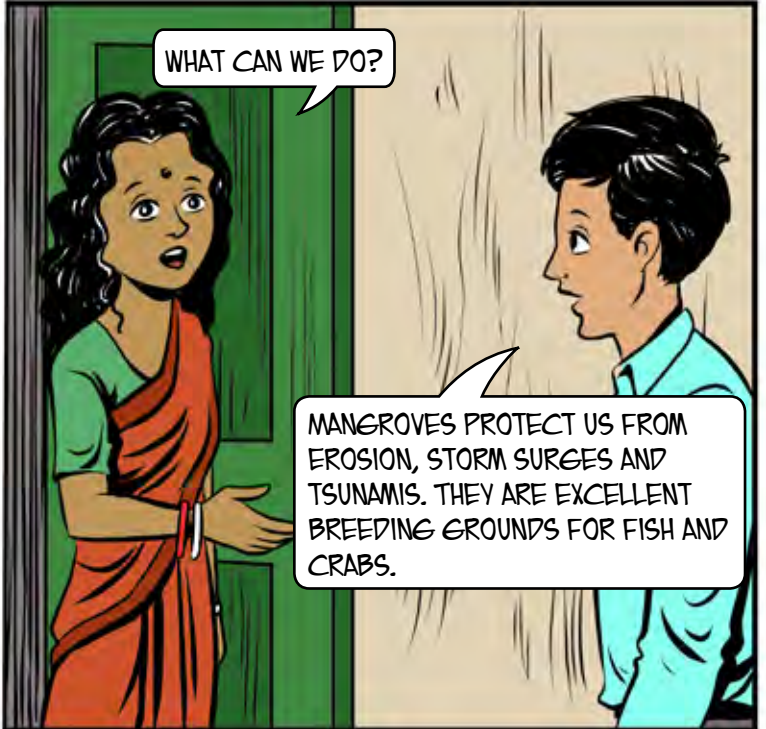
I'M SURE YOU KNOW WHAT IS HAPPENING TO OUR LANDS.



YES. BUT WE'RE HELPLESS.



NO, WE CAN DO SOMETHING. THE MANGROVE FORESTS ARE DISAPPEARING. I LOST MY HOME TO EROSION. OUR LANDS ARE GOING TO DISAPPEAR INTO THE SEA. OR A CYCLONE WILL KILL US.



WHAT CAN WE DO?

MANGROVES PROTECT US FROM EROSION, STORM SURGES AND TSUNAMIS. THEY ARE EXCELLENT BREEDING GROUNDS FOR FISH AND CRABS.

CLIMATE CHANGE IS TRIGGERING A SILENT YET DRASTIC CHANGE IN THE AGRICULTURAL FIELDS AND THE CREEKS AND RIVERS OF THE DELTAIC REGION. AS AGRICULTURE AND FISHING BECOME VERY DIFFICULT ON THE ISLANDS BATTERED BY EXTREME WEATHER EVENTS AND SALT WATER INGRESSION, A LARGE NUMBER OF FARMERS HAVE BECOME MIGRANT LABOURERS WORKING IN CONSTRUCTION PROJECTS OR NEARBY BRICK KILNS. VILLAGE AFTER VILLAGE HAVE VERY FEW MEN AND SO THE HARD WORK OF FISHING AND FARMING IS DONE BY WOMEN.



SOME 1.5 MILLION PEOPLE LIVE ON 53 ISLANDS IN THE DELTA REGION. THE SEAS AROUND THESE ISLANDS HAVE BEEN RISING FASTER THAN THE GLOBAL AVERAGE. SCIENTISTS HAVE FOUND THAT THE COASTLINE IS RETREATING AT ABOUT 600 FEET A YEAR. AS THE SEA ADVANCES, THOSE WHO LIVE ON THESE ISLANDS HAVE HAD TO RELOCATE, BUILD NEW HOUSES AND START THEIR LIVES ALL OVER AGAIN. MANY THOUSANDS HAVE HAD TO LEAVE AND FIND WORK IN THE BIG CITY.

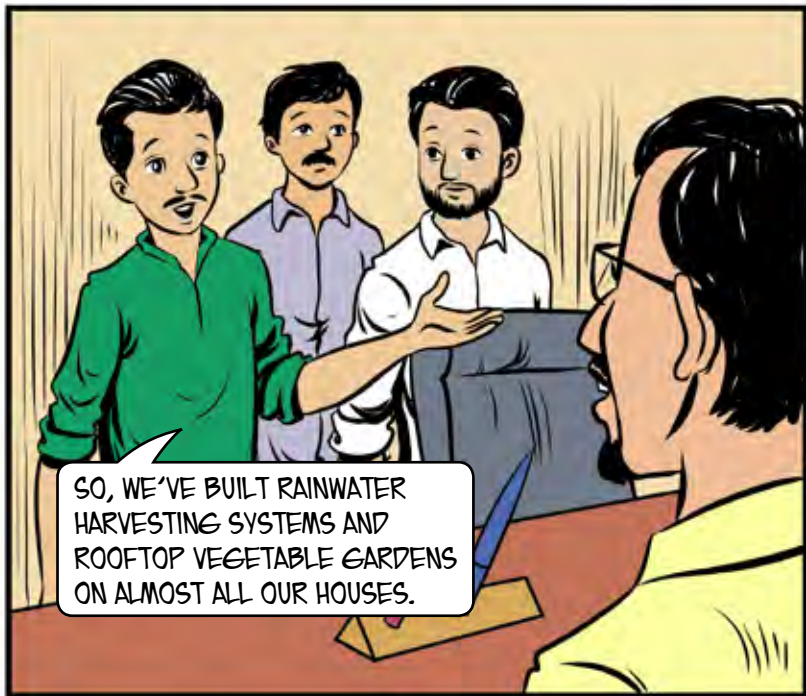
A MEETING AT THE COMMISSIONER'S OFFICE WITH AMIT, AND VIKRAM AND HIS NEIGHBOURS, AND OTHER CONCERNED CITIZENS IS ON.

MAY I HELP YOU?

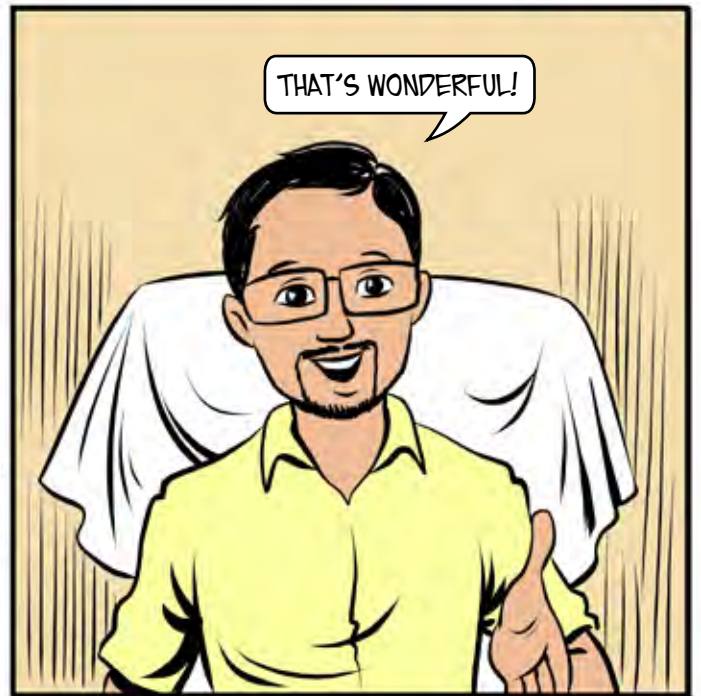
THANK YOU FOR SEEING US. WE LIVE IN AN AREA THAT HAS HAD ACUTE WATER SHORTAGE.



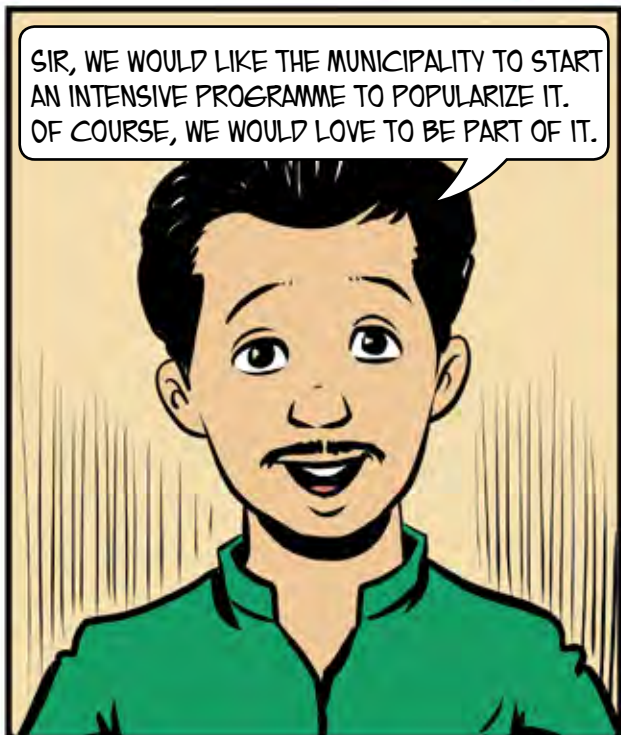
SO, WE'VE BUILT RAINWATER HARVESTING SYSTEMS AND ROOFTOP VEGETABLE GARDENS ON ALMOST ALL OUR HOUSES.



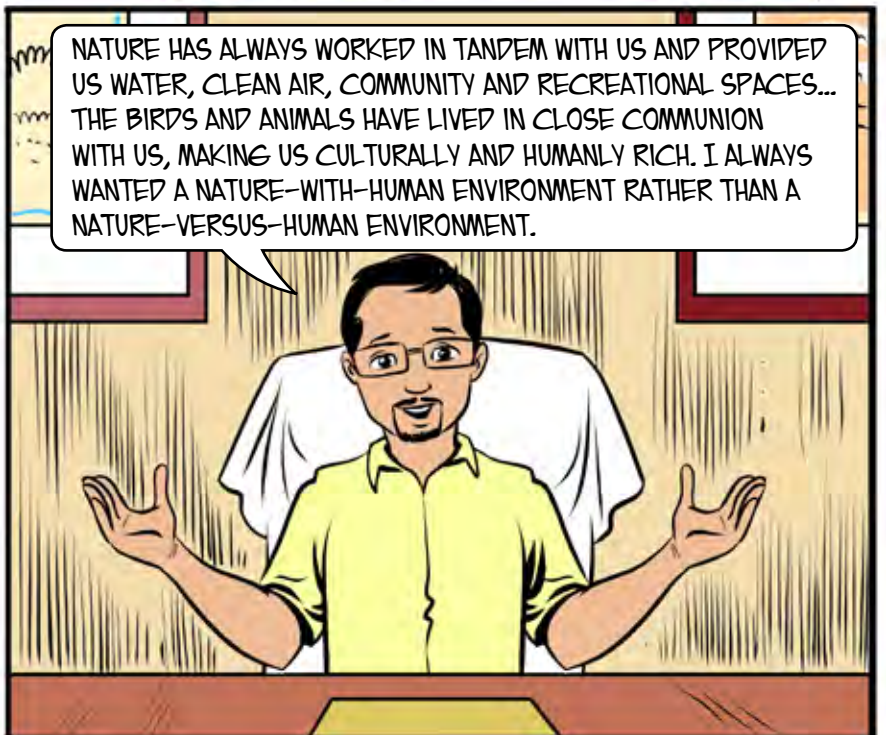
THAT'S WONDERFUL!



SIR, WE WOULD LIKE THE MUNICIPALITY TO START AN INTENSIVE PROGRAMME TO POPULARIZE IT. OF COURSE, WE WOULD LOVE TO BE PART OF IT.



NATURE HAS ALWAYS WORKED IN TANDEM WITH US AND PROVIDED US WATER, CLEAN AIR, COMMUNITY AND RECREATIONAL SPACES... THE BIRDS AND ANIMALS HAVE LIVED IN CLOSE COMMUNION WITH US, MAKING US CULTURALLY AND HUMANLY RICH. I ALWAYS WANTED A NATURE-WITH-HUMAN ENVIRONMENT RATHER THAN A NATURE-VERSUS-HUMAN ENVIRONMENT.



SIR, THE SITUATION IS SO BAD THAT OUR CHILDREN HAVE BECOME NATURE-DEFICIENT. THEY LIVE IN A WORLD THAT HAS NO CONNECTION TO THE BEATING OF THE CITY'S HEART, THE NATURAL ORDER OF THINGS.



WE HAVE A LOT TO DO. AND WE HAVE A LONG WAY TO GO. BUT WE MUST DO WHAT HAS TO BE DONE. BECAUSE THE LIVES OF THE POOREST IN THE CITY DEPEND ON US.



CHANGE CAN COME ONLY IF WE ALL OF US - THE GOVERNMENT, CIVIC GROUPS, COMMUNITY BODIES AND ORDINARY CITIZENS - COME TOGETHER.



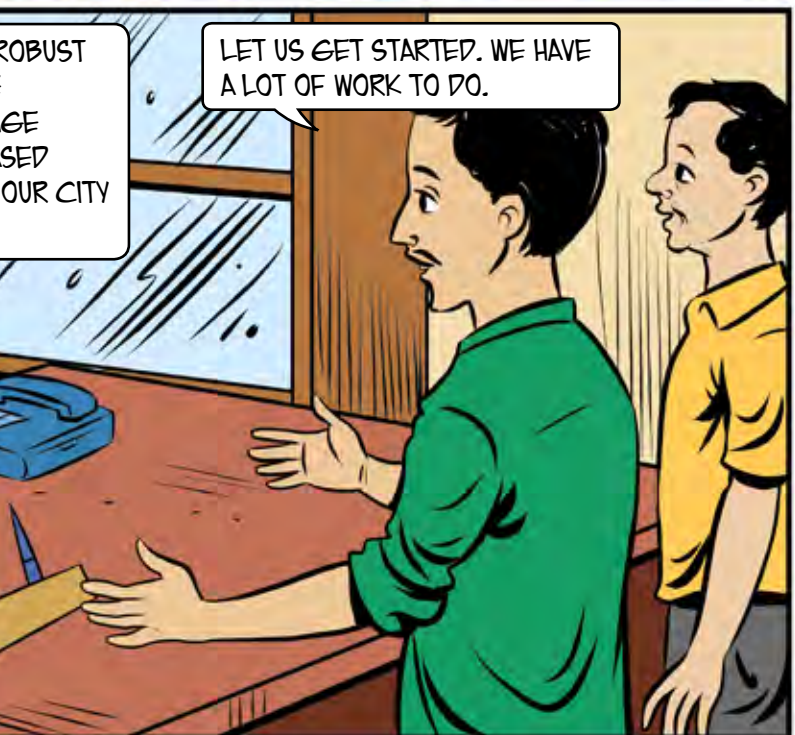
YOU'RE RIGHT. WITHOUT DEBATES BETWEEN URBAN CONSERVATIONISTS AND URBAN PLANNERS, WE AREN'T GOING TO GET ANYWHERE.

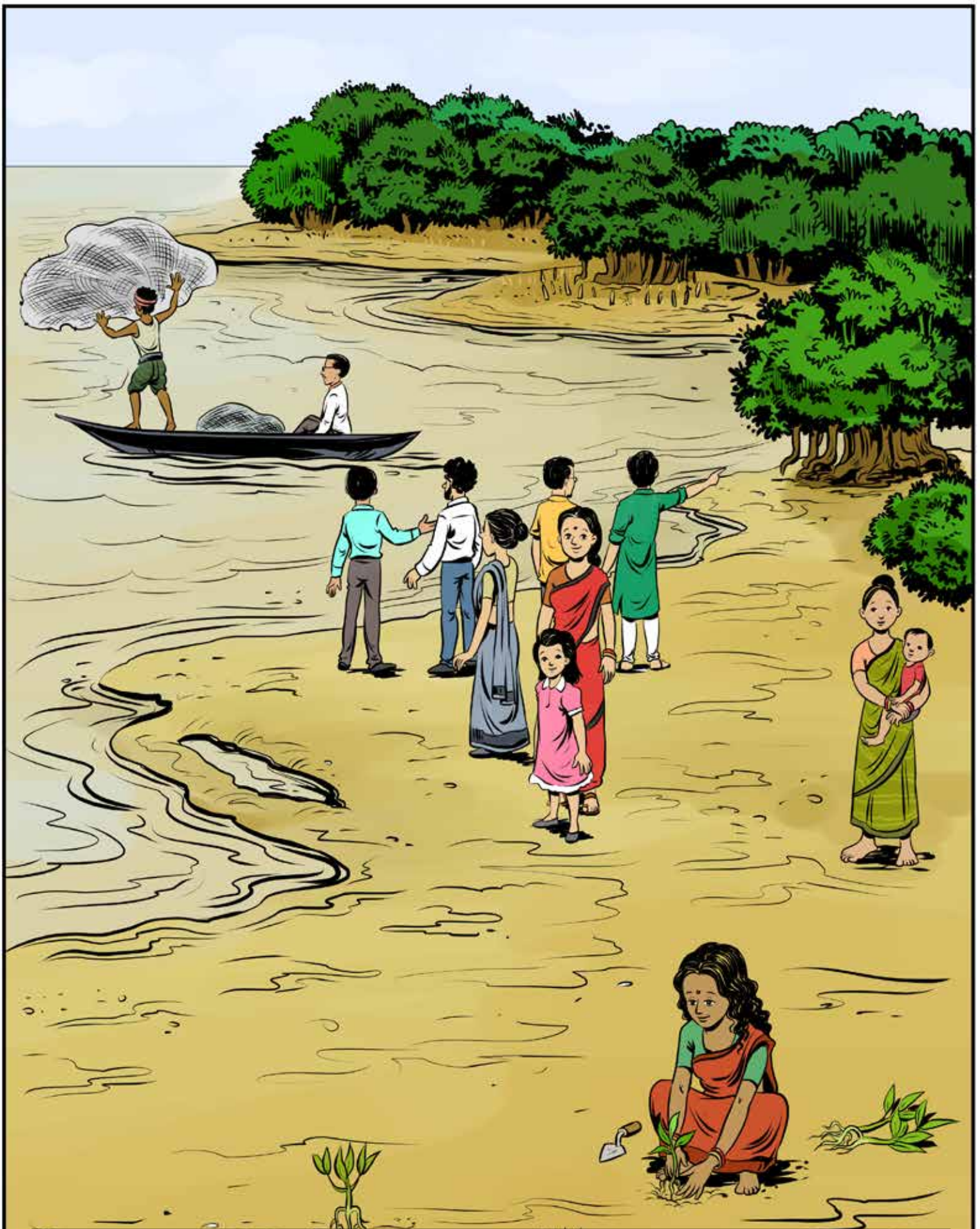


WE'LL HAVE TO DEVELOP A ROBUST PLAN THAT CAN LESSEN THE EFFECTS OF CLIMATE CHANGE AND INTEGRATE NATURE-BASED SOLUTIONS THAT WILL MAKE OUR CITY RESILIENT AND HEALTHY.



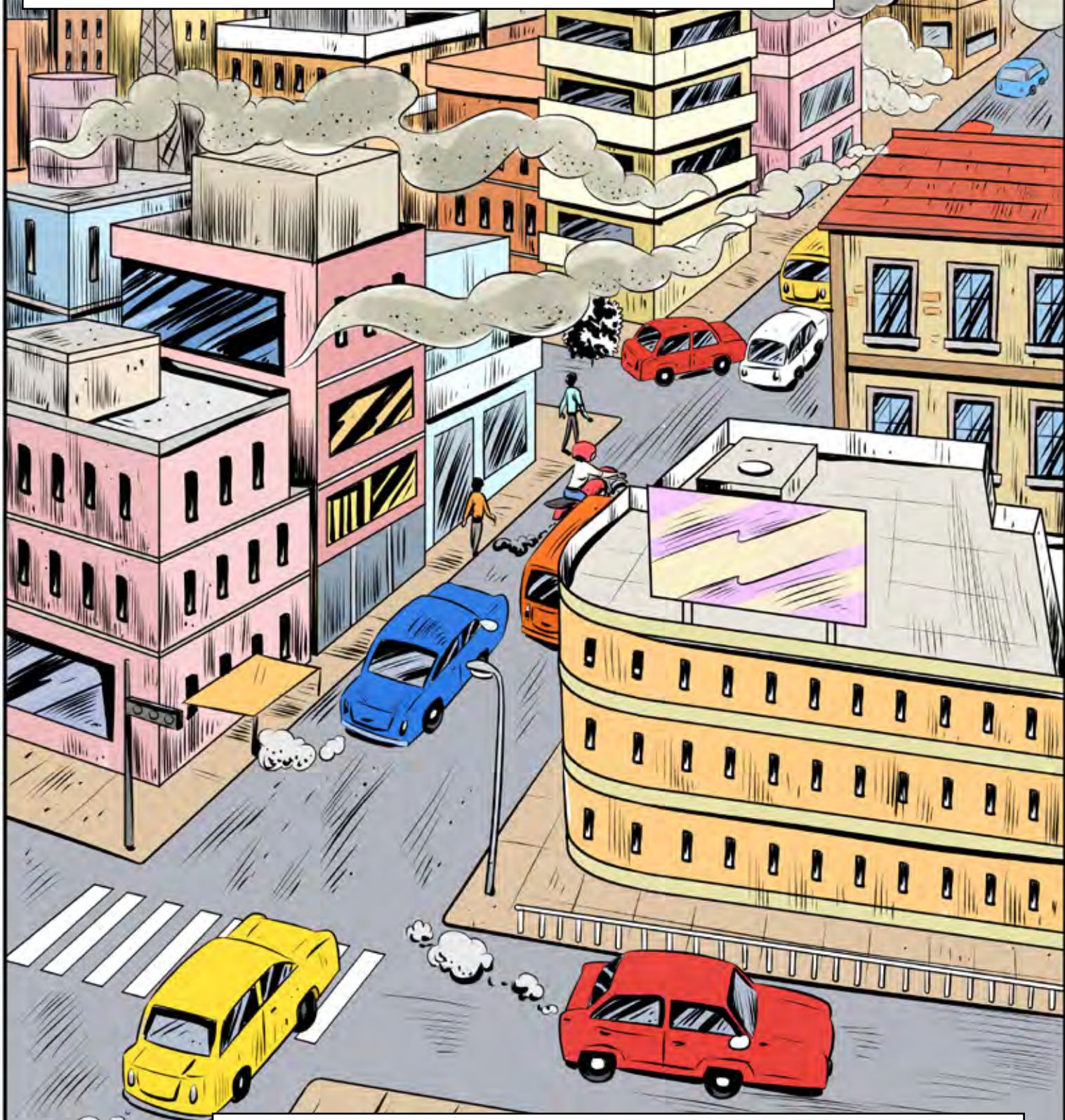
LET US GET STARTED. WE HAVE A LOT OF WORK TO DO.





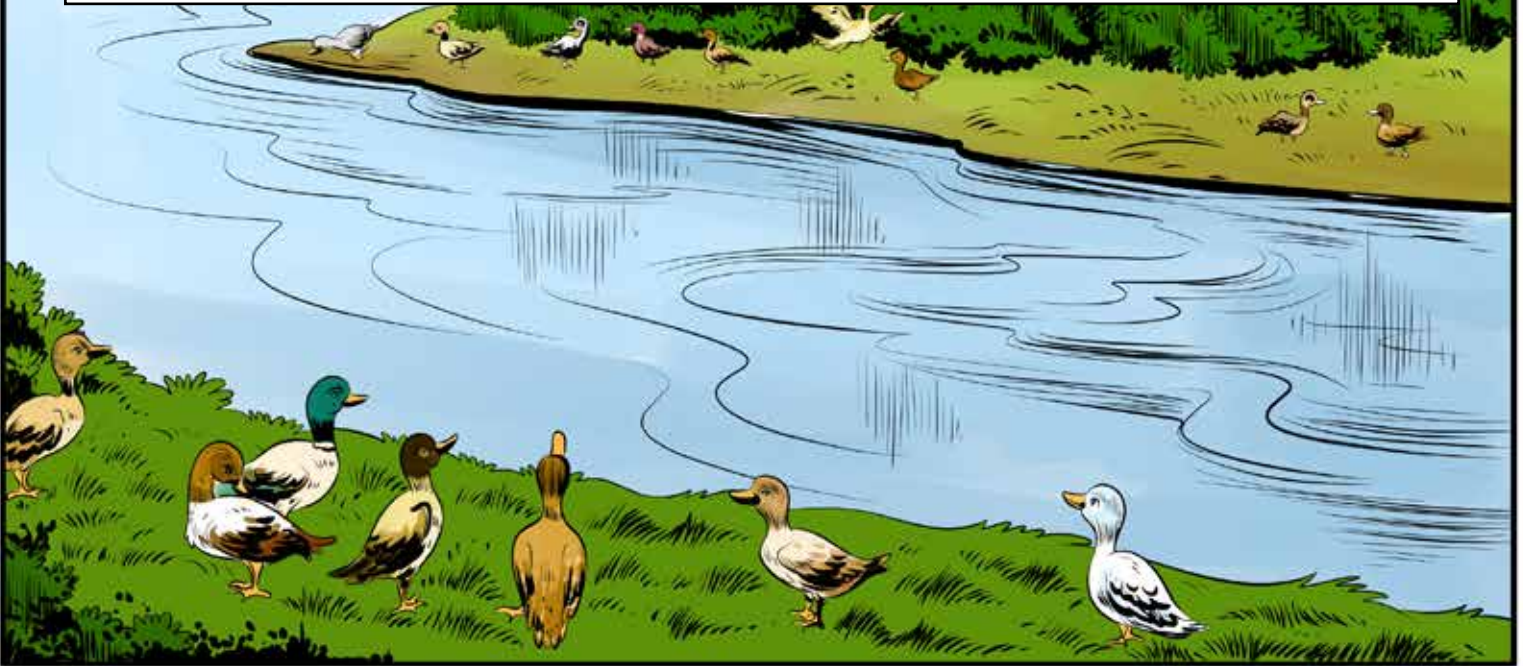
EARLY MORNING ON THE ISLAND: MOU IS PLANTING MANGROVE SAPLINGS. SHASHI IS IN A BOAT DRAGGING A SMALL FISHING NET IN THE WATER. LIFE IS HARD, UNFORGIVING ON THE ISLANDS. BUT MOU IS DOING HER SMALL BIT TO SAVE WHATEVER IS LEFT OF THE MANGROVE FORESTS. VIKRAM, ANITA, AMIT AND ALL THE OTHERS IN THE CITY DON'T KNOW THAT PEOPLE LIKE MOU - RIGHT ON THE EDGE OF A COMING CLIMATE CRISIS - UNKNOWN TO THEM, ARE LOOKING OUT FOR THEM.

For centuries, cities have led the world innovation and enterprise. But cities have grown to gigantic sizes, consuming most of the world's energy and contributing most of the CO₂ emissions. Now climate change threatens the very fabric of city existence. The effects of climate change and unplanned urbanization are converging dangerously. Most urban areas are along coastlines. Climate change will hit these urban populations severely.



But cities have the efficiency, innovation and resilience to push back and lessen the effects of climate change. Here we present a few stories of how some cities are planning and implementing solutions that are nature-based so that the effects of climate change can be managed and mitigated.

YAMUNA BIODIVERSITY PARK: Located in Delhi, the Yamuna Biodiversity Park is a successful example of eco-restoration. Spread over an area of 701.55 ha, the park today hosts the lost native riverine vegetation. . The area was earlier a barren salt pan. Initiated in 2002, the Park has been developed by the Centre for Environmental Management of Degraded Ecosystems (CEMDE), University of Delhi and managed by the Delhi Development Authority (DDA). Ecosystem restoration uses nature-based solutions such as development of wetlands and carefully thought out scientifically informed plantations. This park kick started the establishment of six more eco-restored parks. These parks conserve and preserve the critical ecosystems and the services provided by them to the city.



KOCHI: The high density of population in Kochi has strained the city's water supply and its sanitation system. The city is vulnerable to increased temperatures, heavy rainfall and flooding and rise in sea levels. The government, environmentalists, urban planners and ICLEI- Local Governments for Sustainability, South Asia have converged to develop a local biodiversity strategy and action plan to make Kochi climate resistant. Among the many measures that will be undertaken are a biodiversity interpretation zone and a butterfly garden at Subhash Bose Park and restoration of Thevara Canal, now completely choked because of dumping and siltation.



PICHAVARAM MANGROVE FORESTS, TAMIL NADU: Just four hours from Chennai is the world's second largest mangrove forest, Pichavarm spread across 1,100 hectares. The mangroves were degraded due to large-scale felling of the mangrove trees, mostly for fuel wood and fodder. Between 1987 and 1998, the Tamil Nadu Forest Department began efforts to encourage the growth of the mangroves. Seeds, larvae of fish and shrimps were introduced. Endangered species of mangroves were planted along the shorelines.



MOOKANERI LAKE RESTORATION, SALEM, TAMIL NADU: Mookaneri, a beautiful lake, is spread over 58 acres. But Mookaneri wasn't beautiful till a few years ago. It had become a stinking cesspool of raw domestic sewage and plastic waste. The lake was dying. In 2010, the Salem Citizens Forum with the people of Salem contributing money began cleaning up the lake. Islands were made and planted with saplings like neem and jamun trees. The medicinal plants planted on the islands purify and filter the water. The islands now bring many birds and some rare species like the Great Flamingo, Baillon's Crake and the Whiskered Tern.





ICLEI
Local
Governments
for Sustainability

ICLEI-Local Governments for Sustainability, South Asia
C-3 Green Park Extension
New Delhi-110016
Tel: +91 - 11 - 4974 7200; Email: iclei-southasia@iclei.org